Kant's Concept of Teleology

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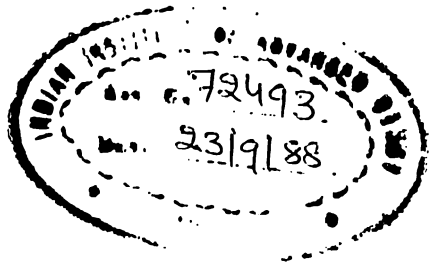

PREFACE

The problem of teleology is the problem of whether or not concepts such as 'purpose', 'end', 'design', have any value for the investigation and explanation of nature. In this study I have attempted to explain why this problem arose for Kant in two seemingly quite distinct areas and to show his way of dealing with it in each of them. I have tried, as well, to show how his treatment of teleology relates to issues which he raises in other contexts. For example, it helps to place in perspective his theory of science and scientific explanation, and his growing recognition that the language of the physicist is not adequate for describing all aspects of our experience of the world. It also indicates more clearly than ever the constructive importance of the distinction between the sensible and supersensible worlds which is crucial for his moral theory.

My primary intention has been to make clear why Kant considered teleology to be a problem and how he came to terms with it. I have tried to show that one aspect of the problem as he saw it was not unique with him, but that it arose originally from the eighteenth-century scientific view of the world, and that it was present for Hume and others as well. I have not, however, done more than suggest occasional parallels with contemporary treatments of the problem, nor have I given a full discussion of the philosophic issues connected with it which are still of current interest. I know of no similar attempt to deal strictly with Kant's treatment of teleology, and, since this aspect of his thought is not as familiar as it might be, I have been mainly concerned to set out and explain what he said about teleology within the context of the way in which it was important for him.

I should like to thank my colleagues, Professor John Yolton and Professor John Brückmann, the first for his valuable criticisms and suggestions, the second for his generous assistance with translations. Most especially I should like to thank Professor W. H. Walsh for his kindness, encouragement, and help, over many years.

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TRANSLATIONS AND REFERENCES

Quotations from Kant are from the following translations: *Critique of Pure Reason*, trans. Norman Kemp Smith (London 1933); *Critique of Practical Reason*, trans. Lewis White Beck (Chicago 1949); *Prolegomena*, trans. Peter G. Lucas (Manchester 1953); *Metaphysical Foundations of Natural Science*, trans. E. B. Bax (London 1883). I have used, but frequently disagreed with, the James Creed Meredith translation of the *Critique of Judgement* (Oxford 1928), as well as translations from the first Introduction to the *Critique* included in H. W. Cassirer's *A Commentary on Kant's 'Critique of Judgment'* (London 1938). Since instances of disagreement are relatively numerous, I felt it would be cumbersome to indicate my own departures from passages taken from these two sources. Except where otherwise noted, all other translations are my own.

References to the *Critique of Pure Reason* are to the second edition only. Quotations from the *Critique of Judgment* are followed by two numbers separated by a colon. The first number indicates the section of the *Critique* from which the quotation is taken and the second the page number in Vol. V of the *Akademie* edition. The *Akademie* pagination appears in the margin of the Meredith translation. All references to Kant's other works are to the volume and page of the *Akademie* edition only.

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THE JUSTIFICATION OF NATURAL SCIENCE

In the Dialectic of the *Critique of Pure Reason*, when discussing the physico-theological proof for the existence of God, the argument from design, Kant says:

> 'This proof always deserves to be mentioned with respect. It is the oldest, the clearest, and the most accordant with the common reason of mankind. It enlivens the study of nature, just as it itself derives its existence and gains ever new vigour from that source. It suggests ends and purposes [*Zwecke und Absichten*], where our observation would not have detected them by itself, and extends our knowledge of nature by means of the guiding-concept of a special unity, the principle of which is outside nature. This knowledge again reacts on its cause, namely, upon the idea which has led to it, and so strengthens the belief in a supreme Author (of nature) that the belief acquires the force of an irresistible conviction.' (B651–2)

This passage is interesting if for no other reason than that it is quite unexpected within the context of the *Critique* itself. Kant's argument in the Analytic had been designed to show that only mechanical concepts, based on the categories, can give knowledge of nature, and no one who has followed that argument would expect him to be willing to admit that the idea of a supreme Author of nature can extend our knowledge of nature in any way whatever. The fact that he is willing to make the admission leads to the following questions: first, in what way does Kant believe that teleological concepts such as 'end' and 'purpose' contribute to the extension of our knowledge of nature, and second, what are his

reasons for believing that they are of continuing value and importance? It is these questions which I would like to answer by following the development of his theory of teleology through the *Critique of Pure Reason* and the *Critique of Teleological Judgement*. Although the concept of teleology also plays a role in Kant's moral theory, I shall not discuss his moral writings since in this study I am concerned only with the bearing which it has on his doctrine of theoretical knowledge.

For Kant, theoretical knowledge of nature was scientific knowledge, and Newtonian physics was the only real example of such knowledge which he was willing to recognize. Consequently, in order to prepare the ground for answering the above questions, I shall begin with an examination of Kant's theory of science as it is presented in the Analytic of the *Critique of Pure Reason*. My main purpose is to point out how far the argument of the Analytic provides a justification for natural science and scientific explanation, since this will show why Kant believed that the argument needed to be supplemented with an examination of the contribution of teleological concepts to theoretical knowledge.

I. THE ARGUMENT OF THE SECOND ANALOGY

One of the questions which Kant set himself to answer in the Analytic of the *Critique of Pure Reason* was 'How is pure science of nature possible?' His answer to the question was intended to demonstrate, in reply to Hume's criticisms, that the fundamental principles of Newtonian physics are objectively valid principles of the world of our experience. As Weldon has remarked,

> 'had he merely wished to refute Hume's view that we can never justly claim to apprehend necessary relations between real existences, much of what he says would certainly be redundant. But in fact his aim was not merely to answer Hume but also to provide a metaphysical basis for Newton'.[1]

However, although Kant was intent upon giving Newtonian science a final justification in the face of Hume's sceptical doctrines, this was not a case of attempting to justify a questionable body of knowledge, like metaphysics. It was a case of showing how an established and successful discipline was possible, by tracing out its conceptual foundations and showing that they could be derived from necessary features of the human mind.

