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THE SOURCES OF A PRIORI KNOWLEDGE:
A COMMENTARY ON KANT'S NOTIONS
OF SENSIBILITY, UNDERSTANDING, AND REASON

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By
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* * * * *

The Ohio State University
1980

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A NOTE ON CITATIONS IN THE TEXT

Citations to the writings of Immanuel Kant will be found in the following essay primarily within parentheses in the text. The following abbreviations are employed:


... I beseech those who have the interests of philosophy at heart (which is more than is the case with most people) that, if they find themselves convinced by these and the following considerations, they be careful to preserve the expression 'idea' in its original meaning, that it may not become one of those expressions which are commonly used to indicate any and every species of representation, in a happy-go-lucky confusion, to the consequent detriment of science. There is no lack of terms suitable for each kind of representation, that we should thus needlessly encroach upon the province of any one of them. Their serial arrangement is as follows. The genus is representation in general (repraesentatio). Subordinate to it stands representation with consciousness (perceptio). A perception which relates solely to the subject as the modification of its state is sensation (sensatio), an objective perception is knowledge (cognitio). This is either intuition or concept (intuitus vel conceptus). The former relates immediately to the object and is single, the latter refers to it mediately by means of a feature which several things may have in common. The concept is either an empirical or a pure concept. The pure concept, in so far as it has its origin in the understanding alone (not in the pure image of sensibility), is called a notion. A concept formed from notions and transcending the possibility of experience is an idea or concept of reason. Anyone who has familiarised himself with these distinctions must find it intolerable to hear the representation of the colour, red, called an idea. It ought not even to be called a concept of understanding, a notion.

—Immanuel Kant, Critique of Pure Reason
CHAPTER I
INTRODUCTION

In concluding the Prolegomena to Any Future Metaphysics, Immanuel Kant prescribes the elements that he believes essential in order for the natural disposition of reason that he names 'metaphysics' to be regarded as a science—to be, that is, considered a systematic and coherent body of cognitions which rests on the idea of a whole that precedes the parts.¹ He writes:

In order that as a science metaphysics may be entitled to claim, not mere fallacious plausibility, but insight and conviction, a critique of reason itself must exhibit the whole stock of a priori concepts, their division according to their various sources (sensibility, understanding, and reason), together with a complete table of them, the analysis of all these concepts, with all their consequences, and especially the possibility of synthetical knowledge a priori by means of a deduction of these concepts, the principles and the bounds of their application, all in a complete system.

(Prol., p. 114)

In the following chapters, I investigate what Kant here identifies as the sources of our a priori knowledge—namely, sensibility, understanding, and reason.

The purpose of chapter two, "Kant's Given," is to determine the character of the objects of sensibility. On this issue hinge the related questions of what Kant means
when he calls himself a transcendental idealist and of whether Kant is, as P. F. Strawson remarks, "closer to Berkeley than he acknowledges." To provide a context for my explication of Kant's refutation of idealism, I introduce his account of ordinary idealism and take up his own special version of idealism. As Kant indicates in the *Prolegomena,* "my so-called (properly critical) idealism is of quite a special character, in that it subverts the ordinary idealism and in that only through it all a priori knowledge, even that of geometry, receives objective reality, which, without my demonstrated ideality of space and time, could not be maintained by the most zealous realists" (*Prol.*, p. 124). Kant's refutation of idealism depends on establishing a necessary interrelationship between our intuitions of space and time; this is done wholly in terms of the formal characteristics of space and time, without reference to Kant's discussion of our capacity (receptivity) for receiving representations. In the final section of chapter two, I deal with Kant's discussion of receptivity and with the spontaneity that must be combined with it in order for cognition to take place.

Having in chapter two established the character of intuition, to which all thought, Kant says, as a means of knowing an object is directed, I turn in chapter three to the sources of a priori knowledge in mathematics and
natural science. Robert Paul Wolff, in his study *Kant's Theory of Mental Activity*, provides a convenient foil for this discussion; his reading of Kant's regressive method in the *Prolegomena* leads Wolff to interpret the conditions of knowledge in a way that, I think, is mistaken and obscures Kant's solution to the problem of how synthetic judgments in mathematics and natural science are possible *a priori*. In this chapter I attempt to explicate Kant's notions of sensibility as the source of mathematical knowledge and of the understanding as a source of our knowledge of nature. Kant's treatment of the understanding as a source of knowledge is a reply to Hume's scepticism with respect to causality.

The aim of chapter four is to explicate in its particulars Kant's claim that reason is our highest faculty "for elaborating the matter of intuition and bringing it under the highest unity of thought." To accomplish this requires distinguishing between the unity of understanding ("the unity of appearances by means of rules") and the unity of reason ("the unity of the rules of understanding under principles"). Fundamental to an understanding of the function of reason on Kant's view is his discussion of the conditions of thought; I undertake to provide this understanding through an examination of the logical apparatus that underlies the origination of the
transcendental ideas of reason, as Kant explains and defends that apparatus in both the Logic and the Critique of Pure Reason. Chapter four concludes with a discussion of the transcendental ideas insofar as they guide our investigation of the three kinds of relations which, Kant argues, "are to be universally found in all our representations"—namely, relation to the subject, relation to objects as appearances, and relation to objects in general.

Toward the conclusion of his well-known essay on sensibility and understanding (from Science and Metaphysics: Variations on Kantian Themes), Wilfrid Sellars speaks of philosophy's having begun a "slow climb 'back to Kant' which is still underway." With this in mind, in chapter five I examine the work of a modern thinker, Thomas Kuhn, and discuss some points of agreement and disagreement between Kant's thought and Kuhn's methodological and historiographic discoveries, including some treatment of implications of Kant's thought, as explicated in the present study, for issues that Kuhn raises in the philosophy of science. After a brief summary of Kuhn's essay The Structure of Scientific Revolutions, I contrast Kuhn's views concerning sensation with Kant's, and go on to show how, in spite of several points of similarity, the differences in their accounts of sensation lead to very different assessments of the possibility of a neutral observation language. This contrast
with Kuhn points up, I believe, the fundamentally philosophical character of Kant's notions of sensibility, understanding, and reason as the sources of our a priori knowledge.

Throughout the following analysis of Kant, my method has been to read his texts intensively and sympathetically, with an eye not to criticising him but rather to what I take to be a priori enterprise, namely understanding him in his own terms. So, for example, I have taken seriously Kant's insistence on the importance of the logical framework to which he refers throughout his work, and I have done this in spite of the widespread view expressed by P. F. Strawson in *The Bounds of Sense*: "The artificial and elaborate symmetry of this imposed structure has a character which, if anything in philosophy deserves the title of baroque, deserves that title. But this is a feature which, though it may cause us unnecessary trouble and give us irrelevant pleasure, we can in the end discount without anxiety."¹ I assume this sympathetic standpoint for reasons that are well expressed by Thomas Kuhn in the preface to his collected essays, *The Essential Tension: Selected Studies in Scientific Tradition and Change*: "... there are many ways to read a text, and the ones most accessible to a modern are often inappropriate when applied to the past... . . . When reading the works of an important
thinker, look first for the apparent absurdities in the text and ask yourself how a sensible person could have written them. I have assumed throughout that Kant was a sensible person and have preferred to seek ways to resolve apparent difficulties in the text rather than to dismiss them as breakdowns in Kant's argument. A corollary methodological principle has been to seek to see Kant whole. This principle arises out of the unity of Kant's enterprise and has permitted me, often in a single page or paragraph, to refer to widely separated passages in Kant's writings to determine the nuances of his argument. This unity underlies Kant's outline of the elements that a critique of reason must include, as cited at the opening of this introduction. Kant makes the point explicit early in the Prolegomena when he writes: "... pure reason is a sphere so separate and self-contained that we cannot touch a part without affecting all the rest..." (Prol., p. 11).
Footnotes to Chapter I

1 Here I conflate Kant's remarks in Logic, pp. 28 and 79, for a definition of "science."


4 Strawson, p. 24.

KANT'S GIVEN

Introduction--Transcendental Idealism

Kant calls himself a "transcendental idealist." In essence, this means that although he views what he calls pure (versus empirical) concepts as having a "transcendental meaning" (CPR, p. 265) as principles from which the possibility of other a priori synthetic knowledge--knowledge concerning objects of a possible empirical intuition--can be understood,\(^1\) he denies these concepts a "transcendental employment," that is, an application to things in general and in themselves, apart from our sensibility.\(^2\) At the root of Kant's transcendental idealism is his view that what is given to us by means of sensible intuition is mere appearance, not the representation of objects as they are in themselves apart from our sensibility. The basis for this claim is that space and time are pure forms of sensible intuition, and nothing more.\(^3\) That is to say, although for Kant, space and time are empirically real and represent two sources of knowledge from which bodies of a priori synthetic knowledge concerning objects (appearances) which allow of
being given to our senses can be derived, he denies that they have the absolute or transcendental reality of conditions or properties of things in general and in themselves, independently of any reference to the form of our sensibility. According to Kant, space and time apply to objects only insofar as objects are viewed as appearances, and do not present things as they are in themselves. Briefly, Kant's transcendental idealism rests on his contention that space and time are transcendentally ideal.

What we have meant to say is that all our intuition is nothing but the representation of appearance; that the things which we intuit are not in themselves what we intuit them as being, nor their relations so constituted in themselves as they appear to us, and that if the subject, or even only the subjective constitution of the senses in general, be removed, the whole constitution and all the relations of objects in space and time, nay space and time themselves, would vanish. As appearances, they cannot exist in themselves, but only in us. What objects may be in themselves, and apart from all this receptivity of our sensibility, remains completely unknown to us.

(CPR, p. 82)

An important question, then, is whether Kant's so-called transcendental idealism commits him ultimately to the same ontology as ordinary idealism, which Kant claims his view enables him to refute. The ordinary idealist denies that ordinary objects like tables and chairs are real. Idealism consists in the assertion that there are "none but thinking beings, all other things which we think are perceived in intuition, being nothing but
representations in the thinking beings, to which no object external to them in fact corresponds" (Prol., p. 36). Kant claims that "the things which we intuit are not in themselves what we intuit them as being," since as appearances, "they cannot exist in themselves, but only in us" (CPR, p. 82). This claim seems to leave open the possibility of some connection between our representations and a realm of things in themselves that exist independently of the representations in us. This claim is also very close to the assertion that the being of the objects of sense experience is exhausted in their being perceived, so that what the mind knows by means of sense experience exists in the mind as accidents in a substance. A possible criticism of Kant is therefore that his view is simply a variation of the ordinary idealism he claims to refute.

Before examining this criticism of Kant in greater detail, it might be worth sketching Kant's position with respect to so-called ordinary idealism.

Kant's Account of Ordinary Idealism

The subjective idealism that Kant responded to is the view that the existence of things outside us, of actual external objects corresponding to the representations of such objects in us, cannot be known through immediate perception. On the contrary, one's own existence qua
thinking being is the sole "object" of immediate perception, and that the contents of inner sense, the representations that are in us qua thinking beings, are demonstrably real only insofar as they exist in us qua thinking beings. To be is, therefore, to be perceived. The objects of immediate sense experience, what the mind knows by means of the senses, are not ordinary objects such as tables and chairs that exist in space independently of mind; they are merely representations existing in us qua thinking beings. According to Kant, idealism assumes that the mind is given as a thing in itself and presupposes that space and time are transcendentally real. The ordinary idealist's assumption, on Kant's account, is that the time in which the representations in us are apprehended belongs to mind absolutely, as a condition or property of mind as such, independently of any reference to our form of sensibility. Similarly, it is assumed that ordinary objects, the real in space, would be real in space "even when abstraction has been made of all the subjective conditions of intuition" (CPR, p. 71), space too being taken to have transcendental reality. Thus, assuming that by objects of immediate experience we mean the contents of consciousness as such, it follows that we cannot know for sure whether there is anything real in space outside us that corresponds to the representations of such objects in us qua thinking beings. The problem, of course,
even apart from the special assumptions of ordinary idealism, is the problem of what it means to speak of our representations as "standing for" an object.

Everything, every representation even, in so far as we are conscious of it, may be entitled object. But it is a question for deeper inquiry what the word 'object' ought to signify in respect of appearances when these are viewed not in so far as they are (as representations) objects, but only in so far as they stand for an object. (CPR, p. 219)

For the idealist, however, the objects of immediate perception are restricted to the representations in us simply in virtue of their being representations, that is, as apprehended by the mind in inner sense. Since "our apprehension of the manifold of appearance is always successive" (CPR, p. 213), the contents of immediate experience must likewise be determined in strict succession. Even in the case of apparently outer intuition, where what is apprehended successively in time is nevertheless represented as in itself coexistent and enduring, all that is actually given intuitively, according to the idealist as Kant describes him, are representations in us, and those, since they are apprehended successively, are always changing. 6

The idealist can, of course, agree with Kant that "the apprehension of the manifold in the appearance of a house which stands before me is successive. The question then arises, whether the manifold of the house is also in itself
successive. This, however, is what no one will grant" (CPR, p. 220).

But the idealist denies that the house itself can be immediately perceived. What is given in immediate experience is not the house itself but only the representation of a house generated by the mind in inner sense; whether we recognize it as such or not, the generation of such a representation (beginning, for example, with the roof and ending with the basement) takes place by means of a "successive synthesis of part to part" (CPR, p. 199). By positing its representations in this way, literally generating them in time through a successive synthesis of their parts, the mind is clearly "affected through its own activity" (CPR, p. 87), which the idealist takes to be the activity of mind as it is in itself. However, for the idealist, there is no immediate evidence that the representations in us have objective correlates in actual space, apart from their representations in us. Once again, the reality of objects in space (objects of so-called outer perception) is, for the idealist, the transcendental reality of existing in space outside the sphere of immediate perception, apart from our sensibility. On this view, the only relation possible between our representations of objects in space and real objects in space would be a causal one, and only by establishing such a relation could we ever come to know
that objects in space actually exist. However, the idealist is bothered by the uncertainty of causal arguments—in this case, that knowledge of things existing in space is possible by inferring from given effects, the representations in us, to determinate causes outside us, "taking the inner perception as the effect of which something external is the proximate cause" ([CPR], p. 345). Kant summarizes the relevant points of his understanding of ordinary idealism as follows:

Idealism assume[s] that the only immediate experience is inner experience, and that from it we can only infer outer things—and this, moreover, only in an untrustworthy manner, as in all cases where we are inferring from given effects to determinate causes. ([CPR], p. 245)

Now the inference from a given effect to a determinate cause is always uncertain, since the effect may be due to more than one cause. Accordingly, as regards the relation of the perception to its causes, it always remains doubtful whether the cause be internal or external, whether, that is to say, all the so-called outer perceptions are not a mere play of our inner sense, or whether they stand in relation to actual objects as their causes. ([CPR], p. 345)

Perception is a modification of inner sense, and the existence of the outer object [i.e., the existence of something in space apart from our sensibility] can be added to it only in thought, as being its outer cause, and accordingly as being inferred. ([CPR], p. 345)

The term 'idealist' is not, therefore, to be understood as applying to those who deny the existence of external objects of the senses, but only to those who do not admit that their existence is known through immediate perception, and who therefore conclude that we can never,
by way of any possible experience, be completely certain as to their reality.
(CPR, p. 345)

As these quotations clearly indicate, idealism, at least on Kant's view of it, takes for granted that the mind's intuition of itself and of its inner states (consciousness of one's own existence as determined in time) is possible without having to grant the existence of anything genuinely permanent in perception. For the idealist, according to Kant, our representations of ordinary objects are merely creations of mind; all that is real is mind and the activity of mind whereby such representations are generated through the strictly successive synthesis of part to part.Appearances notwithstanding, all there really is to be apprehended is the activity of the mind and its contents, which exist in the mind in strictly temporal, successive order, that is, in "bare succession": "... in bare succession existence is always vanishing and recommencing, and never has the least magnitude" (CPR, p. 214). Nothing but the mind persists. For the idealist, what is given empirically is in succession, not coexistent or enduring. Since that succession must be represented in time, and since, for the idealist, there is nothing permanent in perception that represents time in general, idealism entails the view that time can by itself be perceived.
Kant's Refutation of Idealism—The Impossibility of Perceiving Time by Itself

Kant's refutation of idealism must be understood to involve rejection of this last claim. "Time," he claims, "cannot by itself be perceived" (CPR, p. 213). According to Kant, time is an a priori form of sensible intuition to which all so-called "synthesis of apprehension" must conform. Having to conform to time qua form of intuition means, of course, that apprehension of a temporal manifold must take place through "that successive advance from one moment to another, whereby through the parts of time and their addition a determinate time-magnitude is generated" (CPR, p. 198). In other words, time is an extensive magnitude, and must be apprehended accordingly: the representation of its parts make possible, and therefore necessarily precedes, the representation of the whole.

Since the representation of time is at issue, it is important to understand why—or perhaps instead, in what sense—the representation of the parts of time makes possible, and therefore necessarily precedes, the representation of the whole. Thus, it should first be noted that time is a continuous magnitude. Since, therefore, no part of time or advance in time is the smallest possible, distinct moments in time are never immediately sequential. Moments in time are only limits, "that is, mere positions which limit . . . time" (CPR, p. 204). Thus, the intuition
of things existing at different times (successively) always presupposes the intuition of time; our apprehension of the successive advance from one moment or time to another, in order to conform to the formal conditions underlying succession in time itself qua form of intuition, must include apprehension of the time as such, the unit of time enclosed between the two moments. Thus, "only in so far as the mind distinguishes the time in the sequence of one impression upon another" (CPR, p. 131) does "succession . . . ever come within our perception" (CPR, p. 74). Since the parts of time are all in succession to one another, and since time is a continuous magnitude, our intuition or apprehension of time as such—that is, the intuitive apprehension of some determinate period of time as extending from one moment to another—in order to conform to time itself qua form of intuition, must advance continuously, without interruption, through all the successive parts of time one after another, and must involve holding these parts (whether we are conscious of them as a manifold or not) together in a single, "original" representation (intuition) of the given time as such.

Space and time are represented a priori not merely as forms of sensible intuition, but as themselves intuitions which contain a manifold [of their own], and therefore are represented with the determination of the unity of this manifold. (CPR, p. 170)
sensibility, the status of time as a form of intuition means simply that our apprehension of what is given to us by means of sensibility must take place in time, in conformity with the sorts of relations possible in time.

From the standpoint of our knowledge of objects, however, it is not enough for the mind to "run through" and "hold together" the given manifold if we are not at the same time conscious of the manifold as a manifold. But to be conscious of the given manifold as a manifold, the mind, insofar as it must apprehend the manifold in time, must consciously distinguish successive parts of time as such—which Kant claims must be done through limitations of the "one single time that underlies" our apprehension of the manifold (CPR, p. 75). Thus, "since no part of [time] can be given save as enclosed between limits" (CPR, p. 204), that is, as a successive advance from one moment to another, the parts of time must themselves all be times, distinguishable units of time, and must be intuited one after another, whether or not we consciously distinguish them from one another. However, for the manifold in time to be represented as a manifold, it must be intuited as an aggregate; we must be conscious of the successive parts of time as such, each of which is generated by apprehending the manifold given by means of sensibility in the same temporal way. The intuition of the "whole" time must
therefore be generated through repetition of this "ever-ceasing synthesis" of apprehension (CPR, p. 204). But the intuition of the whole time as such—as containing a manifold of its own—also requires consciousness that the units, which, having been "successively intuited, and thereupon also reproduced, . . . now hover before [us], have been added to one another in succession" (CPR, p. 134). In the final representation of time as containing a manifold, the individual parts of time, and every quantity of time qua sum of the given parts of time, can be determinately represented only insofar as the mind takes note of "positions" (moments, or limits) in time, "only through limitation of the single time underlying" the apprehension of what is given by means of sensibility (CPR, p. 75).

It is in the sense defined above, therefore, that the mind, in its apprehension of time as containing a manifold, having to conform to time itself qua form of intuition, thinks to itself "only that successive advance from one moment to another, whereby through the parts of time and their addition a determinate time-magnitude is generated" (CPR, p. 198). Similarly, it is in this sense that Kant maintains that the representation of the parts of time makes possible, and therefore necessarily precedes, the representation of the whole, even though the representation of time must be presupposed as underlying the
representation of the whole \textit{a priori}.^9

It must be remembered here that our apprehension of a temporal magnitude is the apprehension of a manifold given to us by means of sensibility, and that it must agree with the formal conditions of time itself \textit{qua} form of sensibility. In other words, what is to be represented in intuition—the object of intuition, albeit mere appearance—determines the way in which we apprehend the manifold given to us by means of sensibility, and does so \textit{a priori}, or objectively.

Now we find that our thought of the relation of all knowledge to its object carries with it an element of necessity; the object is viewed as that which prevents our modes of knowledge from being haphazard or arbitrary, and which determines them \textit{a priori} in some definite fashion. (\textit{CPR}, p. 134)

There is, therefore, a distinction to be drawn between the object of intuition and the actual intuition itself: "intuition takes place only in so far as the object is given [my emphasis] to us" (\textit{CPR}, p. 65). The object, of course, is a manifold in time and can be represented as a manifold only insofar as it is determined in time \textit{qua} form of inner sense. Thus, it must be intuited as an aggregate,"as contained \textit{in a single} representation" (\textit{CPR}, p. 132).

