Methodological Rules in Kant's Philosophy of Science

by Margaret Morrison, Minneapolis

I. *Introduction*

In the appendix to the Transcendental Dialectic of the *Critique of Pure Reason* Kant tells us that subjective maxims interpreted as methodological rules do not enjoy the same kind of objectivity as the principles of the understanding or the categorical imperative (A667/B695). Yet, despite their subjective status Kant does claim that they are both objective and necessary (A663/B691). These apparently incompatible claims prove problematic when attempting to provide an interpretation of the role of methodological rules in the critical philosophy. Confusion results if we construe the methodological maxims as rules which, taken together, constitute a set of prescriptions that tell us how we ought to proceed when engaging in scientific activity. The problem is that this interpretation cannot accommodate the fact that some maxims are contrary to others, and, taken individually, seem to prescribe varying methodologies depending on the situation at hand. Hence, it seems quite unlikely that the complete set of such maxims could be interpreted as defining, in any strict sense, a notion of scientific rationality.

A more systematic account of Kant's methodological programme, one that overcomes this difficulty, can be given simply by distinguishing between different *kinds* of rules and evaluating the prescriptive role of each. My project will be to examine the differences between maxims, imperatives and transcendental ideas in an effort to isolate particular features of the subjective maxims that bear on the kind of objectivity and necessity Kant ascribes to them. Accomplishing this will require a careful look at the different senses of objectivity and necessity Kant appeals to when contrasting the categorial principles with methodological maxims and transcendental ideas. Finally I will consider the question whether these methodological maxims, taken together, are definitive of scientific rationality or if in fact there is room for an element of pragmatism in their adoption. It may turn out that there is some sense in which they are justified by the success of the overall method they prescribe.

II. *Ideas of Reason as Methodological Rules: A Definition of the Problem*

Just as the understanding secures the unity of appearances under rules it is reason that secures the unity of rules of the understanding under principles. Reason is responsible

for synthesizing knowledge of objects into systems; an example is Kant's "order of nature", an entire system of phenomena united under laws that are themselves unified under higher order laws. This systematic construction of knowledge is guided by reason to the extent that it directs the search for the absolute totality of the conditions of all appearances (A416 and B384).[1] These conditions however are not given as objects of possible experience. What reason is seeking in this "synthesis of conditions", as Kant calls it, is the unconditioned; the absolute whole of all appearances (A328). Since this totality can never be represented in intuition it remains an idea – a problem for which there is no solution.

At B359 Kant says that reason never applies itself directly to experience or to any object, but only to the understanding in an attempt to give knowledge gained by the understanding an a priori unity; a unity achieved through concepts alone. It is only by ordering our attempts to understand experience that reason bears any relationship to the empirical realm. Reason introduces as an ideal (an uncompletable task or unrealizable goal) a set of rational conditions that must be satisfied in order that our knowledge may constitute a unified system. These ideas of reason have no constitutive employment, instead they *regulate* our understanding and direct us toward a unified end – the *focus imaginarius.*

Reason is labelled the faculty of inferring, an activity Kant describes as "judging mediately by the subsumption of a possible judgement under the condition of a given judgement" (A330). The syllogisms involved in the inferences performed by reason contain no empirical premises and allow us:

> to conclude from something which we know to something of which we have no empirical concept, and to which, owing to an inevitable illusion, we yet ascribe objective reality (B397).

For instance, we proceed in our investigation as if nature constituted a unified system although we have no empirical concept of it being thus and so. These conclusions Kant calls pseudo-rational; "although insofar as they have sprung from the very nature of reason they may be called rational" (B397). When the ideas of reason are given as problematic concepts, when the universality of the conclusion is not an object of possible experience, we have what is termed the "hypothetical" employment of reason. Because reason in its hypothetical employment is not constitutive, the systematic unity it prescribes is merely a *logical* principle designed to secure the coherent employment of the understanding.[2] Kant specifically remarks that we would have no coherent employment of the understanding were it not for this presupposition of systematic unity. We are capable of forming empirical generalizations by means of the unity afforded us by the categories but no scientific knowledge or systematic classifications are possible by a mere application of the categories.

The notion of a *logical* principle serves an important function in the Kantian

[1] *The Critique of Pure Reason,* N. Kemp Smith (transl.), New York: St. Martin's Press, 1921.

[2] As I point out below the idea of systematic unity *is* constitutive of an "order of nature" despite the fact that this "order" is never given as an object of possible experience.

architectonic. The term "principle", for Kant, denotes a universal proposition obtained solely from concepts. Unlike the understanding whose so-called principles depend on synthetic features of knowledge, principles of reason depend on thought alone (A302). The logical employment of reason concerns itself with the attempt to reduce the knowledge obtained through the understanding "to the smallest number of principles (universal conditions) and thereby achieve the highest possible unity" (A305). The rule that bids us to "find for the conditioned knowledge of the understanding the unconditioned whereby its unity is brought to completion" (B364) is thus a logical principle insofar as it concerns itself with knowledge in its unified form. Although we are required to bring about this unity in as complete a form a possible there is nothing about a logical principle that guarantees that nature constitutes a unified whole. As Kant points out at A648:

> ... to say that the constitution of the objects or the nature of the understanding which knows them as such, is in itself determined to systematic unity, and that we can in a certain measure postulate this unity *a priori*, without reference to any such special interest of reason, and that we are therefore in a position to maintain that knowledge of the understanding in all its possible modes (including empirical knowledge) has the unity required by reason, and stands under common principles from which all its various modes can, in spite of their diversity, be deduced – that would be to assert a *transcendental* principle of reason, and would make the systematic unity necessary, not only subjectively and logically, as method, but objectively also.