Commentators are agreed that the Second Analogy contains Kant's

[1] T. D. Weldon, *Kant's 'Critique of Pure Reason'*, 2nd edition, Oxford: Clarendon Press 1958, pp. 128–9.

final answer to Hume.[1] It is also, in an important sense, the core of his justification of Newtonian physics. For in the Second Analogy he attempts to demonstrate that the category 'cause', whose central importance for physical science he never questioned, is valid for objective human experience, thus guaranteeing Newton against the disastrous consequences of Hume's scepticism. In order, then, to have a clear view of Kant's theory of science, it is necessary to examine this part of his argument to determine how far it provides a justification for science and scientific explanation, and why it requires supplementation in order to account satisfactorily for scientific activity. This is not to say, of course, that Kant intended the argument of the Second Analogy to be his complete answer to the question 'How is pure science of nature possible?' A complete answer emerges only from the whole of the Analytic, where one of his major aims was to show that the unity of nature, which is required for science, and the unity of objective human experience have their root in a common source. But because of the crucial importance of the causal principle for Kant's theory of scientific explanation, at least the basic line of argument in the Second Analogy warrants particular examination.

Kant's argument is based on his distinction between the order of our perceptions or representations, and the order of objective events. He attempts to show that only if events are causally determined by prior events is it possible for us to distinguish an objective succession of perceptions from a subjective one. He states the problem in the following way: 'The apprehension of the manifold of appearance is always successive. The representations of the parts follow upon one another.' (B234) But whether the parts 'also follow one another in the object is a point which calls for further reflection, and which is not decided by the above statement'. (*ibid.*) That is to say, although all our representations occur to us in succession, this fact alone does not entitle us to infer that such succession corresponds to an objective order of events which is independent of us.

[1] For example, Kemp Smith says that the Second Analogy is 'Kant's answer to Hume's denial of the validity of the causal principle' (Norman Kemp Smith, *A Commentary to Kant's 'Critique of Pure Reason'*, 2nd edition, London 1930, p. 364). H. J. Paton says that 'it is here, more than anywhere else, that we find the answer to Hume' (*Kant's Metaphysic of Experience*, London 1936, Vol. II, p. 222). Weldon calls 'the transcendental argument in the *Analogies*, especially that contained in the *Second Analogy*, . . . the nerve of his reply to Hume' (op. cit., p. 317).

The central point in Kant's argument in the Second Analogy is that if we are to move from the subjective order of our representations to an objective order of events, it is necessary that our representations be connected in a certain time-sequence and no other; and by this he means that the order of our representations must be an irreversible one. It must be a sequence whose order is independent of us, or, as he puts it, one perception must succeed another 'according to a rule'. He says:

> 'We have representations in us, and can become conscious of them. . . . How, then, does it come about that we posit an object for these representations, and so, in addition to their subjective reality, as modifications, ascribe to them some mysterious kind of objective reality? Objective meaning cannot consist in the relation to another representation (of that which we desire to entitle object), for in that case the question again arises, how this latter representation goes out beyond itself, acquiring objective meaning in addition to the subjective meaning which belongs to it as determination of the mental state. If we enquire what new character *relation to an object* confers upon our representations, what dignity they thereby acquire, we find that it results only in subjecting the representations to a rule, and so necessitating us to connect them in some one specific manner; and conversely, that only in so far as our representations are necessitated in a certain manner as regards their time-relations do they acquire objective meaning.' (B242–3)

In saying that if our representations are to have objective reference they must succeed one another according to a rule which compels us to connect them in some specific manner rather than any other, Kant is saying that there must be a sufficient reason for their occurrence. In fact, at B246–7, he refers to the principle of the Second Analogy as 'the principle of sufficient reason'[1]:

> 'This rule, by which we determine something according to succession of time, is, that the condition under which an event invariably and necessarily follows is to be found in what precedes the event. The principle of sufficient reason is thus the ground of possible experience, that is, of objective knowledge of appearances in respect of their relation in the order of time. . . . Something must necessarily precede,

[1] See also B264–5, where Kant indicates that, while in the past, 'the attempt has, time and again, been made, though always vainly, to obtain a proof of the principle of sufficient reason', he believes he has succeeded in obtaining one.

and when this antecedent is posited, something else must necessarily follow. . . . Were it not so, were I to posit the antecedent and the event were not to follow necessarily thereupon, I should have to regard the succession as a merely subjective play of my fancy.'

Thus, for Kant, our knowledge of objective succession is based upon the idea of a determinate order between events. The presupposition underlying the idea of such a determinate order is that of something which determines it; and this latter idea of a determinant or reason is that of a cause. As he says in the *Prolegomena*:

'It is all one whether I say: without the law that when an event is perceived it is always referred to something preceding it on which it follows according to a universal rule, a judgement of perception can never rank as experience; or whether I express myself thus: everything of which experience teaches me that it happens must have a cause.' (Ak., IV, 296)

The distinction which can be made between perceptions whose order can be reversed at will, and those whose order is independent of us shows, according to Kant, that we recognise the latter succession to be governed by an objective law or rule. In fact, we must recognize this if we are to provide our perceptions with the objective reference which they must have if we are to regard them as constituting experience.

'Thus the relation of appearances (as possible perceptions) according to which the subsequent event, that which happens, is, as to its existence, necessarily determined in time by something preceding in conformity with a rule – in other words, the relation of cause to effect – is the condition of the objective validity of our empirical judgements, in respect of the series of perceptions, and so of their empirical truth; that is to say, it is a condition of experience. The principle of the causal relation in the sequence of appearances is therefore also valid of all objects of experience . . . as being itself the ground of the possibility of such experience.' (B247)

This, then, is the essential outline of Kant's proof that the causal principle is valid for all objective experience, and itself makes that experience possible. It is important to note, however, that he does not argue that in any particular case we must be able to state the causal ground for an event before we can know that it is an objective experience. That he is not arguing in this way comes out clearly when he makes assertions such as the following:

'If, then, we experience that something happens, we in so doing

always *presuppose* that something precedes it, on which it follows according to a rule.' (B240)

'Immediately I perceive *or assume* that in this succession there is a relation to the preceding state, from which the representation follows in conformity with a rule, I represent something as an event.' (B243)

'There is an order in our representations in which the present, so far as it has come to be, refers us to some preceding state as a correlate of the event which is given; *and though this correlate is, indeed, indeterminate*, it none the less stands in a determining relation to the event as its consequence.' (B244: my emphasis throughout)