Assume now that we can perceive time by itself, that there need be nothing permanent in perception. The parts of time are not coexistent; they are all in succession to one another. Therefore, the antecedent parts of time cease to
exist as time advances to those that follow. In order for our apprehension to conform to time qua form of sensible intuition, our apprehension of time must be successive. However, since in bare succession time is always vanishing and recommencing and never has the least magnitude, our apprehension of bare succession likewise "occupies only an instant" (CPR, p. 202). Unlike the case above in which our representation of time was generated by a successive advance from one moment to another, through the parts of time and their addition, and thus contained combination of the parts of time in a single representation of the whole, the constituents of our representation of time in this case would not be parts of time qua times, but merely the bare succession of these parts, mere limits between which the parts of time must be enclosed. Such limits represent mere positions in time. However, as Kant points out,

positions always presuppose the intuitions which they limit or are intended to limit; and out of mere positions viewed as constituents capable of being given prior to [the formal intuition of] time, [no such intuition] can be constructed. (CPR, p. 204)

It follows from this that time by itself cannot be perceived, which is a first step toward the refutation of ordinary idealism.
Human cognition must be directed, according to Kant, toward a manifold given to us by means of sensibility: intuition and therefore all of the higher functions of human cognition, which look to intuition for their objects, take place and are possible "only in so far as the object [manifold] is given to us by means of sensibility" (CPR, p. 65). Sensibility is "the capacity (receptivity) for receiving representations through the mode in which we are affected by objects" (CPR, p. 65)—hence, the means by which objects (a manifold) are first given to us. Intuition, the immediate knowledge or representation of the given manifold (object) as a manifold, presupposes the mind's apprehension of what has been given by means of sensibility in accordance with certain "forms of outer and inner sensible intuition" (CPR, p. 170), in terms of which the given manifold is "ordered, connected, and brought into relation" (CPR, p. 131). In essence, "everything in our knowledge which belongs to intuition ... contains nothing but mere relations" (CPR, p. 87). In the case of human intuition, the synthesis of apprehension is a successive synthesis and is therefore "subject to time" "(CPR, p. 131). That is to say that the mind's apprehension of the given manifold, "the undetermined object of an empirical intuition" (CPR, p. 65), takes place in time: "our apprehension is always successive,
and is therefore always changing" (CPRe, p. 213). The mind's apprehension of what is given by means of sensibility represents "the mode in which the mind is affected through its own [my emphasis] activity" (CPRe, p. 87), and therefore underlies the mind's intuition of itself and of its inner states, making time the formal condition of so-called inner intuition or inner sense.

As shown above, however, time cannot by itself be perceived, since the parts of time are always vanishing and recommencing and never have the least magnitude. Thus, although what is given by means of sensibility must be apprehended in time qua form of inner intuition, what is apprehended—namely, the given manifold—cannot be represented as a manifold merely through its "representation in apprehension" (CPRe, p. 220), which is always successive, since, in that case, so far as our consciousness is concerned, not merely time but existence itself, always vanishing and recommencing, would never have the least magnitude. In order to represent the given manifold as a manifold, the mind's apprehension of that manifold must take place in a way that allows the mind, over and above its successive synthesis of apprehension, to combine the manifold, "successively intuited, and thereupon also reproduced, into one representation" (CPRe, p. 134). The problem with representing time by itself had been that although
the apprehension of the parts of time in their bare succession serves merely to limit time, it cannot represent time, since bare succession "occupies only an instant" (CPR, pp. 202, 204). Indeed, the apprehension of bare succession actually presupposes the intuition of time that it limits or is intended to limit.\(^{12}\) What is needed, therefore, is a mode of representing a manifold in time that makes possible the representation of time itself as containing a manifold—hence, the representation of duration, of extensive magnitude, is needed, notwithstanding the necessity of a strictly temporal, successive apprehension or "generation" of such a representation (CPR, p. 134). In other words, the mind, in apprehending what is given to it by means of sensibility, must proceed in a way that makes possible, from a purely formal standpoint, the combination of "the manifold . . . in an intuitive representation" of time as containing a manifold—that is, as containing relations not only of succession but also of coexistence, and "or that which is coexistent with succession, the enduring."\(^{13}\) Hence, the mind must conform to a form of intuition that will permit combination of the manifold in terms of a purely formal intuition containing nothing but relations of coexistence, a representation generated in time and therefore represented as enduring. That is to say, the formal representation of time cannot be separated from the generation in time of a formal representation of a different sort,
one containing relations of coexistence instead of succession. Only in virtue of such a representation can the given manifold, qua undetermined object of empirical intuition (appearance), be represented as a manifold, "ordered, connected, and brought into relation" in time. In the case of human beings, coexistence is represented by means of the formal intuition of space.

We represent the time-sequence by a line, progressing to infinity, in which the manifold constitutes a series of one dimension only; and we [must] reason from the properties of this line to all the properties of time, with this one exception, that while the parts of the line are simultaneous the parts of time are always successive. (CPR, p. 77)

Even time itself we cannot represent, save in so far as we attend, in the drawing of a straight line (which has to serve as the outer figurative representation of time), merely to the act of the synthesis of the manifold whereby we successively determine inner sense, and in so doing attend to the succession of this determination in inner sense. Motion, as an act of the subject (not as a determination of an object), and therefore the synthesis of the manifold in space, first produces the concept of succession—if we abstract from this manifold and attend solely to the act through which we determine the inner sense according to its form. (CPR, p. 167)

Temporal intuition is therefore coextensive with the successive synthesis of the manifold in space. This means, however, that the mind (or more specifically the productive imagination) is kept from being "haphazard or arbitrary" by having to conform to the necessary a priori
representation of space that is presupposed in the representa-
tion of a manifold of appearance as being "outside and alongside one another" (CPR, p. 68). Further details aside, it is this "objectivity" of the representations of inner sense (namely, that they must conform to certain a priori forms of intuition) that makes possible our applications of the categories to them, and thus enables us to distinguish between dreams and real, objective experiences in a way that is consistent with the procedures of common life, "by investigating the connection of appearances in both space and time according to universal laws of experience" (Prol., p. 85).

Unlike the ordinary idealist, therefore, Kant holds that "all determination of time presupposes something permanent in perception" (CPR, p. 245), which, in our human case, means immediate perception (intuition) of objects in space, albeit qua mere appearances. Indeed, according to Kant, the synthesis of the manifold in space is what first produces and in that way makes possible the concept (representation) of succession, since it is our generation in time of the formal intuition of space that underlies the representation of permanence: "Space alone is determined as permanent, while time, and therefore everything that is in inner sense, is in constant flux" (CPR, p. 255). The idealist's assumption that the representation of things existing in space is illusory, that what can be
perceived immediately is confined to one's own existence qua thinking being and to the successive contents of inner sense, is therefore mistaken. On the contrary, the representation of a manifold in space—that is, of something permanent in perception—is itself a condition of the time-determination underlying so-called inner sense. "The representations of the outer senses," Kant says of the five bodily senses, "constitute the proper material with which we occupy our mind" (CPR, p. 87).

Thus, Kant can agree with the idealist that the distinction between our dreams and objective experience must be drawn without having to assume the reality of bodies (material substances) as things in themselves, determined as such in space apart from our sensibility. But he need not agree with the idealist that the representation of objects in space is therefore illusory, and that the immediate perception of one's own existence as determined in time represents a glimpse of the mind as it is in itself. In other words, Kant need not accept the subjective idealist's view that space and time are transcendentally real, determinations of objects as things in themselves. On Kant's view, space and time are both merely forms of sensible intuition. Our understanding of ourselves and of the objects of the senses, on his view, must develop empirically in accordance with the categories, as is appropriate to beings who depend on sensibility for
Kant's Refutation of Idealism—The Final Step

What was shown in the preceding section is that having to conform to space and time qua "a priori forms of outer and inner sensible intuition" (CPR, p. 170) gives human intuition at least the appearance of a certain objectivity, the object, the representation of the real in space and time, being viewed as that which prevents our modes of knowledge (sensible intuition) from being "haphazard or arbitrary, and which determines them a priori in some definite fashion." However, insofar as Kant represents space and time as mere forms of sensible intuition, prescribing how what is given by means of human sensibility must be ordered, connected, and brought into relation, they remain fundamentally subjective (transcendentally ideal), not valid of objects as such, or of things in themselves apart from our sensibility. Again,

we know nothing but our mode of perceiving [objects]—a mode which is peculiar to us, and not necessarily shared in by every being, though, certainly, by every human being. With this alone have we any concern. Space and time are its pure forms, and sensation in general its matter.
if the subject, or even only the subjective constitution of the senses in general, be removed, the whole constitution and all the relations of objects in space and time, nay space and time themselves, would vanish. As appearances, they cannot exist in themselves, but only in us. (CPR, p. 82)

Left here, of course, Kant's argument hardly seems to constitute a refutation of idealism; although by making clear the transcendental ideality of space and time Kant has refuted, I think, the idealist's assumptions "that only what is in ourselves [qua thinking beings] can be perceived immediately," and that one's own existence as a thinking being "is the sole object of a mere perception" (CPR, p. 344), he does so by reducing everything in immediate experience, including what he himself admits pertains to us qua thinking beings, to mere appearance. Moreover, although Kant claims that we have no immediate knowledge of the mind as it is in itself, it nevertheless seems clear that we must posit the existence of mind as underlying our immediate perception, and not at all clear that there is any analogous reason to posit the existence of things outside the mind. The idealist might respond that the mere representation of objects (the real) in space—the appearance or semblance of something permanent in perception, albeit illusory—suffices for time-determination, without having to assume the objective reality of these representations, the connected existence (necessary connection) of the given
manifold itself in space. Since apprehension is always successive, the connected existence of objects in space is never immediately apprehended: time is "the mediate condition of outer appearances" (CPR, p. 77). Equating the real with "representations of apprehension" (CPR, p. 220), the representation of something permanent in perception becomes illusory.

On Kant's view, however, the determination of time presupposes something genuinely permanent (objective) in perception, and "perception of this permanent is possible only through a thing outside [us] and not through the mere representation of a thing outside [us]" (CPR, p. 245). Kant's problem, therefore, is to make sense of this claim.

Insofar as space and time as forms of sensibility determine our representations a priori in a definite manner, the representations of space and time are objective—that is, they apply to objects of a possible experience. This is true even though our dependence on sensibility—the "matter of all appearance is given to us a posteriori only" (CPR, p. 66)—means that the existence of objects (appearances) in space and time must be determined empirically.

In experience . . . perceptions come together in accidental order, so that no necessity determining their connection is or can be revealed in the perceptions themselves. For apprehension is only a placing together of the manifold of empirical intuition; and we can find in it no representation of any necessity
which determines the appearances thus combined to have connected existence in space and time. (CPR, p. 209)

Although the synthesis of apprehension of the manifold given to us by means of sensibility must conform to space and time qua a priori forms of sensible intuition, the mere intuition of the manifold of appearance in space and time, which "contains combination of the manifold, given according to the form of sensibility, in an intuitive representation" (CPR, p. 170), is empirical, so that no necessity determining its connection is or can be revealed in the constituents of the manifold (in what is given according to the forms of sensibility) themselves. In other words, since we can find in the mere intuition of objects in space outside us no representation of any necessity which determines the appearances thus combined (namely, what has been given intuitively according to the forms of sensibility) to have connected existence in space and time, mere intuition is no proof of the existence of anything real in space apart from our representation. Hence, it is no proof of anything genuinely permanent in perception.

The appearances, in so far as they are objects of consciousness simply in virtue of being representations, are not in any way distinct from their apprehension, that is, from their reception in the synthesis of imagination; and we must therefore agree that the manifold of appearances is always generated in the mind successively. (CPR, pp. 219-220)

In other words, from the standpoint of their mere intuition,
the being of appearances consists in their being perceived: "they cannot exist in themselves, but only in us." Intuition as such involves combination of the manifold merely insofar as it has been apprehended empirically in accordance with the forms of sensibility—hence, as a homogeneous manifold, the constituents of which do not necessarily belong to one another.15

It would be out of place in this chapter to discuss the details of Kant's deduction of the categories. Here it is enough to point out that proof of their application to appearances—in particular, proof that "experience is possible only through the representation of a necessary connection of perceptions" (CPR, p. 208)—is all that is needed to complete Kant's refutation of idealism, since what must be overcome is the ordinary idealist's view that there is no necessity which determines the appearances themselves (the given) to have connected existence in space and time. With the deduction of the categories it follows that the existence of appearances with respect to one another in space and time must be determined a priori in a definite fashion, objectively, according to the categories of relation, and not in the haphazard or arbitrary way that would be true of representations having merely subjective validity. Unlike combination of the manifold in mere intuition, the categories of relation express combination of the manifold
"so far as its constituents necessarily belong to one another" (CPR, p. 198).

In summary, using Kant's own language as far as possible in order to show that the argument here does indeed belong to him, it must be noted, first, that what is given or presented by means of sensibility is represented in intuition as being in space and time: "in the representations of space and time we have a priori forms of outer and inner sensible intuition; and to these the synthesis of apprehension of the manifold of appearance must always conform, because in no other way can the synthesis take place at all" (CPR, p. 170). Second, Kant adds, the objects of intuition, insofar as they are "objects of consciousness simply in virtue of being representations,"16 are not "in any way distinct from their apprehension, that is from their reception in the synthesis of imagination" (CPR, p. 219), since even our representations of objects in space must be generated in the mind successively. Clearly, therefore, if the objects of intuition are viewed as objects merely insofar as they are representations, their being consists in being perceived—ultimately, a succession of sense impressions of various qualities and intensities. But Kant indicates, third, that we must also examine what the word "object" ought to signify in respect of our representations (in particular, in respect of our representations of space
and time as objects) when these are viewed not insofar as they are objects but only insofar as they stand for an object. In other words, we must know whether when "we represent to ourselves objects as outside us . . . in space" (CPR, p. 67), we are actually representing anything real at all (whether there is any necessity determining the given manifold itself, represented as object, and thus as containing combination of the manifold, to have connected existence in space and time), or whether all our "so-called outer perceptions are not a mere play of our inner sense" (CPR, p. 345). Kant, of course, holds that the given manifold does have connected existence (necessary connection) in space and time, so that to be is to be either substance or a determination of substance. The idealist denies that objects of the senses (ordinary objects—tables and chairs) have being of this sort. In response, Kant notes, fourth, that although the being (necessary connection) expressed by means of such concepts is "quite heterogeneous from empirical intuitions, and indeed from all sensible intuitions" (CPR, p. 180) which come together in experience only in accidental order and therefore cannot be met with in experience, it can nevertheless be deduced as a condition underlying the possibility of experience. Kant's deduction of the categories, therefore, also constitutes the final step in his refutation of idealism.
The Workings of Sensibility

Sensible intuition has two components. First, the mind must be sensibly affected in a certain way, actually being receptive to certain sensible impressions. Second, "awakened into action" (CPR, p. 41) by these impressions, the mind must take cognizance of having been thus affected, representing the sensible impressions objectively, in accordance with certain a priori forms of outer and inner sensible intuition as sensations, the effects of an object "upon the faculty of representation, so far as we are affected by it" (CPR, p. 65).17

The sensible impressions themselves are strictly a "raw material" (CPR, p. 41) for cognition, "given to us a posteriori only" (CPR, p. 66). Although worked up into a knowledge of experience, they do not "of themselves yield knowledge of any object, least of all any a priori knowledge" (CPR, p. 73). Of themselves, each impression is completely foreign to every other, standing apart in isolation, whereas "knowledge is [essentially] a whole in which representations stand compared and connected" (CPR, p. 130). In mere receptivity of impressions, there is no cognition, no combining and connecting, at all, not even of the mind as such as having been affected in a certain way. "Apprehension by means merely of sensation occupies only an instant, if, that is, I do not take into account the succession of
different sensations" (CPR, p. 202). Additionally, each representation, "in so far as it is contained in a single moment, can never be anything but absolute unity" (CPR, p. 131). Intuition takes place only when receptivity has been "combined with spontaneity," that is, only when the "modifications of the mind" (CPR, pp. 130, 131) that occur in sensation have been represented objectively in accordance with space and time qua a priori forms of outer and inner sensible intuition. What is thereby represented is, of course, represented subject to formal conditions of outer and inner sensible intuition—hence, as mere appearance. Inner intuition will be concerned with the representations generated by the mind insofar as they are objects of consciousness simply in virtue of being representations, whereas outer intuition, the intuition of objects as outside us (CPR, p. 67), concern these appearances when they are viewed not insofar as they are themselves objects, but only insofar as they stand for an object. Without respect to the difference between inner and outer intuition, the apprehension of a manifold rests, Kant says, on certain functions of imaginative synthesis in terms of which "the understanding determines the sensibility" (CPR, p. 171). Moreover, the formal intuition as containing a homogeneous manifold requires apperception, consciousness of the unity of representation:

space and time are represented a priori not merely as forms of sensible intuition,
but as themselves intuitions which contain a manifold [of their own], and therefore are represented with the determination of the unity of this manifold. (CPR, p. 170)

The intuitive (and successive) apprehension of a homogeneous manifold is, for Kant, the same as the generation of a representation of the manifold by the mind through a successive synthesis by what he calls "the productive imagination." For example, he says that the "mathematics of space (geometry) is based upon this successive synthesis of the productive imagination in the generation of figures" (CPR, p. 199). He calls the synthesis of productive imagination "an expression of spontaneity" (CPR, p. 165). He also claims that it is a transcendental synthesis, since although it underlies our apprehension of objects of possible experience (appearances), it has no application to things in general and in themselves.

It is imagination that connects the manifold of sensible intuition; and imagination is dependent for the unity of its intellectual synthesis upon the understanding, and for the manifoldness of its apprehension upon sensibility [my emphasis]. (CPR, p. 173)

The action of productive imagination cannot, therefore, be intuited apart from sensibility. Space and time are not only its a priori sensible forms, but are also themselves intuitions of the mode in which the mind is thus affected through its own activity: the mind

... intuits itself not as it would represent itself if immediately self-active, but as it is affected by itself,
and therefore as it appears to itself, not as it is. (CPR, p. 88)

Thus the understanding, under the title of a transcendental synthesis of imagination, performs this act on the passive subject, whose faculty it is, and we are therefore justified in saying that inner sense is affected thereby. (CPR, p. 166)

"Our intuition," Kant maintains, can never be other than sensible" (CPR, p. 93). That is to say, it is based on receptivity, on the mind's power "of receiving representations in so far as it is in any wise affected," even as affected by itself (CPR, p. 93). Although Kant says that the imagination is dependent for the unity of its intellectual synthesis upon the understanding, its form must be sensible. Without imagination there could be no intuition, since the given sense impressions could not in that case be ordered, connected, and brought into relation. But all the same, without sensibility, imagination would have nothing to connect: imagination is dependent for the manifoldness of its apprehension upon sensibility.

Although time must be given as a single object ("different times are but parts of one and the same time," CPR, p. 75), the successive parts of time "do not necessarily belong to one another" (CPR, p. 197), and thus the productive synthesis of imagination that underlies the representation of time need not advance uninterrupted through time as a whole in order for the whole time to be apprehended. Indeed,
in order to distinguish successive parts of time as such from one another, to represent time as containing a manifold of its own or parts, we must think to ourselves only "that successive advance from one moment to another, whereby through the parts of time and their addition a determinate time-magnitude is generated" (CPR, p. 198). In other words, although in this case the productive synthesis of imagination advances unbroken through each of the distinguishable parts of time, the generation of our representation of time as a whole by the productive imagination is interrupted. The whole time must therefore be intuited as an aggregate: "Such an aggregate is not generated by continuing without break productive synthesis of a certain kind, but through repetition of an ever-ceasing synthesis" (CPR, p. 204).

In lieu of an uninterrupted synthesis of imagination, the representation of time as a single object requires combination of the homogeneous manifold of distinguishable parts of time, given as such according to the form of sensibility through a productive synthesis of the imagination, in an intuitive representation of the aggregate as such. This combination, of course, is not a function of the imagination, for the latter is sensible and aimed merely at apprehension of the manifold of sense. On the contrary, it represents an "original power" of bringing the manifold
of intuition (as distinguished from the manifold of sense) "under an apperception" (CPR, p. 166), that is, of "uniting a priori in one consciousness the [homogeneous] manifold given in intuition" (CPR, p. 266). It is therefore intellectual rather than sensible.

Apperception and its synthetic unity is, indeed, very far from being identical with inner sense. The former, as the source of all combination, applies to the manifold of intuitions in general, and in the guise of the categories, prior to all sensible intuition, to objects in general. Inner sense, on the other hand, contains the mere form of intuition, but without combination of the manifold in it, and therefore so far contains no determinate intuition, which is possible only through the consciousness of the determination of the manifold by the transcendental act of imagination (synthetic influence of the understanding upon inner sense), which I have entitled figurative synthesis.