The passage at A651/B679 indicates Kant's awareness of the difficulty in understanding how there could be a logical principle whereby reason prescribes the unity of rules without also presupposing a transcendental principle whereby this unity is taken to be inherent in objects. The same is true of the logical maxims of homogeneity, variety and affinity. Indeed, if this were not the case it would be quite possible for reason to be involved in a contradiction, by proposing as its aim an idea inconsistent with the constitution of nature. However, we are not at liberty to say that reason has arrived at this systematic unity by observation of nature because the unity is never given to us as an object. The principle that bids us to seek unity is necessary insofar as it is definitive of the role of reason in cognition; without it we would have no intervention on the part of reason and, as a result, no coherent employment of the understanding and no empirical criterion of truth. Again at A647/B675 Kant remarks that:

> the hypothetical employment of reason has, therefore as its aim the systematic unity of the knowledge of the understanding, and this unity is the criterion of the truth of its rules.

Before attempting an analysis of these passages let me first try to clarify the relationship between the role of reason and the empirical criterion of truth that Kant refers to. At A58–62 Kant discusses the nature of truth and the difficulties involved in establishing a general criterion for the truth of knowledge. Although Kant defines truth as the agreement of knowledge with its object, the material conditions that account for the *content* of this knowledge are variable. Hence, Kant claims that no criterion can determine the material (objective) truth of knowledge (A59). We can however determine a purely logical criterion of truth; what Kant terms the agreement of knowledge with the general and formal laws of the understanding and reason. But this purely

formal constraint is not sufficient for forming judgements about objects; in addition we require the framework provided by the *schematized* categories. Although the categorial principles cannot guarantee that our judgements are correct, nevertheless, it is the constitutive employment of the categories that renders our empirical judgements possible. Because the understanding concerns itself *directly* with the objects of possible experience it is our touchstone with the phenomenal world and thus provides our only access to empirical truth. Reason's demand for systematic unity is imposed on the understanding as a regulative constraint designed to ensure a measure of coherence. In that sense unity bears only an *indirect* relationship to the notion of empirical truth.

Although the relationship between the notions of truth, logic and coherence and their connection with reason is a complicated one, we can summarize it very briefly in the following way. The logical status of the principle that bids us to seek systematic unity ensures that our classifications of phenomena will adhere to the principles of parsimony and thereby provide the maximum amount of information with a minimum of problematic concepts. Here reason acts in accordance with the demands of logic, providing the kind of systematization that guides the understanding. The degree to which reason coheres with the demand of projected unity is what determines the truth of its rules. Coherence can then be understood as a kind of "twin" of logical validity, the rules being judged on their ability to preserve *coherence* in the way that logical rules preserve *truth*. As a result, these regulative ideas prove to be constraining in their preservation of fit or coherence without possessing the objectivity of the categorial principles or the strict demands of logical consistency. Since these ideas are constitutive of *problematic* concepts it seems that the best we can do is to judge their so-called truth or falsity by the success we experience in our efforts to achieve this projected unity.

So, what Kant seems to be saying at A647/B675 and A651/B679 is that the successful employment of the understanding in a systematic manner provides us with the criterion whereby we can judge the truth or falsity of the rules of reason. But, strictly speaking, only the categorial principles (since they are constitutive of objects of possible experience) can lead us to truth or falsity. Ideas of reason viewed as problematic concepts are not capable of proving the truth of the rule(s) they enjoin us to adpot. This is because we are incapable of knowing whether all the possible consequences which follow from adpoting a principle (rule) are sufficient to prove its universality. Instead, ideas of reason are, in a sense, constitutive of an *order* of nature, the pursuit of which, for us, is set as a task. The unity that we seek provides us with a coherence or logical *fit* in the systematization of knowledge. The degree to which ideas of reason contribute to this goal serves as a test of their truth.

There is however the additional consideration alluded to above, that if these ideas of reason are not constitutive of any object of experience then they cease to be true or false in any strict sense. Construing them as methodological prescriptions we either adopt them or we don't, hence their usefulness becomes directly related to the success of the method they prescribe. This is the tension within Kant's methodological programme. If these principles or ideas have the kind of strong presuppositional necessity akin to that of the categories (as Kant would have us believe at A651/B679) then by no means do

they involve a pragmatic component that relates their truth to their success. If, on the other hand, their objectivity is presuppositional in some looser methodological sense then we may find that there is indeed room for a kind of pragmatism in the decision to adopt one or another of the maxims. The problem results from a failure to differentiate *kinds* of ideas of reason. Kant refers to both the subjective maxims, which bid us to seek homogeneity (unity) and specification (diversity), and the overall demand of reason for systematic unity as ideas of reason. In the latter context the idea seems to carry a strong presuppositional necessity while in the former case, where we have conflicting demands, it seems reasonable to opt for the pragmatic interpretation. One way of seeing how this tension can be eased is to exploit the differences between transcendental ideas and logical maxims; a distinction Kant places some emphasis on in the later parts of the first *Critique*. This allows us to formulate a kind of "levels" approach to interpreting the methodological rules and thereby create what can perhaps be seen as a plausible solution to the problem.