What Kant does argue in the Second Analogy is that in any case of objective experience there must have been *some* objective causal ground or reason for its occurrence. Our objective experience is such that it *must* have had an objective reason, even though we may be entirely unable to say what it is, whereas this is not the case with a mere subjective succession of perceptions. It is because we know that objective events, just in so far as they are objective, *must* be connected necessarily with past objective events, that we are justified in looking for their grounds. It is this which leads us to assume, in the first place, that it will be possible for us to find an explanation for whatever occurs. But it is not necessary in any instance that we either know what these grounds are, or even have a good idea of them, before we can be certain that an experience is objective. In other words, the principle of the Second Analogy does not give us an 'inference licence' from 'Here is an event for which I know or can assume a reason' to 'Here is an objective event', but rather from 'Here is an objective event' to 'Here is an event for which I know there was a reason'.[1]

If we are willing to admit that Kant has succeeded in demonstrating what he set out to prove, at least on the basis of the premises from which he began, we can go on to characterize the conclusion of his argument in different terms. It sounds highly artificial to modern ears when

[1] Cf. Paton, *Kant's Metaphysic of Experience*, Vol. II, p. 269: 'What Kant himself maintains is that *when* we perceive an objective event, our sense-perceptions must be irreversible – *not* that when we find our sense-perceptions to be irreversible, we infer that we are perceiving objective events. The word "irreversibility" is not even used by Kant himself. It is only our shorthand method of describing that *necessity* which he finds in the succession of our perceptions when we are aware of objective events.'

he claims to have shown that 'the principle of the causal relation in the sequence of appearances is . . . valid for all objects of experience . . . as being itself the ground of the possibility of such experience'. (B247) There is an alternative way of expressing his claim, however, which is perhaps more acceptable. We can say that Kant's interest throughout the Analytic is largely a conceptual one. That is, he wanted to show that there are certain fundamental concepts, the categories, which play an essential role in human experience, and, further, to show what these concepts are, and how they are required for experience. Although I have confined myself to his argument concerning the category 'cause', Kant believed that there are a number of such concepts, all of which are central both in ordinary experience and in science. Taken together, the categories can be described as the basic conceptual structure of human thought, a structure which first introduces certain essential conceptual discriminations into our experience, and which forms the foundation for any further conceptual discriminations we might wish to make. The concept 'cause', for example, as we have seen, is what first enables us to distinguish events in our experience from mere subjective sequences of perceptions. The concept 'cause' is intimately tied to that of 'event', in such a way that, unless the former concept were applicable, there would be no concept of an event as an objective happening. It is for this reason, Kant believes, that we know that any event must have a cause; unless it did it would not be an event.

The categories find original expression in conceptual principles such as, 'Every event has a cause', which, as Kant believes he has shown, underlie objective experience and make it possible. For such principles are the most general 'laws' which first introduce a minimal yet essential conceptual coherence into nature as an object of our experience. These 'laws' are not, like empirical laws, discovered in nature; but they are the principles which first enable us to organize our perceptions into a nature within which empirical laws can be sought. As Kant says at the close of the Analogies:

> 'By nature, in the empirical sense, we understand the connection of appearances as regards their existence according to necessary rules, that is, according to laws. There are certain laws which first make a nature possible, and these laws are *a priori*. Empirical laws can exist and be discovered only through experience, and indeed in consequence of those original laws through which experience itself first becomes possible.' (B265)

It is because the principle, 'Every event has a cause', in which the concept 'cause' finds expression, has been shown to be a condition of objective experience, that it is possible for us sensibly to assert any particular causal statement.

II. LIMITATIONS OF THE ARGUMENT

In examining the basic line of argument in the Second Analogy, I have been more interested in setting out what Kant believes he has proved than in discussing whether or not it is true. With this limitation in mind we can proceed on the assumption that his argument has answered Hume's sceptical doubts about the validity of the causal principle. Yet, in so doing, we may still ask how far he has provided an adequate justification for Newtonian science, that is, how far he can be said to have justified scientific activity as a search for systematic explanations for events. There is no doubt that Kant himself believes that he has provided a justification for natural science. Thus he declares:

> 'The principle of the causal connection of appearances is required in order that we may be able to look for and to determine the natural conditions of natural events, that is to say, their causes in the [field of] appearance. If this principle be admitted, and be not weakened through any exception, the requirements of the understanding, which in its empirical employment sees in all happenings nothing but nature, and is justified in so doing, are completely satisfied; and physical explanations may proceed on their own lines without interference.' (B572–3)

It is at once apparent, however, that for scientific explanation more is required than merely a proof that the concept 'cause' has valid application in experience, that events have causes. When we provide explanations for events we provide premises from which they can be deduced. But the causal principle cannot be used as a premise in any explanation. It does not constitute a reason for the explanation of any event, but only justifies our belief that there must be a reason for it, whether it can be discovered or not. The causal principle may be said to introduce the language of reasons into our experience, but of itself it provides no reasons. Kant is quite emphatic that categorial principles are not premises from which explanations can be derived when he says:

> 'Special laws, as concerning those appearances which are empirically determined, cannot in their specific character be *derived* from the categories, although they are one and all subject to them. To obtain

ady knowledge whatsoever of these special laws, we must resort to experience.' (B165)

Thus although it is the causal principle which first ensures events a place in our conceptual scheme of things, in order to explain events more is required than that principle. The importance of the causal principle lies in the fact that unless it is valid, natural science is impossible; but, on the other hand, it does not follow from its validity that natural science *is* possible.

Closely related to this is another point which has to do with the systematic character of science and scientific explanation. Scientists not only attempt to discover general laws which will explain particular events, but also to connect such laws systematically. Unless an event can be placed within a systematic body of knowledge, we do not say that it has been *scientifically* explained. For ordinary, everyday purposes we may be satisfied with explanations which have no systematic background, explanations which form a mere aggregate rather than a system. But for scientific purposes such explanations must have a place in a logically connected, systematic whole of knowledge. Kant himself recognizes this when he says, 'systematic unity is what first raises ordinary knowledge to the rank of science, that is, makes a system out of a mere aggregate of knowledge'. (B860) Yet the argument of the Second Analogy does not guarantee in any way that we will be able to systematize our knowledge and so make it scientific. The categorial principles provide the conceptual framework which enables us to make our experience minimally coherent, and to that extent they can be said to make it systematic. But the system which they introduce is not an explanatory one, for the very reason that the categories are not themselves explanatory. Nor does the system which they make possible guarantee that we will be able to make experience systematic in its detail, that is, that we will be able to discover and systematize particular causal laws.