(CPR, pp. 166-167)
Footnotes to Chapter II

1 CPR, p. 70.
2 CPR, p. 259; see also p. 265.
3 CPR, p. 67.
4 CPR, pp. 78-80.
5 CPR, pp. 344-345.
6 CPR, pp. 213, 255.
7 See CPR, p. 170.
8 CPR, p. 198.
9 CPR, pp. 75, 198.
10 See CPR, p. 67.
11 See CPR, pp. 213, 219-220.
12 See CPR, p. 204.
13 CPR, pp. 170, 87.
14 CPR, p. 167.
15 See CPR, p. 197.
16 "Everything," says Kant, "every representation even, in so far as we are conscious of it, may be entitled object" (CPR, p. 219).
17 See also CPR, p. 170.
18 Compare CPR, p. 165.
19 CPR, pp. 165, 199.
Use of the Regressive Method in Responding to Hume—Preliminary Questions

In his discussion of the "structure and method of Kant's "Analytic," Robert Paul Wolff observes that even "after nearly two centuries of intensive criticism and study, commentators have still not come to an agreement about the precise nature of Kant's argument in the Transcendental Analytic" (Wolff, p. 44). Although Wolff seems to take for granted agreement among the commentators that Kant was in general somehow attempting to answer Hume, he nevertheless insists that there is radical disagreement over the details of Kant's argument. Wolff writes:

This disagreement, so far from concerning [the] truth or significance or deeper meaning [of Kant's argument], is over such straightforward matters as what Kant was trying to prove, what he assumed as premises, and what the steps were by which he connected the two. (Wolff, p. 44)

It is Wolff's contention that an important reason for this "confusion" among the experts was a "failure" on Kant's part "to make absolutely clear the distinction between the [analytic and synthetic] methods of exposition which he
employs in the Critical Writings" (Wolff, p. 44). Wolff insists that "the regressive, or analytic, method is . . . strictly explicative rather than demonstrative" (Wolff, p. 45), and criticizes Lewis White Beck and Norman Kemp Smith for attempting to reconstruct Kant's "answer to Hume" in terms that rely in essential respects on regressive-type arguments. According to Wolff, the success or failure of Kant's Analytic (vis-à-vis the issues raised by Hume) depends on whether an argument can be found "which, beginning with the fact of self-consciousness (de facto consciousness, as Kemp Smith puts it), advances by a rigorous deduction to the validity of the law of causation and the other principles of the Analogies" (Wolff, p. 56). In other words, the success or failure of the Analytic as an answer to Hume depends, in Wolff's estimation, on whether or not its underlying structure is ultimately in any essential respect "regressive." Wolff claims that it is not, and therefore that it "completely answers Hume" (Wolff, p. 56). Without considering here what Wolff takes to be Kant's successful "synthetic" answer to Hume, I want in this chapter to examine Wolff's characterization of Kant's regressive method, the method Kant says he employed in the Prolegomena, and to show that Wolff's treatment of this issue is thoroughly misdirected. (It is important to remember that Kant intended the Prolegomena to be read and understood with reference to, and
as having been informed by, his completed *Critique of Pure Reason*, which he regarded as "the foundation, to which the *Prolegomena*, as a preliminary exercise, refer" [*Prol.*, p. 9].) Expressed in a positive way, I wish to show that Kant's argument in the *Prolegomena* is successful as a response to Hume, and that it sheds considerable light on the nature of Kant's critical program, enabling us, as Kant claimed it would, to grasp the whole plan of a general critique of pure reason, "to examine in detail the chief points of importance in the science, and to improve in many respects [the] exposition, as compared with the first execution of the work" (*Prol.*, p. 11).

**Wolff's Interpretation of the Regressive Method**

Wolff interprets Kant's analytical or regressive method as a search, ultimately, for "premises" from which "given proposition[s] or bod[ies] of knowledge," in particular pure mathematics and pure natural science, can be "deduced," and he takes the synthetical or progressive method to be "simply the familiar deduction of conclusions from premises" (Wolff, p. 45). Although both methods, on Wolff's analysis, are aimed at producing formally valid syllogisms, the fact that the regressive method starts "from what is sought, as if it were given" (*Prol.*, p. 23) makes it, unlike the progressive method that Kant contrasts with it, "strictly explicative
rather than demonstrative" (Wolff, p. 45). The syllogisms that result from an application of the regressive method, taken apart from an independent justification of their premises, in no way increase either the credibility of the statements one starts from (which are represented as conclusions in the resulting syllogisms) or the credibility of the premises to which one ascends. In contrast, since the progressive method is intended to establish the consequences of its starting points (in the synthetical or progressive method, what we start from are assumed as "premises"), the syllogisms that result will have "the apodictic certainty demanded by philosophy" (Wolff, p. 45).

According to Wolff, from the given proposition "All men are mortal," application of the regressive method is intended to lead to the discovery of pairs of premises--for example, "All animals are mortal" and "All men are animals"--from which, taken together, the given proposition can be deduced. But Wolff cautions that "unless you have some independent justification for the two premises, [such a procedure] will not increase the credibility of the conclusion" (Wolff, p. 46). The problem, clearly, is that all syllogisms of the form

\[
\begin{align*}
\text{All } X \text{ are mortal} \\
\text{All men are } X \\
\text{therefore, All men are mortal}
\end{align*}
\]

are valid, no matter how absurd the substitutions
for X: "All men are fish and all fish are mortal; All men are numbers and all numbers are mortal; etc." (Wolff, p. 46).

Wolff points out that,

> In general, for any proposition, true or false, we can find an unlimited variety of premises, true or false, from which it can be deduced according to strict laws of logic. This means that a regressive argument, even if it assumes the validity of the proposition from which it starts, does NOT constitute a proof of the "presuppositions" to which it ascends.

(Wolff, p. 46)

With respect to the issues raised by Hume, of course, this means that if, upon examination, Kant's argument turns out to be regressive in this sense, and if he begins "by assuming the validity of mathematics and physics, then his entire enterprise will be a mere begging of the question" (Wolff, p. 48).

Although Kant himself describes the regressive method as a search for the "conditions" of given a priori knowledge (Prol., p. 23), Wolff argues that "the word 'condition' is Kant's broadest term for any relation of subordination or dependence," and therefore, since "the relation of conditionality is hierarchical," that "the model of a series of conditions is the syllogistic chain called a ratiocinatio polysyllogistica" (Wolff, pp. 49-50). And it seems clear from Wolff's analysis of the regressive method that when he says of the idea of a chain of interlocking syllogisms that it should be construed as the "model" for a series of
conditions, what he means is that the "relation of subordination" contained in the various "forms of conditionality" must be understood, regardless of specific differences, always in terms of the logical notions of necessary and sufficient conditions (Wolff, p. 49). Such a construction of Wolff's view is in accordance with the sort of deductive model he has given, where what is subordinate is a necessary condition of (hence, deducible from) that which it is subordinate to, and where, conversely, "by a well-known equivalence of the propositional calculus" (Wolff, p. 52), the latter is a sufficient condition for the former. According to Wolff, the key to all the difficulty concerning the value of regressive arguments is "the meaning of the term 'necessary condition' which recurs both in the text and in the analyses of the commentators . . ." (Wolff, p. 52). Getting clear on the nature of this difficulty requires, Wolff thinks, a "detour through the arid terrain of formal logic" (Wolff, p. 52). This detour involves making clear that "a necessary condition is a conditio sine qua non" (Wolff 52)--so that, in other words, taking ratiocinatio polysyllogistica as the model here, "if you wish to prove that Q is a necessary condition of P, you must deduce Q from P and not the other way around" (Wolff, p. 53).

Once the logic of necessary and sufficient conditions is clearly understood, Wolff argues, "the image of 'ascending
to necessary conditions' is completely inappropriate, for in the *ratiocinatio polysyllogistica* (chain of syllogisms) the necessary conditions lie farther down the chain" (Wolff, p. 53). When viewed properly, according to Wolff, the regressive method "is clearly a search for sufficient conditions" (Wolff, p. 53). Without taking issue with Wolff at this time, I wish to note that the alleged inappropriateness of the image of "ascending to necessary conditions," and conversely, of seeing the regressive method as a search for sufficient conditions, is, as Wolff himself clearly recognizes, a consequence (indeed, as I will later try to show, an artifact) of Wolff's having identified the regressive method with "ascending a series of conditions, as from the conclusion to the premises of a proof" (Wolff, p. 53).

Finally, on the one hand, Wolff claims that any proposition P "can be deduced from an indefinitely large number of alternative possible [sets of] premises, each of which is a sufficient condition of P" and therefore that it is "meaningless to talk about the sufficient conditions of P" (Wolff, p. 53). On the other hand, he is willing to allow that Kant "actually leaves himself a way out" of the "mistake" of characterizing the regressive method in terms of the image of "ascending to necessary conditions" by leaving open the possibility that the "a priori sufficient conditions" reached by applying the regressive method in
response to Hume are "the only such conditions," and therefore that they are necessary as well as sufficient (Wolff, pp. 53-54). These are contradictory claims. Moreover, Wolff's primary criticism of the regressive method being used in response to Hume is untouched by allowing Kant this so-called "loophole." To repeat, Wolff's primary criticism of using arguments based on the regressive method to respond to Hume is simply that they begin with what they seek to prove, and so, without relying on independent justification of the conditions or premises to which they ascend, they cannot increase the credibility of their starting points.

The Regressive Method--Another Reading

Kant tells us that his problem in the Prolegomena is not whether synthetic a priori propositions are possible, "for there are enough of them which indeed are of undoubted certainty," he says, that we can "start from the fact that such synthetical but purely rational knowledge actually exists" (Prol., p. 23); rather, the question is how such knowledge is possible. Actually, this problem derives from another--namely, "is metaphysics at all possible?" (Prol., p. 21). Since the objects of metaphysics proper cannot be given in experience and yet we claim to have rational insight into them, the problem concerning the possibility of
metaphysics is very much a question of whether synthetic a priori knowledge is even possible. To solve this problem by means of the synthetic method requires laying out, "in abstracto from concepts" (Prol., p. 26), the conditions underlying the possibility of such knowledge. This, Kant says, is what he attempted in the Critique, penetrating by degrees "into a system based on no data except reason itself, and which therefore seeks, without resting upon any fact, to unfold knowledge from its original germs" (Prol., p. 22).

The Prolegomena, of course, are also aimed at laying out or specifying the conditions in abstracto of the possibility of synthetic a priori knowledge. But unlike the synthetical or progressive method used in the Critique, the analytical or regressive method Kant employs in the Prolegomena allows him to start from a common-sense knowledge and use of certain rules in concreto. From this knowledge and using these rules, Kant "ascends" by means of analysis to "sources as yet unknown" (Prol., p. 22), revealing what "lies quite beyond the horizon of common sense" (Prol., p. 119)—namely, the possibility of comprehending the use of these rules "a priori, or independently of experience" (Prol., pp. 118-119), and in that way, in abstracto, "explain[ing] to us what we knew" (Prol., p. 22). The analytical method, Kant says, "facilitates our work greatly for here universal considerations are not only applied to facts, but even start
from them, while in a synthetic procedure they must strictly be derived in abstracto from concepts" (Prol., p. 26). The "facts" (pure mathematics and pure natural science) from which Kant starts in the Prolegomena are simply rules that, "although they are actually a priori," we can see "confirmed by experience" (Prol., p. 118); that is, they are rules understood at least in concreto, though not yet in abstracto. The analysis of any such given knowledge reveals the kind of knowledge it is (synthetic or analytic), the nature of its objects (whether, for example, they are appearances or things in themselves), and its sources (a priori or a posteriori)—or, in other words, how or the conditions under which the given knowledge is possible.

Kant's argument in the Prolegomena is intended to show that some among the propositions of mathematics and natural science (from which common sense permits us to start) are actually both synthetic and a priori, which the argument does by showing how in each case the given synthetical knowledge is possible a priori. The primary question, in the Prolegomena as in the Critique, is whether synthetic knowledge is possible a priori. But it is unnecessary in the Prolegomena, where Kant follows the analytical or regressive method, to investigate that question per se, since the given knowledge (of mathematics and pure science of nature) from which the analysis starts is actually both synthetic and
a priori and needs only to be recognized as such, explained to us. It is in this sense that Kant must be understood when he says that the regressive method "signifies only that we start from what is sought, as if it were given," since what we start from are actually, whether they are recognized as such or not, synthetic propositions a priori. The possibility of such knowledge must be sought or investigated because it "must depend upon other principles than the law of contradiction" (Prol., p. 23). Kant's strategy is then to "ascend to the only conditions" under which such knowledge is possible (Prol., p. 23), thereby not only explaining to us what we knew "but exhibiting a sphere of many cognitions which all spring from the same sources" (Prol., p. 22).

The Regressive Method--A Critique of Wolff's Interpretation

The analytical or regressive method, outlined in the preceding section, clearly does not, as Wolff maintains, begin by assuming a given proposition and then search about for premises from which the given proposition can be deduced. Kant nowhere speaks of "exhibiting . . . a set of conditions" from which mathematics and natural science, whether pure or not, "can be deduced" in a logical or syllogistic sense (Wolff, p. 45), or of discovering "some premise or set of premises from which" the existence of mathematics and natural science "can be deduced" (Wolff, p. 47). Except for
his brief illustration of what he regards as Kant's regressive method in terms of the syllogism

\[
\begin{align*}
\text{All animals are mortal} \\
\text{All men are animals} \\
\text{therefore, All men are mortal,}
\end{align*}
\]

Wolff never really spells out what it would mean to have found premises from which the existence of mathematics and natural science (pure or otherwise) could be deduced. We are left to spell out the implications of Wolff's model ourselves.

If we take Wolff's model to be accurate, we must understand Kant's method in the *Prolegomena* as beginning from the assumption that certain cognitions in mathematics and natural science are possible a priori, and then searching about for some premise or set of premises from which these "pure cognitions a priori" (*Prol.*, p. 26) can be deduced, as special cases of some more fundamental cognitions. In other words, Kant must be viewed as having set out in pursuit of concepts (something to serve here in the way the concept "animal" served as a middle term in Wolff's illustration) that contain the conditions underlying the given knowledge. For the deduction to avoid circularity, the middle term must be drawn from a domain outside mathematics and natural science. After subsuming a predicate given via actual cognition in the fields of mathematics and natural science (as the predicate "mortal" is given in Wolff's illustration)
under that condition (middle term) taken in its whole extension (compare "All animals are mortal" in Wolff's illustration), Kant would then proceed to deduce the knowledge in question, the pure cognition a priori from which the regress began.6

The trouble with such a reading of the Prolegomena is that it makes it seem as if Kant meant to deduce certain propositions in mathematics and natural science—indeed, to deduce the fields of mathematics and natural science themselves—from still more fundamental, and presumably, pure a priori, cognitions existing outside mathematics and natural science. Such a reading clearly takes Kant's term "condition" in a material sense that, in ranging over concepts not found in mathematics and natural science (and which presumably cannot be exhibited in concreto) actually adds to, or is at least intended to add to our concept of an object.

In other words, Wolff does not interpret the regressive method in the purely formal or analytical sense in which we seek only to determine by analysis whether certain given cognitions, cognitions that actually "exhibit to us objects in intuition [i.e., in concreto]" (Prol., p. 26), are possible a priori.

Wolff bases his interpretation of Kant's analytical or regressive method on the following two passages from the Prolegomena in which Kant comments in general terms on the
method as such:

The analytical method . . . signifies only that we start from what is sought, as if it were given, and ascend to the only conditions under which it is possible.

(Prol., p. 23; Wolff, p. 44)

The Prolegomena . . . are intended to point out what we have to do in order to make a science actual if it is possible, rather than to propound it. The Prolegomena must therefore rest upon something already known as trustworthy, from which we can set out with confidence and ascend to sources as yet unknown, the discovery of which will not only explain to us what we knew but exhibit a sphere of many cognitions which all spring from the same sources. The method of prolegomena . . . is consequently analytical.

(Prol., p. 22; Wolff, pp. 46-47)

I have already suggested a different reading of these two passages from the one Wolff gives. I want now to press my case against Wolff one step further by contrasting what would appear, based on Wolff's interpretation of the regressive method, to be Kant's aims in the Prolegomena vis-à-vis the foundations of mathematics and natural science, with what Kant actually says were his aims and with what he tells us about the foundations of our knowledge in the fields of mathematics and natural science. In this way I hope to test the validity of Wolff's interpretation against material that Wolff himself seems largely, if not entirely, to have ignored. I hope to show that whatever initial plausibility Wolff's interpretation of the regressive method may have proves to be merely superficial when set in the context of Kant's
discussion of the possibility of synthetic judgments in mathematics and natural science originating a priori. In what follows, I will draw freely in my analysis from both the Critique of Pure Reason and the Prolegomena, taking seriously Kant's insistence in the latter that the Critique is "the foundation, to which the Prolegomena, as a preliminary exercise, refer" (Prol., p. 9).

Proceeding to the Ground of the Possibility of Mathematics and Natural Science

Knowledge, according to Kant, requires conscious reference of our representations to an object, which is possible only insofar as sensibility and understanding, "the two essentially different basic faculties" from which our representations, intuitions and concepts respectively, spring (Logic, p. 40), function cooperatively. Experience is, Kant says, "beyond all doubt, the first product to which our understanding gives rise, in working up the raw material of sensible impressions (CPR, p. 41), and all our knowledge, Kant insists, begins with experience. In themselves, sensible intuitions are singular. As such they contain only "the logical connection of perception in a thinking subject" (Prol., p. 45), that is, they hold good only for us (that is, for our subject) (Prol., p. 46). In other words, insofar as they are singular, they have no universal or objective
validity. On the other hand, concepts and the thoughts expressed by means of them have no significance or objective reference apart from sensibility: the understanding is a faculty of mind which by itself knows nothing whatsoever, but merely combines and arranges the material of knowledge—that is, the intuition which must be given to it by the object. The act of the understanding is to bring "the synthesis of a manifold, given to it from elsewhere in intuition, to the unity of apperception" (CPR, p. 161).

In this context, it should be clear that there can be no synthetic knowledge from mere concepts, apart from sensibility. Synthetic judgments bring into relation concepts that are neither identical nor contradictory, so that from a synthetic judgment "taken in and by itself, the truth or falsity of the relation can never be discovered" (CPR, p. 192). On the contrary, "if we are to judge synthetically in regard to a concept, we must go beyond this concept and appeal to the intuition in which it is given" (CPR, p. 582). In short, the possibility of synthetic knowledge, whatever its origin or its logical form, can finally be established only by appealing to a pure or empirical intuition in which the synthesis in question is exhibited in concreto. Since, therefore, mathematics and natural science "can exhibit to us objects in intuition, and consequently . . . can show the truth or conformity of the cognition to the object in
concreto, that is, its actuality . . ." (Prol., p. 26), the possibility of these disciplines is never in doubt. It is inappropriate, therefore, to represent Kant's regressive method as having been designed to show that these disciplines are possible by performing "a regress to some premise or set of premises from which [their] existence can be deduced" (Wolff, p. 47). Kant can legitimately take for granted the possibility of mathematics and natural science: when, for example, we want to determine the possibility of an arithmetical proposition such as 7 + 5 = 12 or the possibility of the connection of cause and effect, we look either to intuition (for example, adding five fingers to seven fingers) or to experience, to some actual empirical synthesis (for example, the perceived conjunction of the sun shining on a stone and the stone's growing warmer) assumed to hold universally. Moreover, the notion of deriving these disciplines from "a set of conditions" that have been exhibited "in systematic form" (Wolff, p. 45)--for example, as premises in syllogisms--is vague and misleading, since it seems to suggest the possibility of deriving the possibility of synthetic knowledge from concepts per se. However, Kant argues, if we consider synthetic cognitions in mathematics and natural science "in themselves in relation to their origin," these cognitions "are anything rather than knowledge based on concepts" (CPR, p. 302).
When, therefore, Kant speaks of proceeding to the ground of the possibility of mathematics and natural science ("if there should occur in them a cognition a priori" [Prol., p. 26]) by the analytical method, he wants to determine how (that is, under what conditions) it is possible to pass a priori from a concept to the corresponding intuition in which it is exhibited in concreto—"ascending" to the only conditions under which" such a pure cognition a priori is possible (ProI., p. 23), that is, can originate a priori. Kant was convinced of the possibility of actually being able to distinguish pure cognitions a priori as such in the fields of mathematics and natural science. The basis for his certainty is revealed by analyzing our cognitions in these fields, cognitions "already known as trustworthy" (ProI., p. 22), that is, as representing possible empirical syntheses; such analysis reveals that "even our empirical knowledge is made up of what we receive through impressions and of what our faculty of knowledge (sensible impressions serving merely as the occasion) supplies from itself" (CPR, p. 42). On the one hand, therefore, if we omit from the empirical intuitions of bodies and their alterations by means of which the truth or conformity of a cognition to an object is exhibited in concreto "everything empirical, that is, belonging to sensation, space and time still remain, which are therefore pure intuitions that lie a priori at the basis of the
empirical" (Prol., p. 31). Once uncovered, these pure intuitions of space and time enable us to explain how it is that "in mathematics I can by thinking itself construct whatever I represent to myself as possible by a concept" (Prol., p. 119), that is, how I can exhibit or construct concepts in concreto and yet a priori. Concepts in mathematics, Kant tells us, "contain an arbitrary synthesis that admits of a priori construction" (CPR, p. 587).

On the other hand, by analyzing "our synthetical judgments . . . so far as they are objectively valid" (Prol., p. 49), that is, in reference to objects of a possible empirical intuition, it becomes clear, according to Kant, that they would be impossible if pure concepts of the understanding were not "superadded to the concepts abstracted from intuition, under which concept[s] these latter are subsumed and in this manner only combined into . . . objectively valid judgment[s]" (Prol., p. 49). In other words, for a judgment to be objectively valid means that it holds good relative not merely to the perceptions (which are subjective) of a particular thinking subject, but also in the same way relative to everybody else's perceptions as well; hence, such a judgment must be thought as having universal validity, which never depends upon perception, but rather upon pure concepts of the understanding, on concepts expressing "the universal and necessary connection of . . .
perceptions" (Prol., p. 46) under which the perception is subsumed.10

From these "actual and, at the same time, well-grounded pure cognitions a priori" (Prol., p. 26) in the fields of mathematics and natural science, Kant set out in accordance with the analytical or regressive method to discover the sources of pure cognitions a priori in general—namely, sensibility and understanding. He discovered, in other words, that the employment of reason in such cases, considered in themselves in relation to their origin, and, hence, the possibility of knowledge based on concepts rather than experience, must be "supported by pure intuition (in mathematics), or by conditions of a possible experience in general"ll—the conditions of a possible experience in general representing "conditions which make unity of apperception possible" (CPR, p. 135).