III. *Presuppositional Necessity and Meta-Methodology*

In the appendix to the Transcendental Dialectic and the introduction to the *Critique of Judgement* Kant speaks of a kind of unity distinct from the systematic view of nature defined by the categorial principles (nature$_1$). Nature$_1$ or formal nature is the framework of lawlikeness that determines empirical possibility; nature$_2$ provides the content for this framework, the empirical generalizations discovered in experience. Nature$_1$ does not anticipate a priori the material content of any particular law. Rather, it comprises the principles of possible experience, universal laws of nature that are known a priori. Material nature (nature$_2$) consists of all objects of experience[3] including those laws whose content is discovered a posteriori but whose form is determined a priori. Taken together we have a possibly infinite diversity of substances, causal relations, and so on that we assume can be brought into systematic unity forming an "order of nature". Although we have no guarantee that this will eventually occur such a presupposition is required before any kind of scientific investigation can take place. This is evident from Kant's remarks at B679–80:

> That the manifold respects in which individual things differ do not exclude identity of species, that the various species must be regarded merely as different determinations of a few genera, and these, in turn of still higher genera, and so on; in short that we must seek for a certain systematic unity of all possible empirical concepts, insofar as they can be deduced from higher and more general concepts.'

So, even if we do not openly acknowledge the principle of systematic unity it seems that it is at least implicit in the maxims from which we proceed; the principles that require us to seek homogeneity, variety and affinity in our scientific investigations and

[3] *Prolegomena*, James W. Ellington (transl.), Indianapolis: Hackett Pub. Co. 1985, pp. 39–40/ Akademie edition, Vol. IV, pp. 295–96, sec. 16.

classifications. These maxims are the principles of genera (homogeneity), specification (species) and continuity of form (affinity). Homogeneity requires us to search for unity among different original genera; specification imposes a check on this tendency to unify by requiring us to distinguish certain sub-species; and continuity, the affinity of all concepts, is a combination of the previous two insofar as it demands that we proceed from each species to every other by a gradual increase in diversity. Kant expands on this point in the *Logic* (Sec. 11)[4] where he discusses the concepts "iron", "metal", "body", "substance" and "thing". In this example we can obtain ever higher genera because every species can always be considered a genus with respect to a lower concept, in the way iron is a species of the genus metal. We can continue this process until we come to a genus that cannot be considered a species. Kant claims that we must be able to arrive at such a genus because there must be, in the end, a highest concept from which no further abstraction can be made. In contrast, there can be no lowest concept or species in the series because such a concept would be impossible to determine. Even in the case of concepts applied directly to individuals, there may be differences that we either disregard or fail to notice. Only relative to *use* are there "lowest" concepts; they are determined by convention to the extent that one has agreed to limit differentiation.

As Kant notes at A666 these logical maxims or principles, which rest entirely on the speculative interests of reason *regulate* scientific activity by dictating particular methodological practices. This connection between logic and methodology is a crucial one for Kant. At the core of his view of science as a systematic body of knowledge lies the belief that science must constitute a logical system[5]; "a hierarchy of deductively related propositions in ascending order of generality"[6]. The act of systematizing the knowledge gained through the schematized categories enables us to discover certain logical relations that hold between particular laws of nature. This in turn enables us to unify these laws under more general principles of reason. Kant is concerned with strict logical deductions from proven first principles because in all cases of *projected* unity we argue *to* the universality of a particular principle. From a universal premise employed as a problematic concept we attempt to deduce an empirical fact or law. The universal premise is in no way *proven* by the deduction (A647/B675) because in order to explain the premise we must presuppose some further condition from which it could be deduced. This procedure continues until one reaches the "unconditioned", something which for us is set as a task.

This classification process, which includes the unification of dissimilar laws and diversification of various species, is what Kant terms the *logical* employment of reason.

[4] *Logic*, Robert Hartman and Wolfgang Schwarz (trans.), Indianapolis: Bobbs-Merill, 1974, sec. II.

[5] This was pointed out to me by Robert Butts. A similar view is discussed in J. D. MacFarland, *Kant's Concept of Teleology*, Edinburgh: University of Edinburgh Press, 1970. For a discussion of how reason systematizes the empirical acts of the understanding see B692 and B676 of the *Critique of Pure Reason*.

[6] MacFarland, *Kant's Concept of Teleology*, p. 19.

A properly unified system exhibits the characteristics of a logical system displaying coherence as well as deductive relationships among its members. Scientific theories are themselves logical systems that consist of classificatory schemes that unify our knowledge of empirical phenomena. Kant recognizes however that reason cannot, simply by means of a logical principle, command us to treat diversity as disguised unity if it does not presuppose that nature is itself unified. This presupposition involves a *transcendental* principle whereby the systematic unity is assumed a priori to be necessarily inherent in objects. Such a transcendental principle would make the systematic unity necessary *objectively* as well subjectively and logically as method. But, at A648/B676 Kant tells us that:

> ...the only conclusion which we are justified in drawing from these considerations is that the systematic unity of the manifold of knowledge of understanding, as prescribed by reason, is a *logical* principle. Its function is to assist the understanding by means of ideas. In those cases in which the understanding cannot by itself establish rules, and at the same time to give to the numerous and diverse rules of the understanding unity or system under a single principle, and thus to secure coherence in every possible way.

How then are we to interpret the status of this transcendental principle that presupposes the unity of nature? Kant gives us some clues in the passages found at A649/B677 and A653/B681. At A649 he discusses the search for fundamental powers that enable us to unify seemingly diverse substances. Again the idea of such a power is set as a problem; we do not assert that such a power must be actually met with but only that we must seek it in the interests of reason. As Kant remarks at A650/B678 "this unity of reason is purely hypothetical"; only on passing to the transcendental employment of the understanding do we view the idea of a fundamental power as having objective reality. However, in the discussion of logical maxims at A653/B681 Kant seems to accord the transcendental principle of unity a more prominent role. His example concerns a chemist who reduces all salts to two main genera, acids and alkalies. Dissatisfied with this classification the chemist attempts to show that even the difference between these two main genera is merely a variety or diverse manifestation of one and the same fundamental material; and so s/he seeks a common principle for earths and salts, thereby reducing them to one genus. Kant goes on to point out that it might be supposed that this kind of unification is merely an economical contrivance, an hypothetical attempt that will impart probability to the unifying principle if the endeavour is successful. However, such a selfish purpose can very easily be distinguished from the idea that requires us to seek unity:

> 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 (A653/B681).