A further requirement for the possibility of scientific explanation is that regularities should occur in nature, that causes should repeat themselves, and that similar causes should have similar effects. The problem of whether past regularities in nature will repeat themselves in future is, of course, the problem of induction, a problem with which Kant did not concern himself in the Second Analogy. Yet, in the argument of the Second Analogy, he appears to assume that, although particular causal laws can only be known as a result of experience, there is no reason to doubt that they can be discovered. That is to say, he assumes that we

can distinguish particular causal sequences which will be found to repeat themselves. This seems to be what he has in mind when he frequently declares that, given the cause, the effect must 'invariably and necessarily' follow. It also seems to underlie his continual assertion that the effect must follow 'in accordance with a rule', for the notion of a rule implies regularity and repetition. As he says later in the *Critique:*

> 'For every cause presupposes a rule according to which certain appearances follow as effects; and every rule requires uniformity in the effects. This uniformity is, indeed, that upon which the concept of cause (as a faculty) [*als eines Vermögens*] is based, and so far as it must be exhibited by mere appearances may be named the empirical character of the cause. This character is permanent, but its effects, according to variation in the concomitant and in part limiting conditions, appear in changeable forms.' (B577)

However, although such assumptions may underlie the argument of the Second Analogy, they do not follow from it. As Paton remarks in this connection:

> 'So far as I can see, such assumptions are not a consequence of the principle of causality, nor have they been justified by any argument. It is theoretically possible that in a universe governed throughout by causal law there might be no repetitions. Kant himself recognises in another connexion that, in spite of the formal and universal laws by which nature must be governed, the given matter might be such that in nature no similarities could be found [cf. B681–2]; and clearly if we could find no similarities in nature, we could equally find no repetitions.' (*Kant's Metaphysic of Experience*, Vol. II, p. 276)

These, then, are some of the areas which remain to be dealt with, even if the argument of the Second Analogy be accepted, before an adequate justification for scientific activity can emerge. We can sum up by saying that the problem for physical science is to discover the detailed and systematic character of nature, and that this can only be done through empirical investigation. All that the categorical principles, for example, that of the Second Analogy, claim to do is to establish the general conceptual structure which makes empirical investigation a legitimate activity. But unless we presuppose that regularities will occur in nature, there is no reason to believe that such investigation will enable us to discover empirical laws. For if we did not encounter regularities, there would be no basis for formulating empirical laws, and hence no basis for scientific explanations. The principle, 'Every event

has a cause', neither guarantees nor justifies us in assuming either that regularities will occur in nature, or that those which have occurred in the past will continue to do so in future. For neither assumption follows from that principle; and since both assumptions are essential presuppositions of scientific investigations of nature, the argument of the Second Analogy is not by itself sufficient to justify such investigations. It is a matter for conjecture whether Kant at any time thought that it was sufficient; but at least he goes on in the Dialectic of the *Critique of Pure Reason* and in the Introduction to the *Critique of Judgment* to deal further with the problem of induction as he sees it and with the presuppositions which he believes must underlie scientific investigation.

III. PURE AND EMPIRICAL NATURAL SCIENCE

We have seen part of Kant's answer to the question 'How is pure science of nature possible?' In the *Prolegomena*, he gives a succinct summary of his complete answer when he says, 'Now the principles of possible experience are at the same time universal laws of nature, which can be known *a priori*. And thus the problem which lies in the . . . question . . . *How is pure natural science possible?* is solved.' That is to say, the principles of possible experience, among which is included the causal principle, 'constitute a physiological [physical][1] system, i.e., a system of nature; which system precedes all empirical knowledge of nature, first makes it possible, and hence can properly be called universal and pure natural science'. (Ak., IV, 306)

Pure natural science is, for Kant, the system of *a priori* principles which underlie empirical natural science, and which determine the conceptual terms in which explanations will be formulated. Empirical natural science, on the other hand, is Newtonian mechanics, and the categorial principles are, he believes, the principles of that science. Weldon asserts that:

> 'Kant's avowed aim in the *Analytic* was to prove that the objects about which true synthetic *a priori* statements can be made are, strictly speaking, objects as they are conceived in Newtonian physical theory. This is manifest when we notice that the categories when schematized give us more or less exactly the characteristics which Newtonian

[1] Lewis White Beck translates '*physiologisch*' as 'physical'. Cf. Weldon: 'Kant's nearest equivalent to "science" in our extended use was *Physiologie* quite generally, "the study of Nature"' (*Kant's 'Critique of Pure Reason'*, p. 86).

bodies have to possess.' (*Kant's 'Critique of Pure Reason'*, pp. 249–50)

The nature which is defined by the categorial principles is an abstract, mechanical nature of interacting physical bodies, capable of mathematical treatment. As Gottfried Martin characterizes it: 'The concept of nature in the *Critique of Pure Reason* is . . . limited in that the nature that is discussed there does not include the living; nature for the *Critique* is only the object of mechanics.' In fact,

> 'the Kantian concept of nature does not bear on plants and animals and mountains and not even on the sun, the moon, and the stars, but on conformity to law as such. . . . Kant is only concerned with mechanical conformity to law, and the nature whose existence he is asking about is thus mechanical conformity to law'.[1]

It is because of this general mechanical conformity that we are able to approach nature experimentally with a view to discovering the *empirical* laws of such conformity. However, Kant's tendency to speak, as he often does, of the categorial principles as 'universal laws of nature' can be confusing, since it might tempt one to suppose that he believed *a priori* laws and empirical laws to be of the same type and to define nature in the same way. But he is nonetheless well aware of the distinction between pure science of nature and science as a system of empirical laws. It is, in fact, this latter conception of science which he is concerned with in the Dialectic of the *Critique of Pure Reason*, and in the Introduction to the *Critique of Judgement*.

There is, nonetheless, a certain tension in Kant's treatment of science between two apparently conflicting views of what constitutes a natural science. This comes out clearly in his efforts to distinguish between natural science 'properly and improperly so-called', which is most prominent in the *Metaphysical Foundations of Natural Science*, published a year before the second edition of the *Critique of Pure Reason*. 'The first would treat its subject wholly according to principles *a priori*, and the second according to laws derived from experience.' (Ak., IV, 468) But, although Kant here says that natural science 'properly so-called' would treat its subject entirely according to *a priori* principles, the definition of a science which he gives in the *Critique of Pure Reason* is less strict, and is entirely compatible with the inclusion of empirical elements. 'Systematic unity is what first raises ordinary knowledge to the

[1] *Kant's Metaphysics and Theory of Science*, trans. P. G. Lucas, Manchester 1955, pp. 67–8.

rank of science, that is, makes a system out of a mere aggregate of knowledge.' (B860) Ordinary knowledge forms a mere aggregate, whereas scientific knowledge forms a system. Ideally, a systematic body of knowledge would 'exhibit the connection of its parts in conformity with a single principle' (B673), and it is this connection which we aim toward in making our ordinary empirical knowledge scientific.