In essence, therefore, analysis of the actual and well-grounded pure cognitions a priori that are given in mathematics and natural science reveals a twofold employment of reason, two modes of knowledge based on concepts, one mathematical, the other philosophical: "Philosophical knowledge is the knowledge gained by reason from concepts; mathematical knowledge is the knowledge gained by reason from the construction of concepts" (CPR, p. 577). Clearly, insofar as such knowledge is based on concepts rather than experience,
"the two modes of employment resemble each other in the universality and a priori origin of their knowledge" (CPR, p. 583); but, as Kant makes clear, they represent very different conditions of giving a concept an object to which it may be applied, and so in outcome they are very different. In the case of mathematical knowledge it is possible to pass a priori from a given concept to the intuition in which it is given, "in order to consider it in that intuition in concreto . . . and in this way to obtain knowledge which is at once synthetic and rational" (CPR, p. 582), that is, to exhibit it a priori. In contrast, philosophical knowledge involves concepts that designate neither a pure nor an empirical intuition, "but only the synthesis of empirical intuitions, which, as empirical, cannot be given a priori" (CPR, p. 582), so that "pure philosophy is all at sea when it seeks . . . to obtain insight in regard to the natural world," since we are unable to intuit a priori and thereby to confirm the reality of philosophical concepts (CPR, p. 584). At issue is the general question of the application of a priori concepts springing from two fundamentally different sources of knowledge, sensibility and understanding, and two distinct modes of synthesis.

The logical function of a concept is to bring whatever data may be presented to us "under one common representation" (CPR, p. 105)—that is, to the unity of consciousness.
Indeed, in order to determine whether a concept has objective validity, we demand that the bare concept, the concept represented \textit{in abstracto}, so far merely as it contains "the logical form of a concept (of thought) in general" (CPR, p. 259), be made sensible, that is, that an object corresponding to it actually be presented in intuition. In other words, the objective validity of a concept rests on the possibility of us using the concept to bring empirical data given to us from elsewhere in sensible intuition to the unity of consciousness--on the possibility "of giving it an object to which it may be applied." In the case of our \textit{a priori} concepts, the demand that our concepts be made sensible can be met in one or the other of two ways, depending on the concepts themselves, on whether their specific logical function or intended employment is \textit{intuitive} or \textit{discursive}.

The Ground of the Possibility of Pure Mathematics

\textit{A priori} concepts in mathematics, pure sensible concepts, concern combination of a given and homogeneous manifold into one representation according to rules originating in sensibility vis-à-vis the imagination and its synthesis of apprehension. Mathematical concepts must be determined in relation to our forms of sensibility, space and time, to which the synthesis of apprehension of the manifold of
appearances "must always conform, because in no other way can the synthesis take place at all" (CPR, p. 170). The a priori validity of mathematical concepts rests on the fact that they can be exhibited or constructed, in concreto and yet a priori, as "pure image[s] of sensibility" (CPR, p. 314); in other words, the pure sensible concepts of mathematics represent "a universal procedure" or schema "of imagination in providing an image for a concept" (CPR, p. 182), and so contain in abstracto in thought something which is represented in concreto in the object (appearance) that is to be subsumed under it, establishing in a way that is immediately evident the homogeneity of these concepts with the objects subsumed under them. Kant's writings bear out this interpretation of the character of pure sensible concepts in mathematics:

As regards the formal element [of appearance], we can determine our concepts in a priori intuition, inasmuch as we create for ourselves, in space and time, through a homogeneous synthesis, the objects themselves—these objects being viewed simply as quanta. (CPR, p. 583)

[Mathematical] judgments are always intuitive . . . . This observation on the nature of mathematics gives us a clue to the first and highest condition of its possibility, which is that some pure intuition must form its basis, in which all its concepts can be exhibited or constructed, in concreto and yet a priori. (Prol., p. 28)

Mathematics can achieve nothing by concepts alone but hastens at once to intuition, in which it considers the concept in concreto, though not empirically, but only in an intuition which it presents a priori, that is, which it has constructed, and in which whatever follows from the
universal conditions of the construction must be universally valid of the object of the concept thus constructed [qua 'pure image of sensibility' (CPR, p. 314)]. (CPR, p. 578)

In short, concepts in mathematics relate immediately to the a priori forms of sensible intuition in accordance with which all synthesis of the imagination takes place, and "they are for this very reason themselves a priori and can be given in a quite determinate fashion in pure intuition, without the help of any empirical data" (CPR, p. 583).

Thus, the mathematician meets the demand that each of his concepts be made sensible by specifying universal procedures of imagination for constructing images or objects corresponding to them—that is, by defining them, mathematics being "the only science that has definitions" (CPR, p. 587): "in mathematics I can by thinking itself construct whatever I represent to myself as possible by a concept" (Prol., p. 119). The universal conditions of the construction of a concept—and the nature of mathematics is such that all its concepts can be constructed in concreto and yet a priori—are, at the same time, universal conditions of sensible intuition; indeed, the reason its concepts can be exhibited a priori is that, of the two elements present in the field of appearance to which concepts can in general be referred (namely, form of intuition and matter, or content), the concepts employed in mathematics concern only the formal
element, space and time, which, as forms of our sensible intuition, can be known and determined completely a priori. The identity of the conditions of the construction of a concept with the conditions of sensible intuition is the basis for Kant's claim that "whatever follows from the universal conditions of the construction [of a concept] must be universally valid of the object of the concept thus constructed" (CPR, p. 578). This explains how appearances must necessarily agree with the formal intuition of them "which we make spontaneously and previous to our acquaintance with them" (Prol., p. 35).

We claim in mathematics not merely to be able to exhibit individual concepts in concreto and yet a priori, but also to be able to "combine the predicates of [an] object both a priori and immediately" (CPR, p. 589), "advanc[ing] beyond a given concept in order to compare it synthetically with another [concept]" (CPR, p. 192). One of the aims of the Prolegomena (hence, of the regressive method) is to show how an advance of this sort in mathematics is possible. The answer, lies in the construction of concepts vis-à-vis pure intuition. The possibility of combining the predicates of an object a priori and immediately as we do in mathematics, that is, of advancing beyond a given concept and comparing it synthetically with another concept—"all this," says Kant, "is the work of reason through construction of concepts" (CPR,
p. 584), and can be apprehended only in pure intuition,\textsuperscript{18} that is, in space and time as pure images of sensibility which remain after we omit from our empirical intuitions everything empirical, that is, belonging to sensation.

The problem of the possibility of synthetic judgments \textit{a priori} in mathematics is therefore the problem of subordinating "given presentations in judgments" (\textit{Logic}, p. 110) to one another \textit{vis-à-vis} the formal conditions of sensible intuition to which the synthesis of apprehension of the manifold of appearance must always conform. Thus, for example, from the definition of a straight line and the image of space (which, as pure image of sensibility, is the basis for all construction of concepts), it is "immediately certain" (\textit{CPR}, p. 589) that "there can only be one straight line between two points" (\textit{CPR}, p. 301). Similarly, the proposition that three points always lie in a plane can be known "both \textit{a priori} and immediately" (\textit{CPR}, p. 589) as soon as we determine a "universal procedure of imagination" for constructing a plane given three points from which to start. In "propositions of numerical relation" (\textit{CPR}, p. 199) such as $7 + 5$ is equal to $12$, "the concept of the sum" of the two numbers $7$ and $5$ contains nothing but the thought of the union (or combination) of the two numbers into one—a general notion of the consciousness of the synthetic unity of the homogeneous manifold "in intuition in general, in so far as
the representation of an object first becomes possible by means of it" (CPR, p. 198). In the concept of a magnitude (quantum) in general, "no thought is being taken as to what that single number may be which combines both" (CPR, pp. 52-53).19

Since "the concept of magnitude seeks its support and sensible meaning in number" (CPR, p. 260), in a universal procedure of imagination (counting) whereby homogeneous and sensible units are consciously added to one another in succession, the numerical relation of equality between the number represented as the sum of 7 and 5 and the number 12 can be determined only by counting sensible units of some sort, pure or empirical, in accordance with a universal procedure of imagination, adding to the sensible representation of the concept 7, unit by unit, units picked to represent the concept 5. In this way the total 12 is produced. (Note that "so far as we are here attending merely to the synthesis of the homogeneous (of units), that synthesis can take place only in one way, although the employment of these numbers is general" [CPR, p. 200]. In other words, it makes no difference what units we pick to establish the numerical relation.)

The concept of 12 is by no means already thought in merely thinking the union of 7 and 5; and I may analyse my concept of such a possible sum as long as I please, still I shall never find 12 in it. We have to go outside these concepts, and call in the aid
of the intuition which corresponds to
one of them, our five fingers, for instance,
or, as Segner does in his Arithmetic, five
points, adding to the concept of 7, unit
by unit, the five given in intuition. For
starting with the number 7, and for the
concept of 5 calling in the aid of the
fingers of my hand as intuition, I now add
one by one to the number 7 the units which
I previously took together to form the
number 5, and with the aid of that figure
[the hand] see the number 12 come into being.
That 5 should be added to 7, I have indeed
already thought in the concept of a sum =
7 + 5, but not that this sum is equivalent
to the number 12. (CPR, p. 53)

The point is that propositions in mathematics, axioms proper
as well as these "numerical formulas," must be supported by
pure intuition and yet are nevertheless immediately evident
and a priori—not, as Wolff suggests, "deduced" from some
unspecified "set of conditions . . . exhibit[cd] in
systematic form" (Wolff, p. 45).

The Ground of the Possibility of Pure Natural Science

I want to turn now to what Kant has to say about a pure
science of nature. To be conscious of the manifold of
appearance as such is a complex. It requires a successive
apprehension of the distinguishable parts of the manifold
given to us by means of sensibility, reproduction of these
parts in the order in which these representations were
originally generated, and combination of the manifold of
intuition in a single, well-ordered representation or formal
intuition containing consciousness of the time-relations, succession, coexistence, and duration, qua "rule[s] of relation" (Prol., p. 59) underlying the unity of the representation thus produced. In such knowledge of nature, all that can be known and determined completely a priori are the rules of relation in space and time that originate as a priori forms of outer and inner sensible intuition, to which the synthesis of apprehension of the manifold of appearance must always conform—rules, in other words, the consciousness of which underlies and therefore makes possible the unity of representation contained in the formal intuition of space and time generated by the mind. These rules, that is to say, express the formal unity of consciousness in the synthesis of the manifold of representations. Of the two elements present in the field of appearance (matter and form), space and time alone, as forms of intuition, can be known and determined completely a priori.

In contrast, Kant says that the existence of things (appearances) in space and time "cannot be constructed" (CPR, p. 210)—known and determined a priori. What is represented as existing in space and time, the physical or material element of appearance (the object corresponding to sensation), "can never be given in any determinate fashion otherwise than empirically" (CPR, p. 583). For even if we could on purely a priori grounds infer the existence of a thing
(and Kant believes that the categories of relation enable us to do so), "we could not know it determinately" or "anticipate the features through which its empirical intuition is distinguished from other intuitions" (CPR, p. 210). The relation of perceptions to one another in experience must be determined empirically; as Hume demonstrated, we cannot infer from the perceptions themselves any necessity determining their connection. In the apprehension of the manifold of appearance, by means of which the manifold is "taken up into empirical consciousness" (CPR, p. 198), the mind is concerned only with generating representations of the determinate space or time underlying the given manifold. Since the parts of space and time are homogeneous, the representation of a determinate space or time can be generated in a purely extensive fashion, as complexes of previously given parts. The parts do not necessarily belong to one another. Kant's claim is that in order to determine a knowledge of objects through perceptions, the relation involved in the existence of the manifold has to be represented in experience, not as it comes to be constructed in time, as a merely subjective determination of sensibility, but as it exists objectively in time. The knowledge of objects through perceptions, or experience, is possible "only through the representation of a necessary connection of perceptions" (CPR, p. 208), which
is the principle of Kant's Analogies.

For Kant, the key to our representation of a necessary connection of perceptions is that we are confronted with a manifold of a priori sensibility that prevents our knowledge of appearances from being haphazard or arbitrary. The manifold of appearance is itself an object whose constituents must be related to one another in time: "all appearances whatsoever, that is, all objects of the senses are in time, and necessarily stand in time-relations" (CPR, p. 77). As such, the concept of an object of experience must agree with the object (appearance) given to us by means of sensibility, and what Kant calls the "formal conditions of empirical truth" are simply the various modes in which the constituents of a manifold can be united in time:

. . . appearance, in contradistinction to the representations of apprehension, can be represented as an object distinct from them 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. (CPR, p. 220)

Since there is no representation of necessary connection in perceptions themselves, the determination of an object through perceptions always requires, "besides the representation of the sensuous intuition, special concepts originally begotten in the understanding" (Prol., p. 46), concepts governing what Kant refers to as a second mode of combination, namely connection, "the synthesis of the manifold so
far as its constituents necessarily belong to one
another."24

According to Kant, the representation of the manifold
of appearance as such is the representation of an object:
"appearances . . . are what alone can be given to us to
know" (CPR, p. 220). This representation contains not only a
mere form of intuition, but also combination of the manifold,
given according to the form of sensibility, in an intuitive
representation. In other words, the manifold of appearance,
qua object of a possible empirical intuition, must contain
unity of representation, a unity which only consciousness
can impart to it. In particular, the manifold of appearance
(as distinguished from the manifold of sense), in its formal
aspect, contains an intuition in space and time, which con­
ditions it a priori. In all representation of a manifold
as such the representation of either space or time must be
presupposed.25 Kant's claim is that although what concerns
the existence of the manifold of appearance--that is, what
exists in space and time--can only be given empirically,
by means of sensibility,26 the unity of representation
underlying the representation of the manifold as such
presupposes combination of the manifold, which, qua
spontaneity, must be attributed to the understanding rather
than to sensibility (receptivity)--his treatment of the
unity of intuition in the Aesthetic notwithstanding.27
As objects of a possible empirical intuition, appearances must therefore conform not only to conditions of sensibility (forms of sensible intuition), but also to our understanding and to "the conditions on which alone it can connect things in their existence" (Prol., p. 42). While its objects, the objects of sense, must be given to it from elsewhere in intuition, the synthesis of the given manifold by means of the imagination must take place in accordance with a rule, "which distinguishes [the given manifold] from every other apprehension and necessitates some one particular mode of connection of the manifold" (CPR, p. 200).

As mere representations, [appearances] are subject to no law of connection save that which the connecting faculty prescribes. Now it is imagination that connects the manifold of sensible intuition; and imagination is dependent for the unity of its intellectual synthesis upon the understanding, and for the manifoldness of its apprehension upon sensibility. (CPR, p. 173)

The understanding itself serves only to bring the synthesis of a manifold, given to it from elsewhere in intuition, to the unity of apperception. It is in this sense that the understanding determines the sensibility. Kant characterizes the understanding in these terms in both the Critique and the Prolegomena. In the Critique he argues that by itself, the human understanding "knows nothing whatsoever, but merely combines and arranges the material of knowledge,
that is, the intuition, which must be given to it by the object" (CPR, p. 161). In the Prolegomena he summarizes: "the business of the senses is to intuit, that of the understanding is to think. But thinking is uniting representations in one consciousness" (Prol., p. 52).

The solution to the problem of necessary connection rests, for Kant, on showing that the same "functions of unity among our representations" (CPR, pp. 105-106) are present in intuition (insofar as it contains combination of the given manifold) as are represented by our various forms of judgment, even as to relation.29 Otherwise all subordination of given perceptions, one to another— that is, combination of the manifold so far as its constituents necessarily belong to one another— would have to be viewed, as Hume thought, as only subjectively valid, as a merely logical connection of perception in a thinking subject. If this were the case and Hume were right, the relation of agreement or disagreement between subject and predicate (the form of categorical judgment) would indicate nothing but a reference of two sensations to each other in a single sentient subject: a synthesis of the manifold where its constituents do not necessarily belong to one another, not "the necessity that at the foundation of the existence of things there lies a subject which cannot itself be a predicate" (Prol., p. 58), that is, "their relation to
original apperception, and its *necessary unity*" (CPR, p. 159).

For instance, when I say the air is elastic, this judgment is as yet a judgment of perceptive only; I do nothing but refer two of my sensations to each other. But if I would have it called a judgment of experience, I require this connection to stand under a condition which makes it universally valid. I desire therefore that I and everybody else should always connect necessarily the same perceptions under the same circumstances. (Prol., p. 47)

Similarly, although it is possible, as Kant explains, that in perception we may meet with rules of relation indicating either that a certain appearance is constantly followed by another (though the relation does not hold in reverse) or that two or more appearances are constantly conjoined (the order in the synthesis of their apprehension being "a matter of indifference" [CPR, p. 234]), and although we can express such rules as empirical generalizations by means of hypothetical and disjunctive judgments respectively, we have not yet demonstrated any necessary connection between such appearances. "When I say that experience teaches me something, I mean only the perception that lies in experience--for example, that heat always follows the shining of the sun on a stone . . . " (Prol., p. 53).

However, as Kant later cautions, although one may properly use hypothetical judgment to assert that if the sun shines long enough on a stone, the stone grows warm, "there is
indeed as yet no necessity of connection or concept of cause" (Prol., p. 59). In such judgments of perception, the connection of two judgments with each other as ground and consequent (the form of hypothetical judgment) and the relation of two or more judgments that are mutually exclusive and complementary members of the whole sphere of a divided cognition (the form of disjunctive judgment) would both have to be construed truth-functionally— in terms of truth tables, not as expressions of necessary connection. In this context, therefore, it is clear that Kant was able to represent Hume's doubt concerning causality as only one aspect of a more general concern.

[Hume] justly maintains that we cannot comprehend by reason the possibility of causality, that is, of the reference of the existence of one thing to the existence of another which is necessitated by the former. I add that we comprehend just as little the concept of substance, that is, the necessity that at the foundation of the existence of things there lies a subject which cannot itself be a predicate of any other thing; nay, we cannot even form a notion of the possibility of such a thing (though we can point out examples of its use in experience). The very same incomprehensibility affects the community of things, as we cannot comprehend how from the state of one thing an inference to the state of quite another thing beyond it, and vice versa, can be drawn, and how substances which have each their own separate existence should depend upon one another necessarily. (Prol., pp. 57-58)

For empirical judgments to have objective validity, the appearances themselves qua objects of possible empirical
intuition must necessarily conform to the functions of unity among our representations contained in judgments, where the same function that gives unity to the various representations in a judgment also gives unity to the mere synthesis of representations in an intuition. We know already that the functions of unity in judgment are simply the forms of judgment, mere forms of thought. What remains, therefore, is for Kant to examine the source of the unity of representation given in an intuition (unity of intuition), which he does by analyzing the mode in which empirical intuitions are given in sensibility. Bear in mind here that empirical intuition requires three things: a manifold of sense impressions subject to the formal conditions of space and time, a synthesis of the given manifold as a condition of its being represented as contained in a single representation, and the consciousness of this synthesis whereby unity of representation is added to the representation of the manifold.

Kant consistently holds that knowledge, even intuition, presupposes something given, and that the given element is subject to certain a priori forms—the forms of sensibility, space and time. In other words, space and time are, in one sense, merely "original forms of sensibility" (CPR, p. 175) to which the manifold to be intuited, which is antecedently given in the subject, is subject, without yet having been
represented as a manifold, and therefore as contained in a single representation. The manifold, then, is given without combination.³⁴

To represent the manifold as a manifold, and as contained in a single representation, means distinguishing the time in which sensations arise, since time is contained in "every empirical representation of the manifold" (CPR, p. 181): "time is a necessary representation that underlies all intuitions" (CPR, pp. 74-75). In other words, to do so requires generating the representations of the determinate space or time in which the given sensations are themselves posited and ordered in relation to one another, and in terms of which both self-consciousness ("the consciousness that the subject is affected" [CPR, p. 201]) and objective reference ("representing in intuition an object that is not itself present" [CPR, p. 165]) first become possible. Although the generation of these representations by the productive imagination belongs to sensibility,³⁵ it is nevertheless also an expression of spontaneity, representing combination of the given manifold in a single representation which has been brought into being synthetically. The unity of this act "is at the same time the unity of consciousness (as in the concept of a line); and it is through this unity of consciousness that an object ([for example,] a determinate space) is first known" (CPR, p. 156).
These "objects" will, of course, be known (represented) only as they appear—thus, as subject to conditions of sensible intuition: "Appearances, in their formal aspect, contain an intuition in space and time, which conditions them, one and all, a priori" (CPR, pp. 197-198). Since space and time are extensive magnitudes, no part of which is the smallest possible, the representations of a determinate space or time, however small, always contain a manifold of their own: "space . . . consists solely of spaces, time solely of times" (CPR, p. 204). Therefore, space and time are represented "with the determination of the unity of this manifold" (CPR, p. 170). Note, however, that unity of representation is a third element in the intuition of an object, over and above the given manifold (mere receptivity) and the successive synthesis of its apprehension (the sensible form of intuition). In other words, the synthesis of the manifold given to us by means of sensibility, whereby the representations of a determinate space or time are generated, is possible only insofar as there is at the same time a combination, an intellectual synthesis, of the homogeneous parts of that space or time (which are apprehended one after another) in a single whole, a unity (the so-called original unity of apperception) which, according to Kant, only consciousness, not a further act of the imagination, can impart to our representations.
By analyzing the original unity of apperception, the necessary unity of spatio-temporal intuition, and abstracting from its sensible form, Kant is able in the "Analytic of Principles" to show in detail that the functions of unity in intuition are the same as those expressed by the categories, and more particularly that any knowledge of objects of the senses as such (experience) is possible only through the representation of a necessary connection of perceptions. The given manifold ("the raw material" of the sensible impressions that gets "worked up" into that knowledge of objects "which is entitled experience" [CPR, p. 41]) is given as determined by our forms of sensibility, space and time. However, the manifold of sense is given without representation of space or time as such, since the representations (formal intuitions) of a determinate space or time presuppose "combination" of the homogeneous manifold contained within them, an element of spontaneity not attributable to sensibility.