. Reason presupposes this systematic unity on the ground that we can conjoin certain natural laws under a more general law in the way that we reduce all salts to two main genera. Hence, the logical maxim of parsimony in principles is not only an economical requirement of reason but it is one of *nature's own laws* (A650/B678). It would seem then that the economical interests of reason in its logical employment is in some sense

secondary to the supposed objectivity of unity as it exists in nature. Parsimony in principles makes sense only because nature itself is parsimonious in its workings.

On this interpretation the methodological maxims (homogeneity, variety and affinity), together with the transcendental principles that presuppose the objective validity of the unity of nature, dictate how scientific investigations *ought* to be conducted. In other words, they define scientific rationality. But, if we construe the maxims and their underlying transcendental principles as objective, with a necessity equivalent to the categorial principles or the categorical imperative, inconsistencies arise. The difficulty becomes particularly evident in the case of conflicting research strategies. For example, at A655/B683 Kant remarks that the logical principle of genera responsible for postulating identity is balanced by the principle of species which calls for diversity. In attending to both, reason exhibits a two-fold self-conflicting interest; an interest that also manifests itself among students of nature in the diversity of their approaches. However, recall that no object of experience corresponds to a completed continuity of forms or classification as genera or species. Hence, these principles contain mere *ideas* for the empirical employment of reason – ideas which reason follows asymptotically. Because they possess what Kant calls objective but *indeterminate* validity they hold only *indirectly* at the level of experiential objects. Their task is to indicate the procedure whereby the empirical and *determinate* employment of the understanding can achieve the greatest possible unity.

Kant's use of the notion of "objective but indeterminate validity" is especially puzzling. In his discussion of the law of specification[7] (A656/B684) Kant remarks that the logical law would be without meaning and application if it did not rest on a transcendental law of specification. Although the transcendental law does not demand an actual infinity of differences in the objects of experience it does impose on the understanding the obligation to seek a subspecies under every discoverable species. In contrast, the logical principle affirms only the "indeterminateness of the logical sphere in respect of possible division" (ibid.) and thus gives no occasion for the assertion that nature itself is subject to the law of specification. The logical principles bid us to seek homogeneity, specification and continuity while their transcendental counterparts *presuppose* that nature is constituted in accordance with these principles and that their employment will not lead the understanding astray (A660/B688). As transcendental presuppositions these principles are objective in that they indicate the procedure whereby the empirical employment of the understanding can be brought into complete harmony with itself; a harmony achieved through a connection with the overall principle (demand) of systematic unity. They are indeterminate insofar as they are not constitutive of any object of possible experience and in this respect their objectivity is different from that of the categories. Although these logical principles of reason (and their transcendental counterparts) do not have a constitutive role they are nonetheless objectively real in that they are a product of reason.

[7] The same considerations apply *mutatis mutandis* to the principles of homogeneity and continuity.

Despite the reference to objectivity Kant characterizes to these principles as subjective (A694/B666) and properly defines them as "maxims" of reason. He specifically points out that the term "principle" is inapplicable since their validity rests entirely on the speculative interests of reason (as opposed to its pure practical interest). When these regulative principles are treated as constitutive and employed objectively they often come into conflict; but when treated as maxims they are seen as mere differences in the interests of reason that give rise to differing modes of thought. For instance, one person may be interested in unity while another is interested in specification; both kinds of judgements resulting from attatchments to the methodological maxim rather than insight into the nature of the object under investigation (A667/B695). Neither maxim is based on objective grounds but rather solely on the interests of reason (and because of this they are called maxims rather than principles). As Kant points out, the disputes result from the two-fold interest of reason and, as long as the maxims are taken to yield objective insight they will prove to be a positive hindrance to truth. In fact, reason has but one single interest – the systematic unity of all knowledge – something which is itself undetermined yet objective. Just as we require the schemata to determine the objects of the understanding, we require an analogon of a schema if we are to bring unity to the principles of the understanding. "This analogon is the idea of a maximum in the division and unification of the knowledge of the understanding under one principle" (A665/B693); that principle being the systematic unity of all employment of the understanding. The application of the concepts of the understanding to this schema of reason yields the transcendental principle or rule whereby unity becomes possible. Hence, the conflict of the subjective maxims is only a difference in, and a mutual limitation of, the methods used in attempting to satisfy the interest of reason (A666/B694).

One further point about the subjective maxims that is worth noting occurs at A661/B689. Here Kant tells that these principles (maxims) carry their recommendation directly in themselves and not merely as methodological devices. This seems to be directly at odds with the kind of pragmatic, interest-relative role that he affords the maxims in other contexts. The logical maxims are not derived from any empirical considerations, nor are they put forward as merely tentative suggestions. However, when these maxims are confirmed empirically they yield strong evidence in support of the view that the projected unity postulated by reason is indeed well-grounded; and as Kant remarks, it is in this respect that we say the evidence has a certain utility. We employ a particular maxim in view of a desired end and when successful in achieving our goal, be it unity, specification or continuity, we *assume* that nature itself acts in accordance with the maxim we choose. On that basis we claim that the principles prescribing parsimony of causes, manifoldness of effects and affinity of the parts of nature accord with both reason and nature itself.[8]

[8] What I have attempted here is a partial reconstruction of Kant's views on methodology. Because Kant is less than clear in his distinction between logical maxims and their accompanying

We must keep in mind however that these principles in no way determine the constitution of nature. From the discussion of the logical employment of reason we know that in order to achieve the systematic unity of knowledge that we call science, it is necessary that this unity display the properties of a logical system. In other words, if one agrees with Kant that science is founded on projected systematization and that this system is ultimately reducible to logical form (non-contradiction, identity and deductive closure over classification systems), then those principles that best cohere with the demand of systematic unity are the ones that recommend themselves directly. Parsimony, manifoldness and affinity are not only methodological principles for organizing nature according to our interests, they are also the most efficient way of realizing the one interest of reason – the systematic unity of all knowledge. Because we empirically verify the extent to which this unity has been achieved we are thereby supplied with the means to judge the success of the maxims in furthering our ends (A692/B720). We employ a particular maxim based on what we think will be the most successful approach in achieving systematic unity given the context at hand.