In the *Metaphysical Foundations*, however, Kant wishes to stress the 'rationalist' notion of science as a body of *necessary* knowledge, and so the definition he gives there is a narrower one which focuses on this requirement. He says: 'that can only be called science *proper* whose certainty is apodeictic; knowledge that can merely contain empirical certainty is only improperly called *science*'. (*ibid.*) But despite this second definition, the requirement of systematic unity is evidently more essential than apodeictic certainty; for Kant is willing to admit a systematic body of knowledge to the status of a science even though it contains empirical laws which, since they are only contingently true, and therefore falsifiable,[1] cannot lay claim to such certainty. The latter science, however, must ultimately be *based* on absolutely certain first principles if it is to be a science. For example, Newtonian mechanics contains empirical laws, but at the same time it is based on principles which Kant believes to be absolutely certain, the three laws of motion,[2] and so may properly be called a science.

> 'But when the grounds or principles of a systematic body of knowledge are in the last resort merely empirical, as, for instance, in chemistry, and the laws from which the reason explains the given facts are merely empirical laws, they then carry no consciousness of their *necessity* with them (they are not apodeictically certain), and thus the whole does not in strictness deserve the name of science;

[1] See *Prolegomena* (Ak., IV, 306 n.) where Kant says that 'experience as knowledge *a posteriori*, can only give contingent judgements'. The context indicates that a contingent judgement is one whose truth or falsity is decided by experience.

[2] That Kant believes the laws of motion to be absolutely certain is evident from the Introduction to the *Critique of Pure Reason*, where he calls Newton's third law 'necessary . . . *a priori*, but also synthetic' (B17–18), and indicates that he could have cited other propositions from 'the pure part of natural science' which have the same status. This is undoubtedly inspired by Kant's temptation to suppose that some of the fundamental laws of Newtonian mechanics could be given an *a priori* proof by being deduced from the categories. In fact, in the *Metaphysical Foundations of Natural Science*, he attempts an *a priori* proof of some of them. Strictly speaking, however, the absolutely first principles are the categorial principles.

chemistry indeed should be rather termed systematic art than science.' (*ibid.*)[1]

Thus, the two requirements that must be satisfied before a body of knowledge can qualify as a science are, first, that it be systematically organized, and, second, that it be based ultimately on absolutely certain principles. Kant has already dealt with the absolutely certain first principles of Newtonian science in the Analytic of the *Critique of Pure Reason*. As we shall see in what follows, it is with the *systematic* character of science that he is primarily concerned in his discussion of empirical science in the Dialectic of the first *Critique* and in the Introduction to the *Critique of Judgement*.

IV. TWO CONCEPTIONS OF THE SYSTEMATIC UNITY OF NATURE

We have noted some of the difficulties which remain for Kant, even if the argument of the Second Analogy is taken to have proved that the causal principle is a necessary principle of experience, in connection with the discovery and systematization of particular empirical laws. I have suggested that these difficulties can broadly be summed up as the problem of induction, the problem of whether or not nature, despite the very general regularity and system which is introduced by the categorial principles, and particularly the causal principle, will manifest regularity in its detail. In order to understand how this problem arises for Kant, it is important to notice two ways in which he speaks of nature as a unity, that is, of nature as a system of laws.

The first way of speaking of nature as a unity comes out most prominently in the Analytic of the *Critique of Pure Reason*. Kant there speaks of nature as a system of necessarily interconnected phenomena. He believes that if phenomena did not form such a system there would in fact be no nature in the first place. As he puts it in the *Prolegomena*, '*nature* is the *existence* of things, considered as existence determined according to universal laws'. (Ak., IV, 294) The necessary connections which provide the essential systematic unity required for nature are those of substance and accident, cause and effect, and the mutual inter-

[1] Kant seems to have thought of chemistry as concerned only with the qualitative classification of different substances (cf. *Critique of Pure Reason*, B680–1). As a qualitative study it could never be subject to mathematical treatment, and, since Kant believed that there is only as much science as there is mathematics in any study of nature, could never be a science (see *Metaphysical Foundations*, Ak., IV, 470). He was, of course, writing at a time before Dalton had succeeded in introducing mathematics into chemistry.

action of substances. These connections are expressed in the three principles of the Analogies of Experience, which, 'taken together . . . declare that all appearances lie, and must lie, in *one* nature, because without this *a priori* unity no unity of experience, and therefore no determination of objects in it, would be possible'. (B265)

The second way in which Kant speaks of nature as a unity is most evident in the Appendix to the Dialectic of the *Critique of Pure Reason* and in the Introduction to the *Critique of Judgement*. Within nature as a system in accordance with the categorial principles, we find a possibly infinite diversity of individual substances, causal relations, and mutual interactions among substances; and yet we assume that this diversity can ultimately be brought into systematic unity.

> 'There are such manifold forms of nature, so many modifications, as it were, of the universal transcendental concepts of nature, left undetermined by the laws given *a priori* by the pure understanding, because these only concern the general possibility of a nature (as an object of sense), that there must be laws for these [forms] also. These laws, being empirical, may be contingent as far as the light of our understanding goes; but still, if they are to be called laws (as the concept of a nature requires), they must be regarded as necessary in virtue of a principle of the unity of the manifold, though it be unknown to us.' (*Critique of Judgement*, IV: 179–80)

The latter way of speaking of the unity of nature, as a unity which underlies *empirical* diversity, is the one that is important for Kant's account of the presuppositions which are required for scientific investigations of nature. The distinctive thing about such investigations is the scientist's attempt to reduce the diversity which he finds in nature to some degree of systematic unity. Thus, to use examples which Kant gives later, the scientist will attempt to show,

> '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.' (B679–80; cf. *Critique of Judgement*, V: 185)

However, although the scientist attempts to bring the empirical detail of nature into systematic unity, this unity has a quite different status for Kant from that which is introduced by the categorial principles. In the absence of the categorial unity he believes that there would not be a nature for scientists to investigate; that unity is constitutive of nature

in the sense that we know *a priori* that it must apply to nature as an object of our experience. But the systematic unity of the empirical detail of nature is not constitutive of our experience, since we could quite well have experience which, though subject to the categorial principles, was otherwise so diverse as to be incapable of further systematization. Consequently, as we shall see, Kant believes that if the scientist is to succeed in his task, he must presuppose that the empirical detail of nature *is* ultimately a unity. For if natural science is to display the systematic unity which is required of it, the scientist must presuppose that something corresponding to this unity actually exists in nature to be discovered, that the detail of nature is organized in such a way that it will prove amenable to systematization.