The representation of a determinate space or time must be generated by the imagination in the course of the successive apprehension of the given manifold. The imagination functions schematically, and in accordance with our sensible forms of intuition, establishing the coordinates in terms of which alone "a thoroughgoing synthesis of reproduction" of the given manifold in space and time.
is possible. Kant's idiom in this regard is always the same: drawing lines, describing circles, setting lines at right angles to one another (in order, for example, to represent the three dimensions of space), delineating figures, etc. Since each such schema represents a universal procedure of imagination, the same schema can underlie our apprehension of different objects. The imagination, however, is in this activity subject to certain universal conditions of sensibility. Thus, for example, "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 save through the preceding) . . . " (CPR, p. 225). Thus, if in the field of appearance something that previously did not exist comes into being, our apprehension of the event as such presupposes apprehension of the time immediately preceding. Otherwise it would be impossible to advance to the succeeding time of the event, "since I cannot advance to the succeeding time save through the preceding."

Moreover, since empty time cannot be apprehended, apprehension of an event as such means that something must necessarily precede the event, such that, when posited, it is possible to advance to the succeeding time in which the event takes place. That something serves as a condition for
the advance to the succeeding time of the event from a preceding time in which the event itself did not yet exist. Clearly, however, the transition from a preceding time to an event that follows, if it is to be representative of time itself, must take place in conformity with the law of continuity: no alteration or change in position can be engendered suddenly and still represent time.\(^40\) Thus, not only is the series itself irreversible, but the event in question, which serves to limit what precedes it, is uniquely determined in its existence by what precedes it, in conformity with the law of continuity. This is how Kant should be understood when he speaks of there being something in the preceding state upon which an event "follows invariably, that is, in accordance with a rule" \((\text{CPR}, \ p. \ 225)\). This rule is simply that the condition under which an event "invariably and necessarily follows is to be found in what precedes the event" \((\text{CPR}, \ p. \ 226)\). The unity of representation underlying the intuitive representation of succession is therefore the unity of a series in which what precedes must be viewed as the condition of the event that follows.
Wolff, Kant, and the Answer to Hume

This is Kant's answer to Hume:

Now this synthetic unity, as a condition a priori under which I combine the manifold of an intuition in general, is—if I abstract from the constant form of my inner intuition, namely, time—the category of cause, by means of which, when I apply it to my sensibility, I determine everything that happens in accordance with the relation which it prescribes, and I do so in time in general. (CPK, p. 172)

Abstracting from the temporal character of the series, the constant form of my inner intuition, leaves the notion of one thing as a condition of the existence of another, the notion of cause. Thus,

in the same manner . . . in which time contains the sensible a priori condition of the possibility of a continuous advance of the existing to what follows, the understanding, by virtue of the unity of apperception [my emphasis], is the a priori condition of the possibility of a continuous determination of all positions for the appearances in this time, through the series of causes and effects, the former of which inevitably lead to the existence of the latter, and so render the empirical knowledge of the time-relations valid universally for all time, and therefore objectively valid. (CPK, pp. 232-233)

This reveals the possibility of knowing a priori a law of alterations, in respect of their form. We are merely anticipating our own apprehension, the formal condition of which, since it dwells in us prior to all appearance that is given, must certainly be capable of being known a priori. (CPK, p. 232)

Note, however, that a law or synthetic principle of this
sort cannot be exhibited a priori in the way in which we can exhibit a priori propositions in mathematics. Insofar as the concept cause concerns existence, its application in concreto is "based on certain primary experiences" (CPR, p. 205). Concepts of cause, substance, and reciprocity cannot be exhibited a priori, but only a posteriori, by means of experience; and experience itself is possible only in conformity with principles based on these concepts.42

Taking stock of the preceding, it seems clear that Kant's analytical or regressive method cannot be interpreted along the lines Wolff suggests—namely, on the model of a series of conditions in a syllogistic chain, ratiocinatio polysyllogistica. Ratiocinatio polysyllogistica is, Kant says, "a composite syllogism in which several syllogisms are connected not by mere coordination but by subordination, i.e. as grounds and consequents" (Logic, p. 138), whereby "what is known by means of the understanding is determined in its interrelations, lower rules being brought under higher (namely, those the condition of which includes in its own sphere the condition of the lower), so far as this can be done through [processes of] comparison" (CPR, p. 305). The aim in this, according to Kant, is simply to bring about "the orderly management of the possessions of our understanding" (CPR, p. 305). In other words, it represents an ordering of our concepts in relation to one another ("lower
rules being brought under higher") based on a comparison of their matter or content, on "what has already been thought in our concepts, though [perhaps] in a confused manner" (CPR, p. 47). Here, ironically, the more a concept contains under it (the higher it is), the less it contains in it. But what, then, does *ratiocinatio polysyllogistica* have to do with "the search for the sources of given sciences in reason itself" (Prol., p. 27), Kant's announced aim in the *Prolegomena*? The answer, of course, is that it has nothing to do with that search, and therefore that it cannot be viewed as a model for the interpretation of Kant's analytical method.

Although Wolff's interpretation of the analytical method must be rejected, invalidating his particular grounds for thinking that a regressive analysis beginning from mathematics and natural science will not refute Hume, the question remains whether Kant's argument in the *Prolegomena* yields an answer to Hume. My view is that it does. I think that I have already shown that on the assumption that objects of experience are mere appearances, not things in themselves, the notion of *cause* can be traced to the understanding as an *a priori* concept, *contra* Hume. The final step, therefore, in answering Hume must be to show that this condition is actually met—namely, that objects of experience *are* mere appearances, not things in themselves. Details
aside, both Kant's treatment of the problem of incongruous counterparts (Prolegomena, pp. 31-34) and his discussion of the antinomies serve to establish this claim and thus complete the answer to Hume.
Footnotes to Chapter III

1 Kant's Theory of Mental Activity (Cambridge, Mass.: Harvard University Press, 1969), p. 44. Hereafter citations to Wolff are given in the text, within parentheses, as here.

2 See Wolff, p. 46.

3 What he means, that is, despite his confusing remarks in note 14 on p. 53.

4 Wolff cites only one source in this connection, namely, Kant's description of the regressive method as starting "from what is sought, as if it were given, and ascending to the only conditions [Wolff's emphasis added] under which it is possible" (Prol., p. 23). Wolff, p. 53.

5 Prol., p. 118. Hume, of course, as Kant points out (Prol., pp. 6-7), never doubted the "indispensable need" of using a priori concepts.

6 See CPR, p. 315.

7 See CPR, p. 314.

8 Logic, p. 96.

9 Prol., p. 28.

10 See Kant's examples in Prol., pp. 48-49.

11 CPR, p. 302.

12 "We demand in every concept, first, the logical form of a concept (of thought) in general, and secondly, the possibility of giving it an object to which it may be applied" (CPR, p. 259).

13 CPR, p. 260.

14 "Many empirical concepts are employed without question from anyone. Since experience is always available for
the proof of their objective reality, we believe ourselves, even without a deduction, to be justified in appropriating to them a meaning, an ascribed significance . . . . [But] among the manifold concepts which form the highly complicated web of human knowledge, there are some which are marked out for pure a priori employment, in complete independence of all experience; and their right to be so employed always demands a deduction. For since empirical proofs do not suffice to justify this kind of employment ['their distinguishing feature consists just in this, that they relate to their objects without having borrowed from experience anything that can serve in the representation of these objects'], we are faced by the problem how these concepts can relate to objects which they yet do not obtain from any experience . . . . We are already in possession of concepts which are of two quite different kinds, and which yet agree in that they relate to objects in a completely a priori manner, namely, the concepts of space and time as forms of sensibility, and the categories as concepts of understanding. To seek an empirical deduction of either of these types of concept would be a labour entirely lost" (CPR, pp. 120-121). See also CPR, p. 259.

15 See Prol., p. 28. "The only use which the understanding qua 'faculty of judgment' (CPR, p. 106) aimed at securing 'the unity of appearances by means of rules' (CPR, p. 303) can make of . . . concepts is to judge by means of them" (CPR, p. 105).

16 Intuitions contain representations within themselves; concepts contain representations under themselves; see CPR, pp. 69-70, 134.

17 "The supreme principle of the possibility of all intuition in its relation to sensibility is . . . that all the manifold of intuition should be subject to the formal conditions of space and time" (CPR, p. 155).

18 See CPR, p. 301.

19 See also Prol., p. 16: "... the concept of the sum of 7 + 5 contains merely their union in a single number, without its being at all thought what the particular number is that unites them."

20 "Our apprehension of the manifold of appearance is always successive, and is therefore always changing"
the representation of the parts which are generated one after another "makes possible, and therefore necessarily precedes, the representation of the whole" (CPR, p. 198).

"If I were always to drop out of thought the preceding representations (the first parts of [a] line, the antecedent parts of [a] time period, or the units [representing some particular number] in the order represented), and did not reproduce them while advancing to those that follow, a complete representation would never be obtained: none of the above-mentioned thoughts, not even the purest and most elementary representations of space and time, could arise" (CPR, p. 133).

"This unitary consciousness is what combines the manifold, successively intuited, and thereupon also reproduced, into one representation" (CPR, p. 134), and appearances "cannot be apprehended, that is, taken up into empirical consciousness, save through that synthesis of the manifold whereby the representations of a determinate space or time are generated, that is, through combination of the homogeneous manifold and consciousness of its synthetic unity" (CPR, p. 198).

"As regards the formal element [of appearance], we can determine our concepts in a priori intuition, inasmuch as we create for ourselves, in space and time, through a homogeneous synthesis ['synthesis of the manifold where its constituents do not necessarily belong to one another'] (CPR, p. 197), the objects themselves--these objects being viewed simply as quanta" (CPR, p. 583).

CPR, p. 198; note also that "all combination (conjunctio) is either composition (compositio) or connection (nexus)" (CPR, p. 197).

"... In order that certain sensations be referred to something outside me (that is, to something in another region of space from that in which I find myself), and similarly in order that I may be able to represent them as outside and alongside one another, and accordingly as not only different but as in different places, the representation of space must be presupposed" (CPR, p. 68). "... Neither coexistence nor succession would ever come within our perception, if the representation of time were not presupposed as underlying them a priori. Only on the presupposition of time can we represent to ourselves a number of things as existing at one and the
same time (simultaneously) or at different times (successively)" (CPR, p. 74).

26 Kant defines sensibility as "the capacity (receptivity) for receiving representations through the mode in which we are affected by objects" (CPR, p. 65).

27 Note that "space and time are represented a priori not merely as forms of sensible intuition, but as themselves intuitions which contain a manifold [of their own], and therefore are represented with the determination of the unity of this manifold (vide the Transcendental Aesthetic)." In a footnote to this passage, Kant adds, "In the Aesthetic I have treated this unity as belonging merely to sensibility, simply in order to emphasise that it precedes any concept, although, as a matter of fact, it presupposes a synthesis which does not belong to the senses but through which all concepts of space and time first become possible. For since by its means (in that the understanding determines the sensibility) space and time are first given as intuitions, the unity of this a priori intuition belongs to space and time, and not to the concept of the understanding" (CPR, pp. 170-171).

28 "Our inquiry here extends, not to things in themselves (the properties of which we pass by), but to things as objects of possible experience, and the complex of these is what we here properly designate as nature" (Prol., p. 44).

29 "As to relation, judgments are either categorical, hypothetical, or disjunctive. Namely, the given presentations in judgments are subordinated, one to another, for the sake of the unity of consciousness, either as predicate to the subject, or as consequence to the ground, or as member of the division to the divided concept" (Logic, p. 110).

30 Note that the notion of subordination implies that this is a "synthesis of that which, though heterogeneous, is yet represented as combined a priori" (CPR, p. 198).

31 Kant makes the point in greater detail in the Critique: " . . . if I investigate . . . the relation of the given modes of knowledge in any judgment, and distinguish it, as belonging to the understanding, from the relation according to laws of the reproductive imagination, which has only subjective validity, I find that a judgment is nothing but the manner in which given modes of knowledge
are brought to the objective unity of apperception. This is what is intended by the copula 'is'. It is employed to distinguish the objective unity of given representations from the subjective. It indicates their relation to original apperception, and its necessary unity. It holds good even if the judgment is itself empirical, and therefore contingent, as, for example, in the judgment, 'Bodies are heavy'. I do not here assert that these representations necessarily belong to one another in the empirical intuition, but that they belong to one another in virtue of the necessary unity of apperception in the synthesis of intuitions, that is, according to principles of the objective determination of all representations, in so far as knowledge can be acquired by means of these representations—principles which are all derived from the fundamental principle of the transcendental unity of apperception. Only in this way does there arise from this relation a judgment, that is, a relation which is objectively valid, and so can be adequately distinguished from a relation of the same representations that would have only subjective validity—as when they are connected according to laws of association. In the latter case, all that I could say would be, 'If I support a body, I feel an impression of weight'; I could not say 'It, the body, is heavy'. Thus to say 'The body is heavy' is not merely to state that the two representations have always been conjoined in my perception, however often that perception be repeated; what we are asserting is that they are combined in the object, no matter what the state of the subject may be" (CPR, p. 159).

32 See Logic, pp. 111-112.

33 See CPR, p. 88.

34 "Inner sense . . . contains mere form of intuition, but without combination of the manifold in it, and therefore so far contains no determinate intuition, which is possible only through the consciousness of the determination of the manifold by the transcendental act of imagination" (CPR, p. 166). "... The time in which we set [the] representations [of the outer senses ('the proper material with which we occupy our mind')], which is itself antecedent to the consciousness of them in experience, and which underlies them as the formal condition of the mode in which we posit them in the mind, itself contains [only] relations of succession, coexistence, and of that which is coexistent with succession, the enduring" (CPR, p. 87). "... The
combination (conjunctio) of a manifold in general can never come to us through the senses, and cannot, therefore, be already contained in the pure form of sensible intuition" (CPR, p. 151). In the deduction of the categories "there is one feature from which I could not abstract, the feature, namely, that the manifold to be intuited must be given prior to the synthesis of understanding, and independently of it" (CPR, p. 161).

35 This synthesis is carried out with "the aid of the imagination" (CPR, p. 165), subject to conditions of sensibility, vis-à-vis sensible (versus intellectual) intuition, i.e., the representation of an object as appearance.

36 "The concept of combination includes, besides the concept of the manifold and of its synthesis, also the concept of the unity of the manifold. Combination is representation of the synthetic unity of the manifold. The representation of this unity cannot, therefore, arise out of the combination. On the contrary, it is what, by adding itself to the representation of the manifold, first makes possible the concept of the combination" (CPR, p. 152).

37 "[The] thoroughgoing identity of the apperception of a manifold which is given in intuition [i.e., the unity of consciousness] contains a synthesis of representations, and is possible only through the consciousness of this synthesis. For the empirical consciousness, which accompanies different representations, is in itself diverse and without relation to the identity of the subject. That relation comes about, not simply through my accompanying each representation with consciousness, but only in so far as I conjoin one representation with another, and am conscious of the synthesis of them" (CPR, p. 153).

38 See CPR, p. 133. "When I seek to draw a line in thought, or to think of the time from one noon to another, or even to represent to myself some particular number, obviously the various manifold representations that are involved must be apprehended by me in thought one after the other. But if I were always to drop out of thought the preceding representations (the first parts of the line, the antecedent parts of the time period, or the units in the order represented), and did not reproduce them while advancing to those that follow, a complete representation would never be obtained: none of the
above-mentioned thoughts, not even the purest and most elementary representations of space and time, could arise" (CPR, p. 133).

39 See CPR, pp. 167, 183.

40 See CPR, p. 231.

41 Mutatis mutandis, advancing in time (succession) can only take place in time, i.e., through the representation of something permanent in perception. Abstracting from the temporal character of this intuition, the notion of the permanent becomes the notion of something that is not merely a determination of a something else, i.e., substance. Although more complicated, an analogous reading can be given for the category of community—see CPR, p. 117.

42 See CPR, p. 581.
At the beginning of part II of the introduction to the Transcendental Dialectic where he talks about reason in general, Kant remarks: "All knowledge starts with the senses, proceeds from thence to understanding, and ends with reason, beyond which there is no higher faculty to be found in us for elaborating the matter of intuition and bringing it under the highest unity of thought" (CPR, p. 300). The function of this chapter is to distinguish the unity of understanding from the unity of reason, and to examine the logical apparatus underlying the transcendental ideas of reason.

Early in the Transcendental Dialectic, Kant also asks whether reason can be isolated as an independent source of concepts and judgments. By the following analysis, I hope to establish that Kant answered this question affirmatively, and that reason can, by means of the forms of syllogisms, express the conditions of knowledge as such in a way that the understanding cannot do. "As a matter of fact," Kant affirms, "multiplicity of rules and unity of principles is a demand of reason, for the purpose of bringing the
understanding into thoroughgoing accordance with itself, just as the understanding brings the manifold of intuition under concepts and thereby connects the manifold" (CPR, p. 305). Pure reason, reason in isolation, leaves everything to the understanding, the understanding alone "applying immediately to the objects of intuition, or rather to their synthesis in the imagination" (CPR, p. 318). Yet it reserves to itself the employment of the concepts of the understanding in relation to one another, "solely in order to prescribe to the understanding its direction towards a certain unity of which it has itself no concept, and in such a manner as to unite all the acts of the understanding, in respect of every object, into an absolute whole" (CPR, p. 318). In the preceding chapters I have sought to trace Kant's account of the sources of a priori knowledge from the reception of the given in sensibility through its synthesis by the understanding. The present chapter takes up the question of the a priori determination of our knowledge through concepts by means of reason.

The Unity of Understanding

How does understanding function in experience? Kant identifies the pure understanding as the faculty of rules underlying combination of the manifold given to us by means of sensibility. As such, it is itself the source of
principles "according to which everything that can be presented to us as an object must conform to rules" (CPR, p. 195). The synthetic unity of space and time, the necessary unity of outer and inner sensible intuition, derives from the action of the understanding, so that, if we abstract from the form of intuition, the apprehension of an object given to us by means of sensibility (hence, its intuitive representation in space and time) is necessarily subject to the categories.

In this manner it is proved that the synthesis of apprehension, which is empirical, must necessarily be in conformity with the synthesis of apprehension, which is intellectual and is contained in the category completely a priori. It is one and the same spontaneity, which in the one case, under the title of imagination, and in the other case, under the title of understanding, brings combination into the manifold of intuition. (CPR, pp. 171-172).

In other words, the categories prescribe laws a priori to appearances and therefore to nature. The deduction of the categories guarantees the possibility of a valid representation of objects by means of concepts, where a concept, whether pure or empirical, is, by Kant's definition, "as regards its form, something universal which serves as a rule" (CPR, p. 135). In the application of a concept to an object, the object "must be given prior to the synthesis of understanding, and independently of it": this is the one feature of the deduction of the
categories from which Kant says he "could not abstract" (CPR, p. 161). Since objects must be given to us by means of sensibility prior to the synthesis of understanding and independently of it, concepts relate not to objects in themselves but to representations of objects, in sensible intuitions or other concepts.¹

Representing an object given to us in sensible intuition (original apperception) by means of concepts requires judgment to distinguish whether something does or does not stand under a given rule.² The validity of the categories establishes the understanding as a source of unity within experience, and consequently, Kant takes them to be the source of objective principles, principles according to which everything that can be presented to us as an object must conform to rules. Kant is well aware of the surprising implications of this claim:

However exaggerated and absurd it may sound, to say that the understanding is itself the source of the laws of nature, and so of its formal unity, such an assertion is none the less correct, and is in keeping with the object to which it refers, namely, experience. Certainly, empirical laws, as such, can never derive their origin from pure understanding. That is as little possible as to understand completely the inexhaustible multiplicity of appearances merely by reference to the pure form of sensible intuition. But all empirical laws are only special determinations of the pure laws of understanding, under which, and according to the norm of which, they first become possible. Through them appearances take on an orderly character, just as these same appearances, despite the differences of
their empirical form, must none the
less always be in harmony with the pure
form of sensibility. (CPR, pp. 148-149)

Intuition (sensibility) is the other source of objective
principles: the principles of mathematics are derived
solely from intuition, not from the pure concept of
understanding. The unity of understanding represents a
synthesis of intuitions in accordance with rules, whereby
the understanding connects the manifold of intuition by
bringing it under concepts.

In general logic, a concept, according to Kant, is
merely a "general presentation or a presentation of what
is common to several objects, a presentation, therefore,
so far as it may be contained in different objects . . . .
The matter of concepts is the object; their form is
generality" (Logic, p. 96). In transcendental logic,
however, a concept is always, as regards its form, something
universal which serves as a rule. All concepts, notwith­
standing their generality or universality, are, Kant says,
contained in the presentation of things: what is thought
in the concept must be contained in the intuition of ob­
jects, if only as a "transcendental determination of time,"
void of all empirical content.

"General logic," Kant says, "abstracts from all con­
tent of knowledge, and looks to some other source, whatever
it may be, for the representations which it is to transform
into concepts by process of analysis" (CPR, p. lll). The logical acts of the understanding by which concepts are generated as to their form are:

1) **comparison**, i.e. the likening of presentations to one another in relation to the unity of consciousness;
2) **reflection**, i.e. the going back over different presentations, how they can be comprehended in one consciousness; and finally
3) **abstraction** or the segregation of everything else by which given presentations differ. (Logic, p. 100)

The procedure here is wholly inductive, moving from intuition to concepts. To abstract from all content of knowledge through which an object is known and distinguished from others means to abstract even from the formal conditions of sensibility under which the objective unity of given representations, the necessary connection of perceptions, is known and distinguished from the subjective, the merely logical connection of perception in a thinking subject. In general logic, even the contents of immediate sense perception, our perceptions themselves, must be considered "objects." From the standpoint of general logic, in other words, "everything, every representation even, in so far as we are conscious of it, may be entitled object" (CPR, p. 219). Our list of concepts will thus range even over sense qualities (colors, taste, etc.), and the categories will have either to be analyzed along Humean lines or rejected as being "without any content, therefore
entirely empty" (CPR, p. 111). In other words, our con­
cepts would have only subjective validity, limiting their
use to judgments of perception.