Because the maxims have objective but indeterminate validity a transcendental deduction of them is impossible (A664/B692); they bear no relation to any object of experience. However, at A670/B698 Kant remarks that we cannot employ a concept a priori with any degree of certainty without first giving a transcendental deduction of it. So, if ideas of reason are in any way definitive of scientific rationality in an objectively valid sense (in the way the categorial principles are objectively valid) some type of deduction of them must be possible; a deduction that encompasses more than a subjective derivation from the nature of reason (A393/B336). But, there is an additional problem, if the subjective maxime involve a pragmatic dimension how are we to understand the overall demand to seek unity. It is at this point that Kant emphasizes the distinction between logical maxims and transcendental ideas. He introduces three ideas, the psychological, cosmological and theological and attempts what could be called a quasi-transcendental deduction of their objectivity. But, as he reminds us yet again, the deduction and objectivity of these transcendental ideas differs significantly from their categorial counterparts.

Before examining this quasi-transcendental deduction let me briefly discuss the function of these ideas. The psychological idea requires that we proceed as if the mind were a simple substance which persists through time while conditions of the body undergo continual change. The cosmological idea demands that in following up the conditions of inner and outer appearances we perceive the inquiry as never allowing of completion; as if the series of appearances were endless, without any first or supreme member. Finally, in the domain of theology we must view everything that belongs to the context of possible experience as if experience itself formed a sensibly conditioned

transcendental presuppositions, for the sake of consistency I have chosen to classify *both* as subjective maxims. As will be evident from the discussion below it is the transcendental ideas (the theological, cosmological and psychological) that take on the more prominent role of providing an meta-methodological framework for scientific practice.

unity and was the product of an all-sufficient ground or creative reason. It is this idea of a creative reason that guides *our* reason. By viewing all objects as if they drew their origin from such an archetype we secure the greatest possible extension of our reason. By continually seeking a completed unity of our knowledge we attempt to extend knowledge to its limits.

Although these transcendental ideas do not relate to or determine any objects, they are considered as rules governing the empirical employment of reason; rules that lead to systematic unity by presupposing an *object* in the idea. However, as in the case of the logical maxims, there exists only an analogon of a schema constructed in accordance with the idea of the greatest possible unity (the notion of a maximum). What Kant terms the transcendental deduction of these ideas consists of showing that they contribute to the extension of empirical knowledge without ever being in a position to run counter to it. Adherence to the prescriptions of the transcendental ideas will *always* result in the *successful* extension of our knowledge. Unlike the logical maxims their use is not related to the immediate interests of the inquirer, nor do they present us with conflicting strategies. Hence, we conclude that it is a necessary maxim of reason to proceed always in accordance with such ideas. Although this transcendental deduction is not complete in the sense that the deduction of the categories is (hence my use of the term quasi-transcendental) nevertheless, it does establish the possibility and objectivity of systematic unity and as such exhibits an important characteristic of a transcendental deduction. In the case of the theological idea we can extend our understanding in the following manner. The highest formal unity which rests solely on concepts of reason is the purposive unity of things (A687/B715). This principle suggests new ideas about how things in the world may be connected in accordance with teleological laws. Hence, the assumption of a supreme intelligence as the cause of the universe can never injure reason and will always prove beneficial. By assuming the shape of the earth, mountains, seas etc. to be "the outcome of wise purposes on the part of the author of the world" (ibid.) we are able to make a number of discoveries that may have otherwise gone unnoticed. The worst that can happen is that where we expected to find a teleological connection we find only a mechanical or physical connection. But, reason will never lead us astray if we assume this principle to have only a regulative and never a constitutive use.

> This, indeed is the transcendental deduction of all ideas of speculative reason, not as constitutive principles for the extension of our knowledge to more objects than experience can give, but as regulative principles of the systematic unity of the manifold of empirical knowledge in general, whereby this empirical knowledge is more adequately secured within its own limits and more effectively improved than would be possible, in the absence of such ideas, through the employment merely of the understanding (A671/B699).

Because these principles do not fall prey to the methodological conflicts characteristic of the logical maxims they present themselves as good candidates for defining scientific rationality. They provide us with rules that we *ought* to follow, in fact *must* follow, if we are to be successful in achieving the systematic unity that scientific

investigation sets as its goal. These principles can be interpreted as constituting a kind of meta-methodology; a framework that not only provides a focus for the methodological maxims but furnishes the overall structure necessary for scientific practice. Once this framework of principles is in place the logical maxims can then be considered as methodological devices designed to further the end of systematic unity. They can be employed according to whatever means the particular investigator sees as beneficial, and, as local methodologies they become part of the empirical content of science. The legitimacy of the principles embodied in the transcendental ideas is apparent from the fact that they are required for the very possibility of systematic/scientific knowledge. As a result, the rationality defined by these ideas is conditioned in the sense that it depends upon engaging in scientific activity, unlike the rationality defined by the categorical imperative; a notion that is applicable to all moral agents.