Kant asserts that, although scientists have not always been conscious of the fact that they are presupposing 'the systematic unity of nature as objectively valid and necessary', nevertheless the presupposition is 'covertly implied, in remarkable fashion, in the principles upon which they proceed.' (B679) He goes on to point out three principles which he believes regulate scientific investigation, and which depend on the presupposition of the systematic unity of nature itself. The first such principle is 'the well-known scholastic maxim, that rudiments or principles must not be unnecessarily multiplied (*entia praeter necessitatem non esse multiplicanda*)'. (B680) This principle implicity presupposes that systematic unity will be discovered in nature, 'that the seemingly infinite variety need not hinder us from assuming that behind this variety there is a unity of fundamental properties – properties from which the diversity can be derived through repeated determination'. (*ibid.*) For example,

> 'A great advance was made when chemists succeeded in reducing all salts to two main genera, acids and alkalies; and they endeavour to show that 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.' (B680–1)[1]

[1] Kant is obviously more concerned with the systematic character of chemistry as an empirical study than he is with 'apodeictic certainty' in this context. Chemistry can never possess such certainty, but it can still be systematic.

The presupposition that things in nature are capable of generic classification is simply a particular case of the presupposition that nature itself is ultimately organized in such a way that empirical data can be brought into systematic unity. If nature presented us with so great a variety 'that even the acutest human understanding could never by comparison of them detect the slightest similarity . . . we should not even have the concept of a genus, or indeed any other universal concept'. (*ibid.*) And without such concepts there would be no possibility of systematizing the empirical detail of nature, and hence no scientific explanation of natural phenomena. As Kant describes it,

> 'this is a logical principle . . . without which there could be no employment of reason. For we can conclude from the universal to the particular, only in so far as universal properties are ascribed to things as being the foundation upon which the particular properties rest'. (B680)

The counterpart of the principle of genera is a second principle, which Kant calls 'the principle of species', or 'the law of specification', and which he formulates as, '*entium varietates non temere esse minuendas*'. (B684) It complements the first principle since, whereas the latter requires that the scientist look for similarities in nature, this requires that he look for differences. The principle of genera leads to the systematic unity of empirical knowledge by ascending to ever higher genera, while the principle of species leads to systematic completeness by descending to the diversity of species which are contained under the genera, and considering no species to be the lowest, but always continuing to search for lower species. Kant believes that the goals toward which we are directed, both by this principle and by the first, are goals we can never reach since in descending from genera to species no species can ever be considered the lowest possible, just as in ascending to genera no genus can ever be considered the highest. As with the previous principle, the principle of specification is only a logical one; but nonetheless we must equally presuppose that its basis is to be found in nature itself.

> 'Indeed it is only on the assumption of differences in nature, just as it is also only under the condition that its objects exhibit homogeneity, that we can have any faculty of understanding whatsoever. For the diversity of that which is comprehended under a concept is precisely what gives occasion for the employment of the concept and the exercise of the understanding.' (B685)

We are directed by this principle to look for the specific differences in

nature, and, unless we presupposed that such differences were in nature to be found, there would be nothing to move us to scientific inquiry.

The third principle which leads scientists toward systematic unity in their investigations is the law of 'the *affinity* of all concepts' (B685), or, as Kant also calls it, the principle of the '*continuity* of forms'. (B686) This principle, which arises from the combination of the first two, is 'a law which prescribes that we proceed from each species to every other by gradual increase of the diversity'. (B686) For if we are to achieve systematic unity by ascending to higher genera on the one hand, and descending to lower species on the other, there must be no gaps in the process in either direction. 'In short, there are no species or subspecies which . . . are the nearest possible to each other; still other intermediate species are always possible, the difference of which from each of the former is always smaller than the difference between these.' (B687) And although this principle too is only a logical one, we must nonetheless presuppose that the continuity of forms is in fact present in nature.

Kant makes it quite clear that he does not consider these principles, or the presupposition of the systematic unity of nature on which they depend, to be hypotheses which we advance with a view to justifying them by our success in bringing our empirical knowledge of nature to systematic unity. On the contrary, we have no option but to presuppose that such unity is in nature to be found (see B681–2). Moreover, although we anticipate nature by means of these principles, they are not empirically derived from nature. Rather, they express a demand that nature be of such a character that we will succeed in systematizing it, and this is something we cannot know prior to the actual attempt.

V. NATURAL SCIENCE AS A SYSTEM

In discussing science as a systematic body of knowledge, Kant is interested in it as a body of knowledge which enables us to explain natural phenomena. Although he nowhere gives a detailed account of scientific explanation, his references to it show that he held a straightforward and consistent view. For example:

> 'Explanation means derivation from a principle, which must, therefore, be clearly known and specified.' (*Critique of Judgement*, 78:412)

> 'In the explanation of given appearances, no things or grounds of explanation can be adduced other than those which have been found to stand in connection with given appearances in accordance with the already known laws of the appearances.' (B800)

'Appearances must . . . be capable of complete causal explanation in terms of other appearances in accordance with natural laws.' (B574)

And in the *Inquiry into the Distinctness of the Principles of Natural Theology and Morals*, when speaking of Newton's method, he says that we should search 'for the rules according to which particular appearances of nature occur . . . and we explain complicated natural events when we distinctly show how they are included under these well-proved rules'. (Ak., II, 286)[1] Thus, for Kant, when we provide explanations for events, we provide premises from which they can be deduced, and among the premises in each case will be at least one general law which has been empirically discovered.