If, however, we take account of the formal conditions
of sensibility under which alone objects can be given to
us, and "separate off" (abstract) from sensibility only
what belongs to sensation, what remains is "a manifold of
a priori sensibility . . . as material for the concepts
of pure understanding" (CPR, p. 111), that is, something
which must be viewed as preventing our modes of knowledge
from being haphazard or arbitrary, and determining them
a priori in a definite fashion. In transcendental logic,
therefore, a concept must be, as regards it form, something
universal which serves as a rule underlying the determi­
nation of the manifold of intuition and limiting it to condi­
tions which make unity of apperception possible. Thus,
in order in this way to distinguish the objective unity of
given representations from the subjective, pure concepts
of the understanding must be superadded to the concepts
abstracted from intuition.

The Transcendental Analytic has shown us how
the mere logical form of our knowledge may in
itself contain original pure a priori concepts,
which represent objects prior to all experience,
or, speaking more correctly, indicate the syn­
thetic unity which alone makes possible an
empirical knowledge of objects. The form of
judgments (converted into a concept of the
synthesis of intuitions) yield[s] categories
which direct all employment of understanding
in experience. (CPR, p. 315)
These issues will be discussed more thoroughly in a later section in connection with my discussion of the conditions of thought. All that I want to note here is that Kant considers the objective unity of given representations to be due entirely to the understanding.

 Objects in transcendental logic can be alike, may contain or share common features, only in terms of their relation to original apperception and its necessary unity. Thus, what is common to several objects has to do with the rule underlying their individual syntheses in space and time. The objectivity of a concept, its "objective reality," rests on its being a rule for the original determination of an object in intuition, and is therefore "contained in" the object. The concept must contain something which is represented in the objects that are subsumed under it.\(^5\) Literally one and the same rule of synthesis is contained in different objects, whether we are conscious of the concept as such or not.

 Concepts, therefore, have a dual aspect: (1) \textit{qua} rules according to which the productive imagination apprehends the manifold of intuition, and on which, therefore, the unity of consciousness depends, they are contained in the presentation of things; (2) \textit{qua} grounds of cognition, however—that is, as characteristics of objects—these objects are contained under them. Insofar as all appearances
must belong to or be apprehended in inner sense (that is, by means of a serial synthesis), all concepts of appearances are "nothing but the consciousness of this unity of synthesis," where "this unitary consciousness is what combines the manifold, successively intuited, into one representation" (CPR, p. 134). In other words, the understanding combines the perceptions that have been given without combination in inner sense, adding to them the representation of synthetic unity that underlies the knowledge of objects. The concept of an object is simply a concept of the synthetic unity of the manifold of perceptions through which the object is determined, as appearance, by the understanding. Unity of consciousness must be added by the understanding to the synthesis of the manifold of sensibility (transcendental synthesis of imagination) in order for cognition (intuition) to take place. The pure concepts of understanding, which express the function of unity supplied in an intuition by the understanding, must be viewed as contained in the presentation of things—not as things in general, abstracting from all conditions of sensibility, but merely as appearances, abstracting only from what belongs to sensation. These concepts originate in the understanding in relation to the determination of an object through perceptions. They are not, however, acquired through experience or through reflection upon the subjective conditions associated with our initial discovery of them. "The explanation
of the manner in which concepts can thus relate \textit{a priori} to objects \cite{Kant:1781} their transcendental deduction" \cite[p. 121]{Kant:1781}. Note, however, that the categories (in form, universal) have no validity except in relation to a manifold given prior to the synthesis of the understanding, and independently of it.

We are now prepared to distinguish between the unity of intuition and the unity of understanding, recognizing that the same function of combination underlies each. In the \textit{Logic} Kant reminds us that "all our cognition has a twofold relation, \textit{first} to the object, \textit{second} to the subject. In the former respect it is related to \textit{presentation}, in the latter to \textit{consciousness}, the general condition of all cognition in general. (Actually, consciousness is a presentation that another presentation is in me)" \cite[p. 37]{Kant:1781}. Objects are given to us by means of sensibility. Coming to consciousness of oneself—that is, the mind's giving rise to an intuition of itself and of what lies in it—takes place insofar as the mind seeks out or apprehends the manifold given to it by means of sensibility. A given manifold is nothing to us, however, except insofar as it has been apprehended by the mind, reproduced by imagination to yield a complete representation, and then combined into one representation (brought under a rule) as a function of consciousness, a unity which only consciousness can impart to it and which
constitutes the "spontaneity" of thought on which concepts are based.

Whereas all intuitions, as sensible, rest on affections, concepts rest on functions. By 'function' I mean the unity of the act of bringing various representations under one common representation. Concepts are based on the spontaneity of thought, sensible intuitions on the receptivity of impressions. (CPR, p. 105)

The representation of an object in intuition is singular; although we are conscious of the unity of intuition, we are not conscious of it as a necessary unity. The unity of original apperception can only be represented as a necessary unity in thought, and then only through the pure concepts of the understanding (qua universal). In intuition all that is manifold in the object is given as contained in a single representation. In the understanding, the manifold is thought as contained under a rule expressing the necessary unity of apperception. 6

Synthesis of apprehension must take place in conformity with our a priori forms of outer and inner sensible intuition. In other words, it must take place in accordance with rules. Judgment allows us to bring to explicit consciousness the unity of rule that "determines all the manifold, and limits it to conditions which make unity of apperception possible" (CPR, p. 135). All necessity, Kant claims, is grounded in the a priori conditions of sensibility. Without such a ground, it would be impossible to think any object for our intuitions,
for such an object "is no more than that something, the concept of which expresses such a necessity of synthesis" (CPR, p. 136).

The Unity of Reason

Now Kant tells us that to know a thing completely, we must know every possible predicate of it, and we must determine it thereby, "either affirmatively or negatively. The complete determination is thus a concept, which, in its totality, can never be exhibited in concreto" (CPR, p. 489). This concept is based upon an idea which has its seat solely in the faculty of reason. In other words, reason gives rise to an idea of a synthesis of intuitions by means of concepts that is completely adequate to, that completely reproduces, the synthesis that is possible empirically. Ideas are concepts that aim at the systematic unity of our concepts of experience; in ideas, reason aims only at a systematic unity, seeking to approximate the unity that is empirically possible without ever completely reaching it. In accordance with these ideas, reason attempts to structure the knowledge provided to it by the understanding, aiming for a certain completeness and conceptual unity that the understanding cannot itself provide. By itself the understanding knows nothing,
but acts rather merely by combining and arranging the material given to it in intuition. To know a thing completely means to have determined all the conditions of its possibility. Such knowledge, insofar as it is in complete agreement with its object, must be viewed as unconditionally valid.

What is the difference between the unity of reason and the unity of understanding? "Reason," Kant says, "concerns itself exclusively with absolute totality in the employment of the concepts of the understanding, and endeavours to carry the synthetic unity, which is thought in the category, up to the completely unconditioned" (CPR, p. 318). The unity of reason is therefore not the unity of a possible experience; such unity is the unity of the understanding. The unity of reason, in contrast, concerns the ordered series of conditions that must be established for any given conditioned to be completely understood: "the transcendental concept of reason is directed always solely towards absolute totality in the synthesis [via prosyllogisms] of conditions, and never terminates save in what is absolutely, that is, in all relations, unconditioned" (CPR, p. 318). The unity of reason, which Kant identifies as the highest unity of thought, is the unity of the rules of understanding under principles. It represents knowledge in which "I apprehend the particular
in the universal through concepts" (CPR, p. 301), imposing on given modes of knowledge attained by means of the understanding "a certain form, called logical" (CPR, p. 305), the form of syllogisms applied to the synthetic unity of intuitions under the direction of the categories. Reason in its ideas is concerned with "determining according to principles how understanding is to be employed in dealing with experience in its totality" (CPR, p. 315), making use of the various forms of syllogism in order to derive synthetic judgments from principles.

The unity of intuition is the unity of a given manifold in space and time. The unity of understanding is the unity of appearances in accordance with rules. A rule or concept is useful in knowing an object; its usefulness derives from its being a "higher" representation in the sense that through it "much possible knowledge," the infinite number of different possible representations contained under it, "is collected into one" (CPR, p. 106). The unity of reason, the highest unity of the three, is achieved insofar as "what is known by means of the understanding is determined in its interrelations, lower rules being brought under higher (namely, those the condition of which includes in its own sphere the condition of the lower), as far as this can be done through [processes of] comparison" (CPR, p. 305). The unity of reason is simply
the plurality of the rules of understanding considered as a unity. The unity of reason is unconditionally valid; there is no higher unity with respect to which the unity of reason can be viewed as conditioned.

According to Kant, the unconditioned alone makes possible "the totality of conditions, and, conversely, the totality of conditions is always itself unconditioned" (CPR, p. 316). In aiming toward totality in the series of premises (conditions), reason aims at complete understanding of objects by means of concepts, at knowledge, in other words, deriving from the principles of pure understanding, so-called because, although not themselves derived from concepts (rather they must be supported by pure intuition in mathematics, or by conditions of a possible experience in general), they are, all the same, universal propositions with respect to which it is not practicable to seek for still more universal conditions of their truth. These principles of pure understanding state the conditions of a possible empirical intuition in general and are not limited to any particular object. Ultimately, reason seeks, through establishing the totality of the conditions under which the principles of pure understanding apply in a given case, to derive from such principles a knowledge of particulars. Reason assumes in its method that, in the respects in which any given
knowledge is conditioned, the series of conditions is itself completely given.

Kant introduces the notion of the unconditioned as follows: "Now since it is the unconditioned alone which makes possible the totality of conditions, and, conversely, the totality of conditions is always itself unconditioned, a pure concept of reason can in general be explained by the concept of the unconditioned, conceived as containing a ground of the synthesis of the conditioned" (CPR, p. 316). To attempt to extend the totality of conditions up to something unconditioned constitutes a dialectical employment of these ideas whereby reason mistakes the necessary connection of perceptions expressed in the analogies for a necessity pertaining to things in themselves, that is, for an inner necessity, on the basis of which we purport to advance through prosyllogisms to the unconditioned: "first, to the subject which is never itself a predicate; secondly, to the presupposition which itself presupposes nothing further; thirdly, to such an aggregate of the members of the division of a concept as requires nothing further to complete the division" (CPR, p. 316). Unfortunately, as Kant notes, "this inner necessity is in certain cases a quite empty expression to which we cannot attach any concept whatsoever" (CPR, p. 317).
Kant states that he understands by idea "a necessary concept of reason to which no corresponding object can be given in sense-experience" (CPR, p. 318). The ideas serve to represent the unity of reason whereby reason structures the material given to it by the understanding in a way that the understanding cannot do for itself. The result is the ordered series of conditions presented through the syllogism in its three variations. These variations—categorical, hypothetical, disjunctive—express the three relations which Kant says "are to be universally found in all our representations," and with respect to which "we can form either a concept or an idea"—namely, (1) the relation to the subject; (2) the relation to the manifold of the object in the field of appearance; (3) the relation to all things in general (CPR, p. 323). Relations (2) and (3) are also described as the relation to objects, either as appearances or as objects of thought in general, respectively. This threefold analysis should be viewed in light of Kant's division of the idea of an unconditioned (see CPR, p. 316):

(1') the unconditioned "of the categorical synthesis in a subject"—that is, a "subject which is never itself a predicate": "all appearances are in time; and in it alone, as substratum (as permanent form of inner intuition),
can either coexistence or succession be repre-

sented" (CPR, p. 213). The knowledge that rea-
son yields by means of the categorical syllogism
(such knowledge as "Caius is mortal"), although
derivable from experience by means of the under-
standing alone, achieves universality only as a
function of reason.

(2') the unconditioned "of the hypothetical
synthesis of the members of a series"---that is,
a "presupposition which itself presupposes
nothing further." Kant here speaks of "a series"
because all our intuitions must belong to inner
sense, the form of which is time, which is a
series.

(3') the unconditioned "of the disjunctive
synthesis of the parts in a system"---that is,
"such an aggregate of the members of the division
of a concept as requires nothing further to
complete the division." Therefore, any given
object must fall under exactly one of the possi-
bilities represented by the various members of
the division.

Kant holds that the concept of the totality of the
conditions for any given conditioned rests on the function
of reason in the syllogism, expressing universality of knowledge. In order for this function to be carried out, the series of premises must constitute a totality ("allness or totality is just plurality considered as unity," CPR, p. 116), so that "what is known by means of the understanding is determined in its interrelations [my emphasis]" (CPR, p. 305). A higher (more abstract or more general) rule is a condition of lower rules in the sense that it governs the synthesis by means of which what is given in judgment through the lower rules is brought to the unity of apperception. This requirement of reason is met both if "the series of premisses has a first member, as its highest condition" (CPR, p. 322), and, if that series has no first member, if it can be determined that the series itself, a series of conditions, "is unconditionally true" (CPR, p. 322). For a series to be unconditionally true means that it is in complete agreement with the formal characteristics of its object qua appearance. Regardless whether the totality of the series of premises is finite or infinite, the fact that the understanding is determined, in its application to experience, according to principles, i.e., according to rules that serve as grounds of other judgments, and that "are not themselves grounded in higher and more universal modes of knowledge" (CPR, p. 188), gives reason the right to regard such series as being
unconditionally valid and the series of conditions, taken in their totality (whether finite or infinite), as being completely determined. Thus, whether the series is finite or infinite, and even admitting that we can never succeed in comprehending a totality of conditions, "the series must contain such a totality, and the entire series must be unconditionally true if the conditioned, which is regarded as a consequence resulting from it, is to be counted as true" (CPR, p. 322). In essence, the assumption that all members of the series on the side of the conditions are given expresses the demand of reason that, by application of the form of syllogisms to the synthetic unity of intuitions under the direction of the categories, the understanding be brought "into thoroughgoing accordance with itself" (CPR, p. 305) and treated as a unity whose employment with respect to experience in its totality has been determined according to principles. This reading is consistent with Kant's claim that pure reason has "no immediate relation to [objects] and the intuition of [objects], but only to the understanding and its judgments—which deal at first hand with the senses and their intuition for the purpose of determining their object" (CPR, p. 306).

The categories are objectively valid (true of a thing) through an a priori relation to the formal conditions of sensible intuition (transcendental schemata). In
contrast, the ideas, which express the transcendental concept of reason, "the concept of the totality of the conditions for any given conditioned," are valid unconditionally, though not objectively. Since reason in the syllogism does not concern itself with intuitions, with a view to bringing them under rules (as the understanding does with its categories), but with concepts and judgments, the validity of the ideas will not be restricted to a particular mode of intuition, but will hold of any application of understanding to a sensible intuition, regardless of the formal character of that intuition. The absolute necessity of the relation which the major premise of a syllogism, as a rule, represents between what is known and its condition is an inner necessity, a purely logical condition or *sine qua non* of the agreement of knowledge with the laws of reason. In contrast, the necessity represented in the categories is the necessity of a thing in all relations, i.e., to everything possible. Thus, the material necessity in existence underlying the determination of a series of conditions in the field of appearance is not to be regarded as an inner necessity. To assert that would make it impossible even to conceive the opposite of such a series; if the necessity of the series were an inner necessity, the notion of any other series would be internally impossible or
self-contradictory. This, however, would contradict the first postulate of empirical thought in general, that possibility and impossibility are determined always relative to the formal conditions of experience. In the case of a series of conditions in the field of appearance, so-called "inner necessity" is merely an empty expression to which no corresponding concept can be attached, whereas the notion of the necessity of the series in all respects "involves certain quite special determinations" (CPR, p. 317), viz., determinations expressing formal conditions of experience. Reason can be legitimately concerned with the absolute or unconditional validity of the series only in this latter respect. Kant's distinction here seems to reduce to one between the validity of the series considered in itself, apart from the conditions of sensibility, and its validity vis-à-vis universal laws of experience.

It is important to note that the unity of reason, a unity expressing the totality of conditions for any given conditioned, is not an objective unity. Reason itself is incapable of extending our knowledge to the unconditioned. In its legitimate application, reason merely seeks to determine the relation of given knowledge, knowledge derived from experience, to the principles of pure understanding—in other words, to apprehend the particular in the universal through concepts. If this procedure is
mistaken for insight into things in themselves, reason becomes dialectical.⁹

The Conditions of Thought—A Transition to the Transcendental Ideas

As noted in chapter two, Kant maintains that when someone says that experience teaches him something, he means only the perception that lies in experience—for example, that heat always follows the shining of the sun on a stone. "Consequently the proposition of experience is always so far accidental" (Prol., p. 53). Kant states that there is in such relation of perceptions no necessity of connections or concept of the understanding, only the logical connection of perception in a thinking subject, a judgment in which I compare perceptions and connect them in a consciousness of my particular state. "For instance," he says, "when I say the air is elastic, this judgment is as yet a judgment of perception only; I do nothing but refer two of my sensations," conjoined subjectively in my perception according to laws of association or reproductive imagination, "to each other" (Prol., p. 47). Therefore, although it is possible to speak of "concepts abstracted from intuition" (Prol., p. 49)–hence, of generalizing from particulars—such concepts have only subjective validity. In order for an empirical concept
to be considered objectively valid, a pure concept of the understanding must be "superadded" (Prol., p. 49) to it, under which it is subsumed as an empirical law, i.e., as a special determination of the pure laws of the understanding in terms of which a given object can be distinguished from various other objects and some one particular mode of connection of the representations of the object rendered necessary. Thus, subsuming the concept 'mortal', abstracted from intuition, under pure concepts of the understanding determines the intuition from which the concept 'mortal' has been abstracted relative to judging in general, the empirical rule being considered as a law valid of the connection of the representations of objects given in empirical intuition "for the purposes of a possible experience which requires universal and therefore necessarily valid rules" (Prol., p. 59). Again, Kant holds that "all empirical laws are only special determinations of the pure laws of understanding, under which, and according to the norm of which, they first become possible" (CPR, p. 148). Since the manifold of perceptions through which we determine the relation of knowledge to an object can only be given empirically, the pure concepts of the understanding that deal with the existence of the manifold are merely "indeterminate concepts of the synthesis of possible sensations" (CPR,
These pure concepts themselves yield no intuition but only a synthesis of empirical intuitions in general. Thus, insofar as they serve to define what we mean by an object of possible intuitions, these concepts cannot serve to distinguish one object from another.

Even granting that we could in any manner contrive to infer that something exists, we could not know it determinately, could not, that is, anticipate the features through which its empirical intuition is distinguished from other intuitions. (CPR, p. 210)

Note, however, that empirical concepts are also to some extent indeterminate. The concept 'mortal', for example, is only a partial concept of an object. Thus, even granting that we could in any manner contrive to infer that something mortal exists, we could not (merely through the concept 'mortal') know such a thing determinately, could not, that is, anticipate the features through which its empirical intuition is distinguished from the intuition of any other such being. Although the concept 'mortal' may serve to distinguish a given object (Caius, say) from various others (e.g., from inanimate objects) and to necessitate some one particular mode of connection of the given manifold, it does not suffice to distinguish between Socrates and Caius, both of whom are mortal. Only intuitions can be in immediate relation to an object; concepts relate to an object through other representations—intuitions or concepts. Thus, as Kant notes, "the only use which
the understanding can make of these concepts is to judge by means of them" (CPR, p. 105), clearly making judgment a conditioned knowledge.

"A judgment," Kant says, "is the presentation of the unity of consciousness of several presentations or the presentation of their relation so far as they make up one concept . . . . To every judgment belong, as its essential components, matter and form. The matter of judgment consists in given cognitions that are joined in judgment into unity of consciousness; in the determination of the manner in which various presentations as such belong to one consciousness consists the form of judgment" (Logic, pp. 106-107). In categorical judgments the subject serves as a condition under which the predicate (general term for what is asserted) is determined in relation to an object—that is, in relation to the presentation of the object in empirical intuition. The form of judgment—that is, copula—determines and expresses this subordination of the predicate to the subject. In other words, the form of judgment asserts a relation of agreement or disagreement between subject and predicate, where the object whose representation through a given mode of knowledge is considered in the subject, is, in virtue of its representation through the given mode of knowledge, considered as part of or as excluded from the sphere of the predicate.
According to Kant, all that is thought (asserted) in hypothetical judgments is the logical sequence of the two judgments that make them up, i.e., the connection of the two judgments with each other as ground and consequent, whereby what is thought in the consequent is subordinated as consequence to the antecedent or ground, and asserted under the latter, qua problematically expressed condition.

... What matters [in hypothetical judgments] is only the correctness of the connection—the form of the consequence on which rests the logical truth of these judgments. There is an essential difference between the two sentences: All bodies are divisible, and If all bodies are composite then they are divisible. In the former sentence I assert the matter straightway; in the latter, only under a problematically expressed condition. (Logic, pp. 111-112)

The presentation of this kind of connection of two judgments (given modes of knowledge) with each other—that is, the form of hypothetical judgments—links the two judgments, either subjectively or objectively, "in behalf of the unity of consciousness" (Logic, p. 111). In the one case, the form of judgment determines and expresses, as an empirical rule, a merely subjective connection of perceptions in a thinking subject, with no implication of universal and necessary validity; the rule is merely abstracted from empirical intuition. In the other case, however, the form of judgment is used to indicate the relation of given modes of knowledge to original
apperception, and its necessary unity. Here the rules abstracted from intuition are considered as laws, that is, as having universal validity. "The empirical rule is now considered as a law, and as valid, not merely of appearances but valid of them for the purposes of a possible experience which requires universal and therefore necessarily valid rules" (Pro1., p. 59).