In order to elaborate on these different senses of rationality it is necessary to examine the distinction between maxims/ideas and imperatives; a distinction that allows us to explore the differences between rule-following and acting in accordance with a necessary law. This comparison also proves important in clarifying the relationship between the necessity of ideas of reason and categorial principles. With respect to logic if I am to avoid invalid inference it is objectively required that I adopt the principles of logic and proceed according to the general laws of thought. In the domain of reason if I am to proceed rationally in the construction of scientific theories I must make subjective (but justified) appeal to coherence-incorporating principles, rules that guide the quest for systematic knowledge. Most importantly if I am to do my duty as a moral agent it is imperative that I act in accordance with the objective principles of practical reason.

IV. *Maxims and Imperatives*

As I emphasized above the objectivity claimed for the methodological maxims and transcendental ideas differs from the objectivity of the principles of the understanding. The goals of both speculative reason and the understanding bear directly on the theoretical employment of reason; what *is* the case with respect to objects of possible experience or how we should proceed in organizing knowledge on the assumption that nature constitutes a unified system. The categorical imperative and the objectivity involved in the practical employment of reason has nothing to do with the perceptual judgements governed by the categories of the understanding. Pure practical reason dictates what *ought* to be the case rather than what *is* the case. At this point it is tempting to ask how the "ought" of the categorical imperative compares with the "ought" of the transcendental ideas. An answer to this question will enable us to clarify the role of methodological rules and their relationship to scientific rationality. Part of the solution consists in an understanding of what Kant means when he refers to an "ought" which expresses "the objective necessitation of the act and indicates that, if reason completely determined the will, the action would without exception take place

according to a rule".[9] The objectivity of the categorical imperative requires that there be a synthetic connection between the concept of a "rational being in general" and the fact that such a being is necessarily subject to this imperative. Although this kind of synthetic knowledge is not possible through the speculative employment of reason it *is* possible in the realm of practical reason. It is incumbent on Kant to prove the synthetic a priori character of the proposition that the will of every rational being is subject to the categorical imperative.

To fully appreciate the details of Kant's argument would require a discussion of how pure practical reason can determine the will of a rational agent, something which is obviously beyond the scope of this paper. Nonetheless, a few brief comments on the nature of the categorical imperative should suffice to clarify things for our purposes. The imperative admits of several formulations, perhaps the most common being: "Act only on that maxim through which you can at the same time will that it should become a universal law." Is is important to take note of the contrast between the categorical imperative and hypothetical imperatives; in particular rules of skill which take the form: "If under certain circumstances you want to achieve a certain specific purpose then you must..." These latter imperatives amount to no more than statements about the natural course of events; claims reminiscent of the methodological maxims. The categorical imperative, on the other hand, is absolute; it commands us to act from duty and to do so for duty's own sake, that is, to act in accordance with a self-imposed law.

According to Kant the moral value of a particular action lies in the maxim that determines it. A maxim is a subjective principle of action; the principle according to which the subject *is* acting as opposed to the objective principle according to which s/he *ought* to act. To choose a maxim is to choose a particular policy of action, a moral maxim being one that is universalizable and accords with the moral law. (For example, willing that my maxim become universal law.) The moral law is not contingent on any prior condition and although self-imposed it is valid for *all* rational agents. The difference between maxims and imperatives is summed up quite nicely by Kant in Bk.1 Chapter 1 of the second *Critique* when he remarks that:

> ...for reason to be legislative, it is required that reason presuppose only itself, because a rule is objectively and universally valid only when it holds without any contingent subjective conditions which differentiate one rational being from another.

A rule becomes an imperative when characterized by an ought which expresses the objective necessity of the particular act in question. The use of theoretical reason in natural science is determined by the nature of the *object* under investigation, practical reason, on the other hand, has to do with the determination of the *will.* If reason completely determines the will then we say the action takes place according to a rule.

It is important to remember that despite the universal validity of the categorical imperative the objective practical *reality* of the moral law should not be equated with

[9] *Critique of Practical Reason,* L.W. Beck (trans.), Indianapolis: Bobbs-Merril, 1956, p.18/ Akademie edition, Vol.V, p.20.

the objective reality of the phenomenal realm and the principles that govern it. The three postulates that bear directly on the practical realm have to do with the existence of God, the freedom of the will and the immortality of the soul. The very nature of the question "What ought we to do?" presupposes these postulates and "an expression of the necessary fulfillment of the conditions that alone can realize the full exercise of moral activity".[10] In other words, we *presuppose the truth* of these postulates as the basis of morality. The moral law must carry with it promises and threats, otherwise its status as a command and the obligation imposed by reason would be considerably diminished.[11] In addition, this characterization of the moral law presupposes a necessary being – a supreme reason – that governs according to moral rules and is the underlying cause of all nature. Although we are required in both the practical and theoretical realms to act on the assumption that there exists a purposive unity – the *focus imaginarius* – the demands of practical reason are *necessary* in a way that methodological maxims or even transcendental ideas are not. The latter presupposes engaging in a particular kind of activity – the classification and systematization of empirical knowledge. The necessity of the moral law is completely distinct from the sphere of influence of spatio-temporal phenomena.

The kind of freedom spoken about with regard to freedom of the will is freedom from mechanistic causal influences that operate in the phenomenal realm. This freedom is causally effacacious in bringing about or determining a "good will". In order for us to have any moral obligations there must exist what Kant calls "causality through freedom"; we must be seen as free moral agents if we are to determine our will and claim responsibility for our actions.[12] This self-determination of the will constitutes the very fabric of our moral selves; it is totally free from conditional demands and instead concerns itself with ends that are absolutely necessary, the notion of man as an end in itself. The fact that our reason possesses "causality through freedom" is evident from the imperatives we impose on ourselves as rules of conduct. The "ought" contained in these imperatives expresses a kind of necessity and "connection with grounds that is found nowhere else in nature" (A547/B575). In the case of a free will imperatives are provided a priori by reason; they tell us what ought to happen and are determined independently of empirical constraints.