Closely connected with Kant's view of science as a systematic body of knowledge which enables us to explain particular events is his belief that it must constitute a logical system, a hierarchy of deductively related propositions in ascending order of generality. To see what this connection is, it is necessary to examine his distinction between understanding and reason, and the role which he believes the latter faculty to play in scientific knowledge. Although the language of mental faculties is now highly, and rightly, suspect, the fact that Kant employs it need not generate too great confusion. It was usual in his day to distinguish between different kinds of mental activities and processes, and the import of such distinctions, even if not the terms in which they were drawn, is still often legitimate and relevant. Kant's distinction between understanding and reason is, in fact, related to his effort to come to grips with the further presuppositions which he believes to be required for scientific investigations of nature. He states the distinction in the following way:

'The understanding is an object for reason, just as sensibility is for the understanding. It is the business of reason to render the unity of all possible empirical acts of the understanding systematic; just as it is of the understanding to connect the manifold of the appearances by means of concepts, and to bring it under empirical laws.' (B692)

This suggests that the understanding is concerned both with the *a priori* categorial conceptualization of experience in general, and also with the empirical conceptualization of the detail of experience after it has been subjected to the categories. Understanding is thus responsible both for the introduction of objectivity into our experience and for the detailed

[1] Trans. L. W. Beck, *Critique of Practical Reason and Other Writings in Moral Philosophy*, Chicago 1949, pp. 271–2.

empirical knowledge which we have as a result of further conceptualization. It is understanding which first enables us to distinguish different physical objects and events and make empirical generalizations about them, although in a way that is only minimally systematic. Reason, on the other hand, deals with our *knowledge* of empirical objects, and provides it with systematic organization. Reason does not, however, concern itself *directly* with physical objects, as does the understanding (see B359); its relation to physical objects is an indirect one which results only from its application to the empirical data of the understanding.

> '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.' (B676)

It is evident that for Kant the systematic character of science is in some way the product of reason, while ordinary knowledge of physical objects, the objects of experience which constitute the empirical data of science, depends on the understanding. As he has drawn it here, the distinction between understanding and reason can, I think, be simply and yet accurately described as the distinction between the activity of coming to have ordinary knowledge and the activity of systematizing it so as to make it scientific. In fact, for 'reason' in the present context, and throughout the Appendix to the Dialectic of the first *Critique*, we could substitute 'the natural scientist' or 'the scientific attitude', without doing great violence to what Kant is, in effect, saying. When he talks about 'reason' he is, in an important sense, talking about the scientific attitude toward ordinary knowledge, an attitude that prevents the scientist from resting content with an aggregate of unrelated bits of knowledge, and which leads him to attempt to discover logical relations between them. It is unfortunate that Kant's actual examples of the way in which scientists go to work, and of the concrete principles that they employ, do not clearly bring this out.[1] His use of terms like 'genera'

[1] Cf. his discussion at B690–1 of the way in which 'we discover a unity in the generic forms of the orbits, and thereby a unity in the cause of all laws of planetary motion, namely, gravitation'. If Kant really thought, as this passage seems to indicate, that this was the way Newton discovered universal gravitation, he was obviously mistaken. Even as an ideal reconstruction of Newton's method, it is far from adequate. Kant's view of scientific method, however, need not obscure what is still of interest in his account of the presuppositions underlying scientific activity.

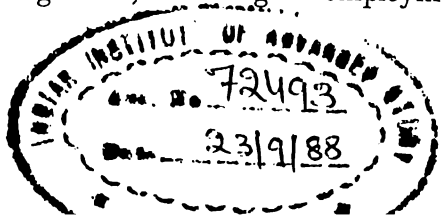
and 'species' suggests that he is concerned with an activity that is merely classificatory, and so could not yield logical relations which would enable deductive inferences to be made. But the fact that he calls the three principles 'logical', together with the account that he will presently give of the type of system that reason demands, suggests that the activity of classification is simply the first step toward the construction of a logical system. And when we remember that logic for Kant was class logic, his emphasis on classification will cease to be puzzling. It would have been difficult for him to give an account of what would today be called 'the logic of science', without conforming fairly closely to the requirements of Aristotelian logic.

Kant's account of what he calls 'the logical employment of reason' thus begins with a description of the Aristotelian syllogism. In every syllogism, he says, there is a universal rule, the major premise, which connects the predicate of the conclusion with a condition; the minor premise states that the subject of the conclusion fulfils the condition, and this shows the conclusion to be determined by the premises. However,

> 'If, as generally happens, the judgement that forms the conclusion is set as a problem – to see whether it does not follow from judgements already given, and through which a quite different object is thought – I look in the understanding for the assertion of this conclusion, to discover whether it is not there found to stand under certain conditions according to a universal rule. If I find such a condition, and if the object of the conclusion can be subsumed under the given condition, then the conclusion is deduced from the rule, *which is also valid for other objects of knowledge.*' (B561)

From this account of mediate inference we can see, according to Kant, that reason in its logical employment 'endeavours to reduce the varied and manifold knowledge obtained through the understanding to the smallest number of principles (universal conditions) and thereby to achieve in it the highest possible unity'. (*ibid.*)

This would mean that, if we wished to explain a certain empirical fact, we would attempt to find a universal premise which stated a condition from which it could be deduced. However, this premise would itself only be *used* in the explanation, and not proved by it; in order to prove or explain the premise, we should have to find further premises, or 'conditions', from which it in turn could be deduced, and so on to the ultimate premise or 'unconditioned'. 'Obviously the principle peculiar to reason in general, in its logical employment, is: – to find for the



conditioned knowledge obtained through the understanding the unconditioned whereby its unity is brought to completion.' (B364) For various reasons which lie outside the scope of this discussion, Kant believes that it is impossible for us ever to reach an unconditioned or ultimate explanation. But he also believes that this is, nonetheless, the necessary goal of reason, which must by its very nature try to advance toward it.

In its logical employment, reason does not give rise to any new objective empirical judgements; it simply exhibits the deductive relationship between judgements already in the possession of the understanding. More specifically, it tries to find premises from which a given judgement can be deduced as a conclusion. It is only the understanding, when applied to the objects of sensible intuition, which yields empirical knowledge. Reason, on the other hand, requires that the empirical knowledge of the understanding be a systematically organized whole. Reason's entire task is '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'. (B383) Such unity is not, therefore, the unity already introduced into experience by the categorial principles, and by the formation and application of empirical concepts, but a further logical unity of the detail of experience which reason compels us to go on and seek.