"The disjunctive judgment," according to Kant, "contains a relation of two or more propositions to each other, a relation not . . . of logical sequence, but of logical opposition, in so far as the sphere of the one excludes the sphere of the other, and yet at the same time of community, in so far as the propositions taken together occupy the whole sphere of the knowledge in question" (CPR, p. 109). What is thought or asserted by means of such judgments is merely that a given object is contained within a sphere of cognition that has been divided into distinct and yet complementary parts, where what is contained under the given sphere is also contained under a part of that sphere and where members of the given sphere agree with one another, differences notwithstanding, in a way that they would not agree with anything falling outside the given sphere.10 In other words, the given sphere is represented as a whole divided into parts, the sum of the parts equaling the whole. Clearly, no member
of the disjunction is to be thought, that is, asserted, in isolation, the sole function of the disjunction being to represent the given sphere of cognition as a whole and therefore as enclosed within definite limits. The members of the disjunction "share in a community as parts of a whole sphere of cognition, outside which nothing can be thought in a definite relation" (Logic, pp. 112-113); they are given merely as conditions of the determination of the scope and limits of that sphere. The special character of disjunctive judgments is this:

The members of the disjunction are altogether problematic judgments of which nothing else is thought but that they, taken together, are equal to the sphere of the whole as parts of the sphere of a cognition, each being the complement of the other (complementum ad totum). And from this follows: In one of these problematic judgments must be contained the truth or—which is the same—one of them must be assertorically valid, because outside of these judgments the sphere of cognition under the given conditions comprises nothing else, and one is opposed to the other; consequently, there can be true neither anything anything else outside them, nor more than one among them. (Logic, p. 113)

Assume that Caius is mortal. As already noted, we cannot, through mere analysis of the concept 'mortal', know Caius determinately, cannot, that is, anticipate the features of his empirical intuition that distinguish him from other mortal beings. However, by dividing the sphere of the concept 'mortal', we can nevertheless add to our knowledge
of Caius, albeit problematically, through a set of mutually exclusive and logically complementary, that is, coordinate, characteristics.

These three forms of judgments (categorical, hypothetical, disjunctive), by means of which given modes of knowledge are brought to the objective unity of apperception, fully account for the kinds of relations which Kant says are to be universally found in all of our representations, namely, "(1) the relation to the subject; (2) the relation to the manifold of the object in the [field of] appearance; (3) the relation to all things in general."

Let us now consider the categorical syllogism,

\[
\begin{align*}
\text{All men are mortal.} \\
\text{Caius is a man} \\
\text{therefore, Caius is mortal.}
\end{align*}
\]

Consider first the major premise, "All men are mortal." Kant calls this complete quantity of the extension of the predicate, taken under a given condition, "universality." Having subsumed the predicate under the condition 'man' taken in its whole extension ("All men are mortal"), Kant proceeds to a determination of the knowledge in question ("Caius is mortal") by means of reason. He could have derived this knowledge "from experience by means of the understanding alone," but he elects to derive it by means of a syllogism because he is in pursuit of a
concept ('man') that "contains the condition under which the predicate . . . of this judgment is given" (CPR, p. 315).

The concept 'man', qua concept, serves as a rule for the synthesis (apprehension) of a manifold, and therefore expresses part of what is involved in bringing objects to the unity of consciousness--concepts are merely partial concepts of the objects represented by means of them. Note again, however, that the concept 'man' is, as regards its form, something universal which serves as a rule; in generating the concept 'man' we abstract from all possible differences that may exist between individual men, limiting the concept to what is common to all men. But since the concept 'man' is only a partial concept, further abstraction is still possible, leading to still higher concepts, until one comes at last to "a highest concept (conceptus summus) from which as such no further abstraction can be made without making the entire concept disappear" (Logic, p. 103). Note that "in every concept there is to be distinguished matter and form. The matter of concepts is the object; their form is generality" (Logic, p. 96). Thus, further abstraction would recognize the determinate character of the concept 'man' (in form something general or universal) and would determine a higher concept, the concept 'mortal', which expresses "formal conditions of experience," that is, "conditions of intuitions and of concepts"--in short,
a notion of possibility broader than that expressed by the concept 'man'.

It is possible, according to Kant, to derive the premises of this syllogism from experience by means of the understanding alone. Reason demands, however, that we search for a series of conditions that, in its sum total, underlies and thereby makes possible our judgments of experience. "Reason is constrained to regard the series of conditions in the ascending line as completed and as given in their totality" (CPR, p. 321), whether or not the series has a first member as its highest condition. Note, however, that Kant also admits "that we [may] never succeed in comprehending a totality of conditions [as such]" (CPR, p. 322). This is true even in the case of an ascending series of categorical syllogisms: by the law of continuity, there can be "neither a lowest nor a nearest species" (Logic, p. 103).\footnote{11}

Objects of intuition are individuals represented as such; positions in space and time, which are given only in intuition, are ultimately the only true individuators. Although concepts may be used to individuate, their universal form makes them essentially different from the singular representations in intuition, and so, unlike the latter, they can serve as the subjects of universal judgments—or, conversely, as potential predicates of a number
of different objects. If we compare a singular with a universal judgment, Kant says, "the singular stands to the universal as unity to infinity, and is therefore in itself essentially different from the universal" (CPR, p. 107). There is, in other words, an absolute gap between concept and intuition. Kant's talk about the totality of the conditions for any given conditioned represents reason's attempt to bridge this gap by means of concepts, thereby establishing any particular predication on thoroughly universal grounds. The "given conditioned" is the knowledge expressed in a singular judgment, for example, "Caius is mortal."

It is only when we have . . . produced synthetic unity in the manifold of intuition that we are in a position to say that we know the object. But this unity is impossible if the intuition cannot be generated in accordance with a rule by means of such a function of synthesis as makes the reproduction of the manifold a priori necessary, and renders possible a concept in which it is united . . . . This unity of rule determines all the manifold, and limits it to conditions which make unity of apperception possible. (CPR, p. 135)

Empirical knowledge, in other words, is a knowledge which determines an object through the representation of a necessary connection of perceptions. The conditions of such knowledge are determined by means of reason in syllogisms; the idea of the totality of these conditions is based on an ascending series of syllogisms, a chain or
series of prosyllogisms, whereby knowledge attained by
the understanding is determined in all its interrelations.
Reason requires totality in the series of premises since
only on the assumption of such a totality is a given
judgment determinable on thoroughly universal grounds.

Reason and the Transcendental Ideas

As I noted in the beginning of this chapter, Kant
characterizes reason as the highest faculty within us
"for elaborating the matter of intuition and bringing it
under the highest unity of thought." He characterizes
this highest unity of thought as attempting to approximate
the knowledge of any given conditioned through the totality
of its conditions. The idea of the "allness" or "totality"
of the conditions for any given conditioned must be under­
stood and applied with respect to each of the three kinds
of relational synthesis which the understanding represents
to itself by means of the categories, and hence with respect
to "the relations which are to be universally found in all
our representations." These three kinds of relations are:

A) relation to the subject

B) relation to objects as appearances--that

is, to the manifold of the object in the

field of appearance
C) relation to objects of thought in general—that is, to all things in general.

Through exploring the conditions underlying these relations, Kant brings to light and gives a name to the concepts of pure reason, calling them the transcendental ideas, which are "none other than" concepts of the totality of conditions for any given conditioned.

A) Relation to the Subject

All our representations, however abstract, insofar as they signify anything at all, must either be contained in the presentation of things, that is, in a possible empirical intuition, or contain something that is contained in the presentation of things. The forms of judgment determine and express the ways in which given representations (modes of knowledge) are related to one another in consciousness, that is, in relation to the subject:

"a judgment is nothing but the manner in which given modes of knowledge are brought to the objective unity of apperception" (CPR, p. 159). However, although all three forms of judgment having to do with relation express the relation of given modes of knowledge to the unity of consciousness in a thinking subject, the categorical form is the only one of the three in which the relation of the given modes of
knowledge to each other is viewed as conditioned, that is, as having to be in agreement with an object. Since the given modes of knowledge (judgments) considered in hypothetical and disjunctive judgments "are one and all problematic only" (CPR, p. 110), that is, admitted merely as being logically possible, the relations of thought asserted in such judgments are merely logical. Although the possibility of hypothetical judgments presupposes the recognition of rules having to do with the synthetic unity of appearances in time, all that is actually thought (asserted) in them is the logical sequence of two propositions. Whether these propositions, antecedent and consequent, are both true is left undetermined. Similarly, the determination of the relation of various judgments as mutually exclusive and complementary members of a divided cognition, an object is represented problematically through the various members of the division--that is, through many concepts--where "nothing else is thought but that they, taken together, are equal to the sphere of the whole as parts of the sphere of a cognition, each being the complement of the other (complementum ad totum)."

In contrast, in categorical judgments nothing is problematic--everything is assertoric. What is thought (asserted) by means of the predicate, is thought mediately through some other representation, viewed as a condition
under which the predicate is given, be that other representation an intuition or itself a concept. Moreover, the truth of the judgment depends on its agreement with the object whose representation through a given mode of knowledge (whether an intuition or itself a concept) is considered in the subject.

In categorical judgments, the subject is considered as part of the sphere of the predicate, which is subordinate to it. Between the subject and the predicate it is always at least logically possible to discover a middle term, a concept which, like the predicate, is subordinate to the subject and which, like the subject, is considered as part of the sphere of the predicate—a concept, in other words, to which the predicate must also be subordinated, and so the condition under which the predicate of the judgment is given. We express this relation of given knowledge to its condition by means of the categorical form of syllogism.

All men are mortal  
\text{Caius is a man}  
\text{therefore, Caius is mortal}

"By this procedure," Kant says, "I [arrive] at knowledge (a conclusion) by means of a series of conditions (the premisses)" (CPR, p. 321), adding that the pursuit of further conditions (a series of conditions) can be continued indefinitely.
The aim of reason is to determine the totality of the conditions underlying any given knowledge of an object, that is, to restrict a predicate to a certain object by means of reason, where restricting a predicate to an object in that way means first subordinating the predicate to some condition, taken, as Kant puts it, in its whole extension.

The function of reason in its inferences consists in the universality of knowledge [which it yields] according to concepts, the syllogism being itself a judgment which is determined a priori in the whole extent of its conditions. (CPR, p. 315)

Since, according to Kant, the unity which an object makes necessary is merely the formal unity of consciousness in the synthesis of the manifold of intuition, the conditions under which the predicate must be subsumed in order to be restricted to a certain object are merely formal conditions of experience. As such, they represent, in their sum total, all synthesis that is required for the knowledge in question, or, in other words, the absolute (unconditioned) unity of the thinking subject.

B) Relation to objects as appearances; that is, to the manifold of the object in the field of appearance

A hypothetical judgment may express a universal rule that links appearances in time. When such a rule is used as a basis for inferring—via modus ponens or modus
that something either does or does not exist (that is, when it is used as the major premise in a hypothetical syllogism), the inference is possible, Kant says, "only comparatively a priori, relatively to some other previously given existence," and that "even so, we can then arrive only at such an existence as must somewhere be contained in the context of the experience, of which the given perception is a part . . . " (CPR, p. 247). Thus, inferring from experience that something is mortal (hence, that something mortal exists) means only that certain features of its empirical intuition can be inferred from the concept 'mortal' in connection with that which is perceived--that, for example, the body's normal functions will eventually cease if the body is denied food and water for long enough.

In other words, according to Kant, to determine our representations in relation to objects as appearances means determining their relation to the "real" in space and time--namely, to "that in the objects which corresponds to sensation" (CPR, p. 184). In short, our representations must be related to the material conditions of experience, among which is the principle that everything that happens "presupposes something upon which it follows according to a rule" (CPR, p. 218). Herein lies the ground for a regress: in the application of this principle to
appearances, reason seeks to carry on the empirical synthesis indefinitely. This synthesis constitutes "a series of conditions subordinated to, not co-ordinated with, one another, and generative of a [given] conditioned" (CPR, pp. 386-387). In pursuing this regress, reason aims at the unconditioned unity of the objective conditions in the field of appearance. Once having conceived the principle of such a series of conditions, reason can direct the understanding to search for and represent a serial order of appearances in any of the four modes in which appearances can be subordinated to one another:

1. Absolute completeness of the Composition of the given whole of all appearances.

2. Absolute completeness in the Division of a given whole in the [field of] appearances.

3. Absolute completeness in the Origination of an appearance.

4. Absolute completeness as regards Dependence of Existence of the alterable in the [field of] appearance. (CPR, p. 390)

C) Relation to objects of thought in general, that is, to all things in general

The subject-predicate proposition "Caius is mortal" asserts something about Caius (1) qua mere representation in itself manifesting unity of consciousness, that is,
expressing relation to the thinking subject, and con­forming to the formal conditions of human experience, and
(2) **qua** object belonging as such to the unity of experience
in general, and therefore subject (a) to material (objective)
conditions in the field of appearance, and (b) to the
material conditions of objects of thought in general,
outside which nothing can be thought in a definite relation.

In treating the proposition "Caius is mortal," we
can first concern ourselves merely with the form of judg­ment through which the relation between subject and pre­dicate is determined and expressed, that is, with "the
manner in which [these] presentations as such belong to
one consciousness" (Logic, p. 107), whether, in other
words, the subject is thought under the sphere of the
predicate or is posited outside the sphere of the predicate,
and with the universal conditions (middle terms) under
which the relation asserted actually holds. This means
abstracting from the worth or content of the predicate
(that is, its value as representing either a being in
time, or a mere not-being) and focusing exclusively on
the internal and logical unity of the judgment itself,
that is, on the conditions underlying the relation of
agreement or disagreement between the predicate and the
object whose representation is considered in the subject
term. The second way of looking at propositions such as
"Caius is mortal" is with respect to their relation to objects. If we set aside the issue of the unconditioned unity of the objective conditions in the field of appearance and focus instead on the unity of the objective conditions of the possibility of Caius merely as thing in general (where Caius falls within the sphere of the universal concept of a reality in general qua highest genus), then we must view Caius as subject to what Kant calls the principle of complete determination.

According to Kant, every thing, "as regards its possibility, is . . . subject to the principle of complete determination, according to which if all the possible predicates of things be taken together with their contradictory opposites, then one of each pair of contradictory opposites must belong to it" (CP R, p. 488). Moreover, the principle of complete determination considers each thing "in its relation to the sum-total of all possibilities, that is, to the sum-total of all predicates of things" (CP R, p. 488). Now, the principle of complete determination stands in contrast with another principle, the principle of determinability, which is based on the law of contradiction and serves as a purely logical principle governing the determination of a concept "in respect of what is not contained in it" (CP R, p. 487). As a purely logical principle, it expresses the merely logical
condition of synthetic knowledge, the condition of its so-called inner possibility, namely, that it be free of contradiction. Since the principle does not concern the content of a concept, it does not stipulate which predicates must belong to a given concept. (Note that although this principle expresses a necessary condition of synthetic knowledge, it is "simply a principle of analytic representation in reference merely to one of two contradictory predicates" [CPR, p. 488]. In other words, when it has been determined that one of two "contradictorily opposed" predicates belongs to a concept, it follows analytically that the other predicate of the contradictory pair cannot belong to the concept.)

The principle of complete determination bears on the content of our knowledge, that is, on what (represented abstractly by means of concepts qua predicates of things) is contained in the presentation of things. Hence, it specifies that "one of each pair of contradictory opposites must belong to [each thing]" (CPR, p. 488). "It is the principle of the synthesis of all predicates which are intended to constitute the complete concept of a thing, and not simply a principle of analytic representation in reference merely to one of two contradictory predicates" (CPR, p. 488). Insofar as predicates express modes in which objects are brought to the unity of consciousness,
this principle accounts for the possibility of a thing as an object of experience. Through the principle of complete determination, Kant maintains, we determine all synthesis that is required for knowledge of the object. In contrast to the merely logical principle of determinability, the principle of complete determination considers the possibility of a thing in all respects, including its relation to the formal conditions of an experience in general: "... the objective form of experience in general," Kant says, "contains all synthesis that is required for knowledge of objects" (CPR, pp. 239-240).

Caius's mortality places him within the sphere of a universal concept ('mortal') and thus under a part of that sphere, once it has been divided. Since the parts of the sphere of a given concept determine one another in the whole of the divided cognition, or as complements within a whole and therefore in the relation of logical opposition, the various parts of the division of a concept, taken individually, are subordinate to the divided concept. Since the logical division of a concept extended through all possible subdivisions represents "the determination of a concept in respect of everything possible contained under it, so far as the elements are opposed to one another, i.e., differ from one another" (Logic, p. 146), the division represents the conditions of the
possibility of an object being contained under the concept, that is, of the complete determination of the object as thing. From a logical standpoint, a subject (for example, "Caius") must be limited to a particular part of the divided sphere of the predicate ("mortal"), thereby subordinating it to conditions of its complete determination vis-à-vis all that is possible with respect to an object having the characteristic (mortality) asserted. That predication itself represents a limitation of the sum total of all that is possible, that is, a division of "the universal concept of a reality in general" (CPR, p. 491).

The concept 'mortal' serves not merely as a ground of cognition or characteristic of Caius himself, but as a "common character" shared by "an infinite number of different possible representations"—namely, by the whole sphere of the concept 'mortal' (CPR, pp. 69-70). The conditions of Caius's mortality are therefore conditions of his having this common character as such, and hence, of his belonging to the sphere of the mortal taken as a whole. Hence, establishing the conditions of Caius's mortality consists in subordinating the predicate "mortal" to the condition "man" taken in its whole extension, then of subordinating "man" to another condition, also taken in its whole extension, and so on. These conditions
determine each other in the sphere of the concept 'mortal', "in one direction only, as in a series" (CPR, p. 117).

With respect to the conditions of the complete determination of Caius's mortality, conditions of the possibility of Caius himself, a logical shift is required from the concept 'mortal' taken as a whole (and thus, from the agreement of the manifold contained under the concept) to the members of the division of the concept 'mortal' taken together--thus, towards "the determination of [the] concept in respect of everything possible contained under it, so far as the elements are opposed to one another" (Logic, p. 146), qua mutually exclusive and complementary members of the whole sphere of the divided cognition.

Given the logical division of the concept or idea of all that is possible (that is, of the sphere of the concept of a reality in general) into the mortal and the non-mortal, and taking this division as the major premise of a disjunctive syllogism, we can reason according to the principle of the excluded middle from Caius's membership in one of these two classes to his exclusion from the other--or, conversely, from his exclusion from one to his membership in the other. Finally, the determination of a thing rests ultimately on the idea of the sum total of all possibility as containing "the whole store of material from which all possible predicates of things must be taken" (CPR, p. 490).
This sum total represents the complete division of the whole sphere of the universal concept of a reality in general. It is the idea of a complete systematic analysis of reality in general which is necessary for the complete determination of the possibility of a thing.

At the beginning of this chapter, I invoked Kant's question whether reason can be isolated as an independent source of concepts and judgments. The foregoing analysis shows that, for Kant, the answer is affirmative, with the qualification that its concepts and judgments serve the merely subjective function of bringing the understanding into thoroughgoing accordance with itself. Systematic unity is the goal of reason. Thus, the argument of this chapter concludes my investigation into the division of a priori concepts according to their various sources in sensibility, understanding, and reason. In the postscript which follows, I ask whether Kant's account is compatible with an important contemporary view in the philosophy of science.
Footnotes to Chapter IV

1 "Objects are given to us by means of sensibility, and it alone yields us intuitions; they are thought through the understanding, and from the understanding arise concepts. But all thought must, directly or indirectly, by way of certain characters, relate ultimately to intuitions, and therefore, with us, to sensibility, because in no other way can an object be given to us" (CP R , p. 65).

2 "... all judgments are functions of unity among our representations; instead of an immediate representa­tion, a higher representation, which comprises the immediate representation and various others, is used in knowing the object, and thereby much possible knowledge is collected into one. Now we can reduce all acts of the understanding to judgments, and the understanding may therefore be represented as a faculty of judgment. For [since concepts are based on the spontaneity of thought] the understanding is a faculty of thought. Thought is knowledge by means of concepts" (CP R , pp. 105-106).

3 The concept 'red', for example, designates a material or qualitative characteristic (redness) of objects of immediate sense perception, and is formed by comparing various red objects with respect to perceived qualitative similarity, reflecting on what these objects have in common, namely, redness, and abstracting from all other characteristics of these objects.

4 See CP R , p. 135.


6 The synthetic unity of consciousness is, Kant says, an objective condition of all knowledge, since it is through this unity of consciousness that an object is first known. "It is not merely a condition that I myself require in knowing an object, but is a condition under which every intuition must stand in order to become an object for me" (CP R , p. 156). This synthetic unity is the unity of apperception; in original apperception it exists as "a transcendental determination of time" (CP R , p. 156).
p. 181), which, qua universal, is homogeneous with the pure concepts of the understanding and thus constitutes the schematism of our understanding, where by a schema Kant means "the representation of a universal procedure of imagination in providing an image for a concept" (CPR, p. 182). Even in intuition, the underlying apprehension of the manifold must be referred to a rule, though in this case as schema and not as concept. In other words, the synthesis of apprehension must be subordinated to a rule. Thus, Kant says that "it is schemata . . . which underlie our pure sensible concepts" (CPR, p. 182) and which are the basis of the homogeneity required between the representation of an object and the concept of that object.

7 Note that to say of such a series that it "never terminates save in what is . . . unconditioned" is not to say that it must terminate: that is, "the series of premisses on the side of the conditions . . . may have no [first] member [as its highest condition], in which case it is without limits a parte priori" (CPR, p. 322). "But however this may be, and even admitting that we can never succeed in comprehending a totality of conditions, the series (of premisses on the side of the conditions) must none the less contain . . . a totality [of conditions], and the entire series must be unconditionally true if the conditioned, which is regarded as a consequence resulting from it, is to be counted as true" (CPR, p. 322).