At A802/B830 Kant tells us that the fact of practical freedom can be proven through experience from the mere fact that we have the ability to overcome our sensous desires. Because the moral law can be said to give rise to free actions the practical employment

[10] G. Buchdahl, *Metaphysics and the Philosophy of Science*, Oxford: Oxford University Press, 1969, p. 528.

[11] This line of argument would seem to imply that the moral law is not sufficient in itself to determine the will of a Kantian agent. There are some subtleties in Kant's position on this point, some of which I shall discuss below.

[12] For a more detailed account of this argument see the third antinomy in the *Critique of Pure Reason* (A445–52/B473–80). See also footnote 3, *Critique of Practical Reason* (Preface), p. 6 / Akademie edition, Vol. V, p. 6.

of reason can render the concepts of God and immortality objective, something that was impossible in the domain of theoretical reason. That is to say, their possibility is proven by the fact that freedom really exists, an idea revealed by the moral law.[13] The concepts of God and immortality become a *need* of pure reason in its practical employment; they are necessary postulates for without them the moral law looses all force as the impetus for action. Hence, the concepts of God, freedom and immortality that were merely problematic for speculative reason become, in the realm of practical reason, *necessary* practical postulates.[14] Their truth is assumed rather than set as a problem and as a result the objectivity conferred on them is slightly different in practical contexts than in theoretical or speculative ones. In effect, practical reason would be impossible without the presumed truth of these postulates or concepts.

> The ideas of God and immortality are, on the contrary, not conditions of the moral law, but only conditions of the necessary object of a will which is determined by this law, this will being merely the practical use of our pure reason. ... they are the conditions of applying the morally determined will to the object which is given to it *a priori* (the highest good).[15]

Kant sums it up quite nicely at A813/B841 where he states that:

> It is necessary that the whole course of our life be subject to moral maxims; but it is impossible that this should happen unless reason connects with the moral law, which is a mere idea, an operative cause which determines for such conduct as is in accordance with the moral law an outcome, either in this or in another life, that is in exact conformity with our supreme ends. Thus without a God and without a world invisible to us now but hoped for, the glorious ideas of morality are indeed objects of approval and admiration, but not springs of purpose and action. For they do not fulfil in its completeness that end which is natural to every rational being and which is determined *a priori,* and rendered necessary, by that same pure reason.

This line of argument would seem to suggest that contemplation of the moral law is not sufficient as an incentive to do one's duty; the motivation provided by the ideas of God and immortality is also required. However, if this were the case then in what sense can we claim that the will is autonomous? In the preface to the first edition of *Religion Within the Limits of Reason Alone* Kant claims that morality, insofar as it is founded on the concept of man as a free being, neither requires the idea of another being superior to him to know his duty, nor any motive for observing the law except the law itself. Although the positions advanced in these two texts appear to be incompatible let me offer a few suggestions as to what Kant may have had in mind.[16]

The concept of the highest good or *summum bonum* is what reason demands as the goal of humanity. It consists of virtue or moral worth attained by obedience to the moral law and a degree of happiness which is exactly proportional to and conditioned by virtue. However, if one's will is to be free one must exclude desire for happiness

[13] *Critique of Practical Reason,* p. 3 / Akademie edition, Vol. V, p. 4.
[14] *Ibid.,* Bk. II, Ch. II, Sec. 9, pp. 151–153 / Akademie edition, Vol. V, pp. 146–148.
[15] Cf. *ibid.,* p. 4 / Akademie edition, Vol. V, p. 5.
[16] That the role of the *summum bonum* in Kant's moral philosophy is a controversial one is pointed out by Beck, *A Commentary on Kant's Critique of Practical Reason,* Chicago: University of Chicago Press, 1960.

from one's motives and, in that sense, the *summum bonum* can be seen merely as an *ideal* of reason rather than a *motive* of action. As an ideal of reason the *summum bonum* functions as an *object* of our moral will. Because of the finite nature of humankind this concept of the highest good is necessary for the moral disposition but not for the definition of duty. Thus, the intention to promote the highest good should be seen as the *subjective effect* of the moral law.[17] As Kant remarks elsewhere:

> Reason needs to assume the highest good and its conditions to prevent the highest and, consequently, all morality from being regarded as a mere ideal, which would be the case if the highest good, the idea of which necessarily accompanies morality, never existed.[18]

The necessity of the *summum bonum* results from the need of reason to presuppose that the universe is systematically ordered according to moral purposes. It is important to keep in mind however that the command of reason to seek the *summum bonum* should not be seen as something over and above the command of the categorical imperative to act according to duty. Kant does seem to suggest this in the *Critique of Practical Reason*[19] where he claims that the impossibility of the *summum bonum* would prove the falsity of the moral law. But, if the will is to remain autonomous in its relationship to the moral law then it seems that the only way of easing this apparent tension is to acknowledge that acting out of respect for the moral law is all we *can* do to promote the highest good; the commands are, in effect, one and the same.