8 See also Logic, p. 100 for a discussion of the role of comparison in concept formation.

9 Kant, of course, rejects this employment of pure reason. "Such a principle of pure reason," he says, is obviously synthetic; the conditioned is analytically related to some condition but not to the unconditioned" (CPR, p. 306). Given the conditions of human knowledge, the possibility (objective validity) of such a synthesis (from the conditioned to the unconditioned) would require that it belong to experience; see CPR, p. 240. However, since we have no experience of the unconditioned (human experience is confined to appearances, all of which are conditioned), the notion of such a synthesis must be regarded as empty: "the concept of the absolute totality of conditions is not applicable in any experience, since no experience is unconditioned" (CPR, p. 318). The presumed inner necessity of the series of conditions in the field of appearance --excluding, as it does,
the possibility of alternative series of conditions—is, in this case, an empty expression. In contrast, however, the concept of the necessity of the series in all respects "involves certain quite special determinations" (CPR, p. 317).

10 "Every concept," Kant says, "contains a manifold under it in so far as the manifold agrees, but also in so far as it is different. The determination of a concept in respect of everything possible contained under it, so far as the elements are opposed to one another, i.e. differ from one another, is called the logical division of the concept" (Logic, pp. 146-147).

11 "There is no lowest concept (conceptus infimus) or lowest species in the series of species and genera under which not yet another would be contained, because it is impossible to determine such a concept. For even if we have a concept that we apply immediately to individuals, there may still be present in respect of it specific differences which we either do not notice or disregard. Only relative to use are there lowest concepts which have received this meaning, as it were, by convention, to the extent that one has agreed to go no further down" (Logic, pp. 103-104).

12 The object, according to Kant, is what prevents our modes of knowledge from being haphazard or arbitrary. "But it is clear," he says, "that, since we have to deal only with the manifold of our representations, and since that x (the object) which corresponds to them is nothing to us--being, as it is, something that has to be distinct from all our representations--the unity which the object makes necessary can be nothing else than the formal unity of consciousness in the synthesis of the manifold of representations" (CPR, p. 135). For this reason, Kant claims that the agreement of knowledge with the object can be determined only with regard to the formal conditions of experience in general; see CPR, p. 220.

13 "The postulate of the possibility of things requires that the concept of the things should agree with the formal conditions of an experience in general. But this, the objective form of experience in general, contains all synthesis that is required for knowledge of objects" (CPR, pp. 239-240).
CHAPTER V
POSTSCRIPT: ON KANT AND THOMAS KUHN

In a footnote that is tantalizing for what it suggests but does not develop, Gerd Buchdahl, in his study *Metaphysics and the Philosophy of Science*, remarks that Kant "somewhat cryptically anticipates such recent views as those espoused in T. Kuhn's *The Structure of Scientific Revolutions*, with its basic contention that central scientific 'paradigms' are not tested, verified or falsified in any straightforward way, but govern the very direction of such tests, etc."¹ Buchdahl goes on to claim that Kuhn's methodological and historiographic discoveries "help us to understand more clearly Kant's vision, hidden from earlier readers if only because [it was] expressed in too traditional a language, a language whose terminology pointed to older preoccupations and logical situations, and which could not bear the weight of such richer insights."² Without attempting to assess the traditional character that Buchdahl ascribes to Kant's language, in the following remarks I wish to examine some points of agreement and disagreement between Kant and Thomas Kuhn, including some discussion of implications of Kant's thought (as explicated in the foregoing chapters)
for issues that Kuhn raises in the philosophy of science.

A Brief Summary of THE STRUCTURE OF SCIENTIFIC REVOLUTIONS

Before Thomas Kuhn published his essay on scientific revolutions, the prevailing view of the progress of science saw it as a history of achievement at once linear and cumulative. After extensive research into the history of scientific practice, Kuhn argues that although there are periods when science proceeds in a linear or cumulative fashion (periods that Kuhn calls periods of "normal science"), many scientific advances have resulted from the rejection of prevailing scientific models, and the substitution for them of models which carry scientific inquiry into wholly new directions. These advances Kuhn calls scientific revolutions, "those non-cumulative developmental episodes in which an older paradigm is replaced in whole or in part by an incompatible new one." Kuhn distinguishes between major and minor scientific revolutions and acknowledges that scientific revolutions "need seem revolutionary only to those whose paradigms are affected by them. To outsiders they may, like the Balkan revolutions of the early twentieth century, seem normal parts of the developmental process."

At the heart of Kuhn's analysis is his notion of paradigms. These he takes to be "universally recognized
scientific achievements that for a time provide model problems and solutions to a community of practitioners." 6 With the emergence of such a paradigm, the scientific community acquires "a criterion for choosing problems that the community will admit as scientific or encourage its members to undertake." 7 Indeed, for Kuhn, a paradigm represents a "strong network of commitments--conceptual, theoretical, instrumental, and methodological . . . ," 8 a network which determines the character of the investigations of scientists who subscribe to the paradigm. Their task is to elaborate and extend the paradigm in its particular details, and this enterprise, which is linear and cumulative, Kuhn calls normal science.

In response to numerous critics who found his use of the term 'paradigm' confusing or unhelpful, 9 to the second edition of his essay Kuhn appended an explanatory postscript in which he calls attention to the two primary senses in which he used the term. "On the one hand," he writes, "it stands for the entire constellation of beliefs, values, techniques, and so on shared by the members of a given community." 10 For this sense, Kuhn suggests the phrase (which he hopes will clarify discussion) 'disciplinary matrix'. On the other hand, the term 'paradigm' denotes "one sort of element in that constellation, the concrete puzzle-solutions which, employed as models or examples,
can replace explicit rules as a basis for the solution of the remaining puzzles of normal science. For this second sense, Kuhn suggests the substitute term 'exemplars'. The role that Kuhn assigns to these exemplars brings his views into sharp contrast with what Frederick Suppe calls "the Received View" of the nature of scientific inquiry. On Suppe's account, the Received View holds that science begins with methodological ("correspondence") rules and proceeds to the determination of a disciplinary matrix:

According to the Received View, the empirical or observational content of the symbolic generalizations in a theory is fully or partially specified by correspondence rules which explicitly state the allowed methods for attaching the generalizations to phenomena and also supply the various theoretical terms in the generalizations with their empirical interpretation or meaning.

In contrast, Kuhn asserts that in practice, "a new theory is always announced"—and, he later adds, also learned—"together with [exemplary] applications to some concrete range of natural phenomena; without them it would not even be a candidate for acceptance."

What is the structure of scientific revolutions? They begin during a period in which some paradigm holds sway as the model governing the inquiries of normal science. "Scientific revolutions are inaugurated by a growing sense... that an existing paradigm has ceased to function adequately in the exploration of an aspect of nature to
which that paradigm itself had previously led the way."\textsuperscript{14}
This growing sense is fed by the discovery of anomalies, counter-examples to the paradigm; notice of some anomalies, Kuhn shows, is even suppressed until a state of crisis in scientific knowledge is reached. This period has historically been marked by increasingly frantic activity, including "the proliferation of competing articulations, the willingness to try anything, the expression of explicit discontent, the recourse to philosophy and to debate over fundamentals . . . ."\textsuperscript{15} The emergence of a new paradigm, the \textit{sine qua non} of a scientific revolution, signals changes in language, methodology, values--in short, a new network of commitments is established. (Adherents of different paradigms therefore find it difficult if not impossible to communicate with each other, and for a period, paradigms compete.)

\textbf{Kant and Kuhn on Sensation}

Although in many ways an historical study, \textit{The Structure of Scientific Revolutions} in a sense provides a paradigm of its own, a paradigm in terms of which, Kuhn believes, investigators may now approach the philosophy of science. As Kuhn acknowledges, his views cut across a wide range of fields and concerns: ". . . many of my generalizations are about the sociology or social psychology of scientists;
yet at least a few of my conclusions belong traditionally to logic or epistemology."\(^\text{16}\) The remaining sections of this postscript focus on issues of a philosophical nature, beginning with a comparison of Kant and Kuhn on sensation and perception. (For Kuhn, sensation and perception are one and the same thing; Kant distinguishes between them.)

In some ways Kant and Kuhn view sensation in closely similar ways. Kuhn says, for example, that however similar the stimuli affecting each of two viewers, "we are under no compulsion to suppose that the sensations of our two viewers are the same . . . .\(^\text{17}\) Kant would no doubt agree that the same stimulus may produce different sensations in different people, or even in the same person at different times. For Kant, sensation is not, like the stimulus that produces it, an objective determination of the object of our sensations, but belongs to the special constitution of sense in the subject affected:

The taste of a wine does not belong to the objective determinations of the wine, not even if by the wine as an object we mean the wine as appearance, but to the special constitution of sense in the subject that tastes it. Colours are not properties of the bodies to the intuition of which they are attached, but only modifications of the sense of sight, which is affected in a certain manner by light . . . . [Taste and colours] are connected with the appearances only as effects accidentally added by the particular constitution of the sense organs.\(^\text{\(\text{CPR, pp. 73-74}\)}\)
In this passage Kant tacitly acknowledges what Kuhn makes explicit when he characterizes sensation as the end product of a process that begins with a physical stimulus and is then in part determined by neural apparatus. Within limits, both Kant and Kuhn would agree "that very different stimuli can produce the same sensations" and "that the same stimulus can produce very different sensations."¹⁸

But this agreement between Kant and Kuhn is limited, as becomes clear when we contrast their very different characterizations of sensation. Kant defines sensation as "the effect of an object upon the faculty of representation, so far as we are affected by it" (CPR, p. 65). Without trying here to repeat the issues I have raised in previous analysis, it may be enough to repeat that sensations in and of themselves are not in any way cognitive. They are what is received in the pure receptivity of sensibility, the matter of all cognition. In contrast, by sensation Kuhn means a complex awareness, not merely colors and tastes but what Kant would call a full-blown intuition or perception, of, say, a black Queen of Hearts, or of the complementary images in a gestalt shift. For Kuhn, but not for Kant, "the route from stimulus to sensation is in part conditioned by education,"¹⁹ and "much past experience is embodied in the neural apparatus that transforms stimuli to sensations."²⁰ To clarify the claim
that education and past experience condition sensations, Kuhn introduces some examples: "In many environments a group that could not tell wolves from dogs could not endure. Nor would a group of nuclear physicists today survive as scientists if unable to recognize the tracks of alpha particles and electrons." By implication, for Kuhn, the difference between dogs and wolves is a matter of sensation.

Ultimately Kant distinguishes in all cognition between form and matter. In that cognition Kant calls intuition, the matter is sensation; sensations are unstructured data. Kuhn does not seem to distinguish in cognition between matter and form. Instead, on Kuhn's account, sensations include what Kant would insist properly belongs to cognition proper, or consciousness. Unlike Kant, Kuhn does not distinguish between sensation and the spontaneity of the mind's apprehension of sensations; or between sensation and the associations aroused by particular stimuli; or between sensation and concept. To borrow language from Hume, Kuhn does not seem to distinguish even between impressions and ideas. Kant sifts the contents of consciousness with a much finer sieve.
Kant and Kuhn on the Possibility of a Neutral Observation Language

An important consequence of Kuhn's notion of sensation is that every statement about the world is determined in some manner by a controlling paradigm. Kuhn believes that this is true not merely of the statement of a sophisticated scientific theory but even of the statement of the empirical consequences of such a theory—of even such apparently purely descriptive statements as "Gold resists rust." Because this is true even of their most concrete statements, on Kuhn's view two scientists who hold competing paradigms can never communicate fully unless one of them adopts the other's paradigm, if only in the way the historian of science "regularly does (or should) when dealing with out-of-date scientific theories." In short, for Kuhn not even sensory experience is ever fixed or neutral. Therefore, no language of observation can ever be neutral.

Kuhn acknowledges a history of attempts to achieve a neutral observation language but believes that no such attempt has succeeded. According to Kuhn, such attempts to formulate a language of observation "presuppose a paradigm, taken either from a current scientific theory or from some fraction of everyday discourse, and they then try to eliminate from it all non-logical and non-perceptual terms." The resulting language merely shows, however,
the futility of the attempt, since inevitably, according to Kuhn, it "embodies a host of expectations about nature and fails to function the moment these expectations are violated." A language can, for Kuhn, accommodate only phenomena of the sort determined by its underlying paradigm, and all phenomena are paradigm-determined. "No language thus restricted to reporting a world fully known in advance," that is, paradigm-determined, "can produce mere neutral and objective reports on 'the given'. Philosophical investigation has not yet provided even a hint of what a language able to do that would be like."25

At the base of Kuhn's views on observation and the possibility of a neutral observation language is evidence from modern psychological experimentation. For examples, he adduces evidence from at least two important experiments in the psychology of perception that he believes proponents of a neutral observation language cannot accommodate. Any shift in visual gestalt shows that two men with the same retinal impressions can see different things; the fact that a man wearing lenses that invert his retinal impressions will in time, without voluntary effort, correct for the inversion and enjoy normal vision shows that two men with different retinal impressions can see the same thing.

Kuhn's assertions notwithstanding, the analysis in the preceding chapters suggests some ways in which Kant provides
a basis for a neutral observation language while at the same time he is able to accommodate both the phenomena of a shift in visual gestalt and the results of the "inverting lenses" experiment. To explain the psychological phenomena that Kuhn adduces, Kant would have only to refer to the spontaneity of mind present in all cognition—that is, to the role of the productive imagination and apperception in determining the character of cognition. Spontaneity is here for Kant what "seeing" is for Kuhn: it precedes interpretation. Moreover, Kant's a priori apparatus—the forms of intuition, the concepts of the understanding—makes possible an articulation of (what Kuhn calls) "pure percepts" that expresses expectations about nature that are independent of any particular scientific theory or paradigm: "All knowledge by means of which I am enabled to know and determine a priori what belongs to empirical knowledge may be entitled an anticipation . . ." (CPR, p. 202). These expectations or anticipations are neutral because they can be determined a priori, independently of empirical data as such.

The fact that different men have the same retinal impressions and yet see different things, or have different retinal impressions and yet see the same thing, may have to do, as Kuhn says, with differences in neural apparatus:
for example, a person under the physical influence of a vision-determining chemical may well see a thing differently than he sees it when he is not under the influence of such a drug, the identity of retinal impressions notwithstanding. Recalling that Kant can make a distinction between sensations and perceptions, for Kant it is even possible for the same sensations to be seen in different ways: for example, a freshman student taking a first course in the history of art will probably see a painting rather differently than Bernard Berenson would, even presuming that their retinal impressions and neural apparatuses are identical. Kant could explain the phenomena of the visual gestalt shift and the inverting lenses without reference to variations in neural processing but rather in purely cognitive terms, as resulting from a difference in the act of cognition itself, a difference in the apprehension of a given manifold (after neural processing) and its relation to original apperception. By invoking his paradigm of perception as stimulus to sensation via neural processing (where neural processing is, in part at least, modified by education), Kuhn tries, I think, to account for perception wholly in terms of the object sciences (chemistry, physiology, et al.); insofar as this means that what we see is causally determined, it apparently makes no sense for Kuhn to speak of the truth or falsity of our
perceptions, since there are no independent criteria for determining truth or falsity (Kuhn says we have no direct access to what we know). Kant might well respond that all Kuhn could provide on such grounds is an account of the physical processes underlying our sensations, not an account of cognition (perception) itself, that is, the apprehension of a manifold of sense and its relation to consciousness. I think that for Kant, education and culture, determinants of sensation on Kuhn's view, control our sensations by controlling the stimuli affecting us, without determining our sensations per se.

For Kuhn, "the scientist who looks at a swinging stone can have no experience that is in principle more elementary than seeing a pendulum," and any alternative vision is "one which makes the swinging stone something else." Kant would surely agree that different observers can cognize the same object in different ways; indeed, a presentation can be either clear or obscure, depending on whether we are conscious of it. Cognition, as involving consciousness, is always to some degree subjectively determined. However, Kant's account of sensibility enables him to distinguish the subjective determinants of cognition from the objective, and that Kuhn cannot do. According to Kant, we have lying before us a manifold of a priori sensibility as material for the concepts of pure understanding, a manifold that
prevents our modes of knowledge from being haphazard or arbitrary. It is possible, therefore, for Kant (but not for Kuhn) to make sense of formal conditions of empirical truth: "truth consists," says Kant, "in the agreement of knowledge with the object" (CPR, p. 220), that is, with the manifold of sensibility. For through the application of the concepts of the understanding it is possible, on Kant's account, to view the connection of sensations in perception as universally valid and therefore as expressing "not merely a reference of our perception to a subject, but a characteristic of the object" (Prol., p. 46). And for Kant, to apply the concepts of the understanding in this way has no effect on the given manifold itself. Kant insists, as Kuhn appears not to, that appearances, "despite the differences of their empirical form, must none the less always be in harmony with the pure form of sensibility" (CPR, pp. 148-149). For Kant the sensory manifold is fixed and neutral. Kant's account of our knowledge of objects through perceptions—a knowledge predicated on the object, the fixed and neutral manifold of sensibility, being given—establishes the possibility of a neutral observation language. In other words, no statement about nature can be significant for Kant except insofar as it concerns the fixed and neutral object of a possible empirical intuition.
Reason does not beg but command.

Near the conclusion of the postscript that he appended to the second edition of his essay, Kuhn takes up the most far-reaching charge that was leveled against his work. Frederick Suppe characterizes this charge and its corollary in the following way:

. . . Kuhn's account of revolutions as involving conflict between incommensurable disciplinary matrixes, which conflict can only be resolved by persuasion and not by logical argument, has led a number of authors to charge that science and scientific change become fundamentally irrational under Kuhn's account— that the acceptance of theories becomes a subjective enterprise which is fundamentally unempirical . . . . and closely related to the previous point, on Kuhn's account data are relative to a disciplinary matrix as is all observation, and so one sees "different worlds" from within different disciplinary matrixes. Some authors . . . have charged that this deprives science of an objective factual basis . . . . 27

In spite of the valuable contributions that Kuhn has unquestionably made to our understanding of the history of science, these charges leveled by Suppe and others against the epistemological views that Kuhn associates with his lessons from history are, I believe, in large measure warranted.

Kuhn himself acknowledges that his views imply that "we have no direct access to what it is we know, no rules or generalizations with which to express this knowledge." 28 Indeed, his response to his critics on
this point is that there is no match between "the entities with which [a] theory populates nature and what is 'really there' . . . the notion of a match between the ontology of a theory and its 'real' counterpart in nature now seems to me illusive in principle."²⁹ On this point, Kant would, I believe, agree with Kuhn's critics, not with Kuhn; for in principle, Kant argues, the objectivity of our knowledge is grounded in the fact that in intuition we have immediate knowledge of objects, albeit only as appearances subject to the formal conditions of space and time. Truth consists in the agreement of knowledge with an object, and we can determine the formal conditions of empirical truth.

In spite of this crucial distinction between Kant and Kuhn, there does obtain between them the important affinity that Buchdahl alludes to in the quotation with which I opened this postscript. For Kant, the understanding is the source of the laws of nature and determines the logical character of experience: "However exaggerated and absurd it may sound, to say that the understanding is itself the source of the laws of nature, and so of its formal unity, such an assertion is none the less correct. . . ." With respect to our knowledge of nature, the special function of reason is merely to impose an order on the activity of the scientist by determining the logical character of his research: since our only conception of systematic unity is the conception
we have through the ideas of reason, the ideas of reason serve to control the scientist's attempt to bring about a systematic unity. "In accordance with reason's legislative prescriptions," Kant writes, and Kuhn would, I believe, say the same about a paradigm's legislative prescriptions, "our diverse modes of knowledge must not be permitted to be a mere rhapsody, but must form a system" (CPR, p. 653). For both Kuhn and Kant, the scientific enterprise is ultimately subjective, and a comment meant by Buchdahl to apply to Kant applies to Kuhn as well: "Above all, only as much 'system' can be found in nature as is imported into it by the scientist. The 'possibility' of a systematic order hinges on the logical character of the scientific act."30

Uncharacteristically in the Critique of Pure Reason, and ironically in context here with Kuhn, Kant develops his view by drawing from the history of science:

A great advance was made when chemists succeeded in reducing all salts to two main genera, acids and alkalies; and they endeavour to show even this difference is merely a variety, or diverse manifestation, of one and the same fundamental material. Chemists have sought, step by step, to reduce the different kinds of earths (the material of stones and even of metals) to three, and at last to two; but, not content with this, they are unable to banish the thought that behind these varieties there is but one genus, nay, that there may even be a common principle for the earths and the salts. It might be supposed that this is merely an economical contrivance whereby
reason seeks to save itself all possible trouble. . . But such a selfish purpose can very easily be distinguished from the idea. For in conformity with the idea everyone presupposes that this unity of reason accords with nature itself, and that reason--although indeed unable to determine the limits of this unity--does not here beg but command.  

(CPR, p. 539)
Footnotes to Chapter V


2 Buchdahl, p. 511.


4 Kuhn, Structure, p. 92.

5 Kuhn, Structure, pp. 92-93.

6 Kuhn, Structure, p. viii.

7 Kuhn, Structure, p. 37.

8 Kuhn, Structure, p. 42.


10 Kuhn, Structure, p. 175.

11 Kuhn, Structure, p. 175.


13 Kuhn, Structure, p. 46. See also pp. 186-191.

14 Kuhn, Structure, p. 92.

15 Kuhn, Structure, p. 91.

16 Kuhn, Structure, p. 8.

17 Kuhn, Structure, p. 192. Kuhn's evidence for this claim arises from psychological experimentation, not from philosophical introspection, though he takes his views on sensation to have epistemological, and therefore philosophical, import.


Kuhn, *Structure*, p. 127.

Kuhn, *Structure*, p. 127. It should be noted that Kuhn reports these attempts at developing a neutral observation language without specifying the non-neutral expectations that are supposed to have vitiated the attempts.

Kuhn, *Structure*, p. 127.

Kuhn, *Structure*, p. 128.

Suppe, p. 150.

Kuhn, *Structure*, p. 196.


Buchdahl, p. 483.
A SELECTIVE LIST OF WORKS CONSULTED


Hinshaw, Virgil G., Jr. "Second Thoughts on Thomas Kuhn's 'Second Thoughts on Paradigms'." Unpublished manuscript.