Even if this was Kant's intention it is still necessary to address his remark at A813, that without the notions of God and immortality the ideas of morality are not springs of purpose and action. As a first step recall that the postulates of God and immortality are necessary conditions of the *summum bonum*. God's existence is required to equate virtue with happiness, something that cannot be achieved by man in a finite world. As a result we must also presuppose the immortality of the soul. It is because the *summum bonum* postulates a connection between happiness (virtue) and the moral law that Kant claims it is necessary in order to render the moral law effective. In fact he goes so far as to say that without the *summum bonum* the moral law would be null and void.[20] But again, this is not to say that the *summum bonum* and its necessary conditions of God and immortality *determine* the moral law or are the determination of our duty. Rather, if we argue that doing our duty as prescribed by the moral law *encompasses* the search for the *summum bonum*[21] then the connection between the postulates of God and

[17] *Critique of Practical Reason*, p. 148 / Akademie edition, Vol. V, p. 143.

[18] *What is Orientation in Thinking?* in *Kant's Critique of Practical Reason and Other Writings in Moral Philosophy*, L. W. Beck (trans.), Chicago: University of Chicago Press, 1949, p. 299.

[19] Cf. pp. 118–9 / Akademie edition, Vol. V, pp. 114–115.

[20] *Critique of Practical Reason*, pp. 118–9 / Akademie edition, Vol. V, pp. 114–115. As Beck, *Commentary*, p. 243 n. 13, points out, this claim is strongly denied elsewhere; for example in the *Critique of Practical Reason* pp. 147–9 / Akademie edition, pp. 142–144 and in the *Critique of Judgement*, J. H. Bernard (transl.), New York: Hafner Press 1951, sec. 87 / Akademie edition, pp. 447–448.

[21] Beck, *Commentary*, pp. 242–255, suggests this as a possible interpretation of the somewhat puzzling passages that refer to the connection between the *summum bonum* and the moral law.

immortality becomes one that is *subjectively* rational rather than objective in any strict sense. Reason commands us to seek the *summum bonum* but not in the objective way the categorical imperative commands us to do our duty. The objectivity of the categorical imperative (as is the case with the categorial principles) stems from formal constraints different in kind from the commands of reason.

Finally there remains the question of how the role of necessity differs in the methodological case from the categorial principles and the moral law. The difference has to do with what Kant calls the "grounds of their determination".[22] Each individual "ground" applies to a different area of human endeavour; the problematic has to do with the methodological deliverances of reason, the assertoric with the practical and the apodictic with the theoretical. For instance, consider mathematics as an example of theoretical knowledge; we construct a concept, the object of which one knows, with complete certainty, to be possible a priori. In the case of practical reason we postulate the possibility of an object (God and the immortality of the soul) on the basis of assertoric laws valid only for practical reason. "This certainty of the postulated possibility is not in the least theoretical and consequently also not apodictic".[23] By assigning objective reality to the ideas of God and immortality reason does not extend its theoretical knowledge. Instead, the possibility of the object in these ideas becomes an assertion for practical reason, a necessary requirement that allows us to realize the goals that we "ought" to set for ourselves. This necessity is not known by reference to an object; it is what Kant terms a necessary assumption made with reference to the subject and his/her ability to conform to the objective practical laws of freedom. The existence of Kantian moral agents renders this assumption necessary and on that basis it can only be given the status of a necessary *hypothesis*. But, as Kant remarks, he "could not discover for this subjective yet true and absolute rational necessity a better term than postulate".[24] In contrast the methodological maxims/transcendental ideas postulate an object – the systematic unity of knowledge – the ground of which is merely problematic. Although this object must be assumed to have objective validity of we are to engage in scientific knowledge, it fails to possess the apodictic certainty or necessity found in other areas of theoretical knowledge. The necessity of the categorical imperative and the principles of the understanding are both prior to the necessity of the transcendental ideas in that the former are minimal requirements for the kind of scientific rationality defined by the methodological deliverances of reason.

V. *Conclusion*

In summary then, even though the transcendental ideas that define scientific rationality tell us what "ought" to be done when engaging in scientific practice, they differ from

[22] *Critique of Practical Reason*, p. 11 / Akademie edition, Vol. V, p. 11.
[23] *Ibid.*, p. 17 / Akademie edition, Vol. V, p. 19.
[24] *Ibid.*, p. 12 / Akademie edition, Vol. V, p. 12.

the principles of pure practical reason on the force of the "ought". The "ought" of the categorical imperative governs the will of *every* rational being and prescribes the kind of behavior that we as moral agents ought to display, regardless of whether we value it as a successful endeavour. The transcendental ideas (the cosmological, psychological and theological) dictate how we ought to act in scientific contexts and these too are devoid of instrumental justification on the part of the individual investigator. Given that science constitutes the systematic unity of our knowledge, the pursuit of this unification is best achieved by adhering to the principles prescribed by the transcendental ideas. Indeed the course of action outlined by these principles must be followed independently of the success of the method they prescribe; they contain pure concepts of reason and are in no way empirically conditioned. Despite the fact that the unity science demands is empirically verified, the transcendental ideas that aid us in achieving this unity are immune from any revision based on empirical success. The situation is substantially different where the methodological maxims are concerned. They are employed in the attempt to attain a particular end, be it homogeneity or specification; both of which can be seen as contributing to the overall demand of reason – the systematic unity of the entire corpus of knowledge. The methodological maxims are not pure or determinable a priori, instead the decision to employ one or another of them depends on individual interests. Although they are objective insofar as they presuppose that a systematic unity of our knowledge is possible, nonetheless, there is a pragmatic element inherent in the decision to adopt any one of them. As a result they are incapable of yielding laws that are pure and determinable a priori.[25]

[25] I have benefitted greatly from discussions with Robert E. Butts concerning the issues dealt with in this paper and from his valuable suggestions on earlier drafts. His *Kant and the Double Government Methodology,* Dordrecht: Reidel 1984, was an invaluable resource during my study of Kant. I would also like to thank an anonymous referee for several helpful comments and Paul Forster for his assistance. Support of research by the Social Sciences and Humanities Research Council of Canada is greatfully acknowledged.