It must be borne in mind that, for Kant, the systematic unity of empirical knowledge which reason seeks to achieve gives us no justification for *asserting* that the basis of such unity exists in nature itself. It is important to remember this because he believes that reason obliges us to *presuppose* that it does exist in nature for us to discover. For if we are to bring our empirical knowledge of nature into systematic unity, we cannot suppose that nature is really quite heterogeneous, and may not be susceptible of systematic treatment. As Kant puts it in the Appendix to the Dialectic:

> 'For with what right can reason, in its logical employment, call upon us to treat the multiplicity of powers exhibited in nature as simply a disguised unity, and to derive this unity, so far as may be possible, from a fundamental power – how can reason do this, if it be free to admit as likewise possible that all powers may be heterogeneous, and that such systematic unity of derivation may not be in conformity with nature? Reason would then run counter to its own vocation, propos-

> ing as its aim an idea quite inconsistent with the constitution of nature. Nor can we say that reason . . . has arrived at knowledge of this unity through observation of the accidental constitution of nature. The law of reason which requires us to seek for this unity, is a necessary law, since without it we should have no reason at all, and without reason no coherent employment of the understanding, and in the absence of this no sufficient criterion of empirical truth. In order, therefore, to secure an empirical criterion, we have no option save to presuppose [*voraussetzen*] the systematic unity of nature as objectively valid and necessary.' (B679)

It is important to note that Kant does not say that without the presupposition of the systematic unity of nature we would have no *understanding*, but that we would have no *coherent employment* of the understanding. In other words, without the presupposition we might have ordinary knowledge, but we would have no scientific knowledge; we might have a collection of isolated propositions and empirical generalizations, but no natural science. If natural science is to be possible, we must presuppose that the detail of nature is not so heterogeneous that we will be prevented from discovering regularities which will enable us to make the classifications which Kant believes to be required for the construction of a systematic body of knowledge. We must presuppose that nature itself is an organized unity, and not just an aggregate of unrelated and diverse material.

I suggested earlier that, even after he had justified the causal principle, Kant was still left with the problem of induction. Although he does not express it in the way it might be expressed by a contemporary philosopher of science, the problem as he sees it is recognizably the same. A contemporary philosopher would point out that the inductive method involves making inferences from observed to unobserved data, and that this rests on the presupposition that what held true in the past will continue to hold true in the future. Kant stops short at the presupposition that nature is organized in such a way that we will be able to discover and systematize empirical laws. But it is clear that the applicability of any laws we may discover, and the systematic unity to which we bring them, will rest equally on the presupposition that nature will continue to be organized in the same way in future. So there is no reason to suppose that Kant would not have wished to say that in presupposing that nature is a systematic unity, we are also implicitly presupposing that it will not change. We are presupposing that the regu-

larities on the basis of which we make our classifications will continue to hold, for example, that the 'generic forms' of the planetary orbits will remain the same. If we did not presuppose this, there would be no point in attempting to systematize our empirical knowledge of nature in the first place.

The examination of Kant's theory of science in this chapter has shown him to be aware that if natural science is to give an account of the phenomena of nature, it must be possible to systematize the empirical detail of nature, and that the latter possibility is something for which we have no *a priori* guarantee. Consequently, he believes that we must presuppose that nature itself is organized in such a way that we will be able to make our knowledge of it systematic. His belief that we must presuppose this is an admission that the categorial principles are inadequate by themselves to guarantee the aims of empirical science. In the Introduction to the *Critique of Judgement* Kant discusses the presupposition in greater detail than he does in the *Critique of Pure Reason* and indicates more clearly why he believes it to be necessary. I shall therefore postpone comment on it until a later chapter. But, since Kant considers the presupposition to be regulative for scientific knowledge, it is important first to examine his discussion of the regulative ideas of reason. This will enable us to see how he completes his account of scientific knowledge and the way in which he believes that the concept of teleology arises.

2

THE IDEAS OF REASON AND TELEOLOGY

I. THE ROLE AND STATUS OF THE IDEAS

The function of reason in its logical employment is to bring ordinary knowledge, the knowledge of the understanding, to systematic unity. For Kant, when we systematize a body of knowledge, we attempt 'to exhibit the connection of its parts in conformity with a single principle'. (B673)

> 'This unity of reason always presupposes an idea, namely, that of the form of a whole of knowledge – a whole which is prior to the determinate knowledge of the parts and which contains the conditions that determine *a priori* for every part its position and relation to the other parts. This idea accordingly postulates a complete unity in the knowledge obtained by the understanding, by which this knowledge is to be not a mere contingent aggregate, but a system connected according to necessary laws.' (*ibid.*)

In its logical employment, reason starts with an empirical fact which is to be explained and searches for a condition or premise from which it can be deduced; but in order to explain this condition it must find a further condition, and so on to an unconditioned, or ultimate, premise. Although we can never reach an ultimate condition, Kant nonetheless believes that the idea of such a condition can have a useful, indeed essential, role in the systematization of empirical knowledge. His initial reason for discussing the function of reason in systematizing ordinary knowledge was in connection with one of the main questions which the *Critique of Pure Reason* was intended to answer, namely, whether a science of metaphysics is possible. Kant was concerned to show how the

logical employment of reason unavoidably generates three types of transcendental idea of the unconditioned: the idea of 'the absolute (unconditioned) *unity* of the *thinking subject*', the idea of 'the absolute *unity of the series of conditions of appearance*', and the idea of 'the absolute *unity of the condition of all objects of thought in general*'. (B391) As we shall see, these are not the only ideas which Kant recognized; but because of their connection with metaphysics, he believed that they were the most important.

> 'The thinking subject is the object of *psychology*, the sum-total of all appearances (the world) is the object of *cosmology*, and the thing which contains the highest condition of the possibility of all that can be thought (the being of all beings) the object of *theology*. Pure reason thus furnishes the idea for a transcendental doctrine of the soul (*psychologia rationalis*), for a transcendental science of the world (*cosmologia rationalis*), and, finally, for a transcendental knowledge of God (*theologia transzendentalis*).' (*ibid.*)

One of Kant's primary purposes in the Transcendental Dialectic was to prove that rational psychology, rational cosmology, and transcendental theology are not, and can never be, genuine sciences, since they are incapable of yielding knowledge of their purported objects. But he also wanted to show that the ideas of the soul, of the world as a whole, and of God, have a legitimate employment in regulating the scientific investigation of nature.[1] It would follow from this that, ideally at least, natural science has two main divisions, psychology and physics, the first of which is regulated by the idea of the absolute unity of the thinking subject, and the second by the idea of the world as a whole, and that these two sciences may ultimately be capable of being systematically united in one science regulated by the idea of God.[2]

[1] See B729: 'Thus pure reason, which at first seemed to promise nothing less than the extension of knowledge beyond all limits of experience, contains, if properly understood, nothing but regulative principles. . . .'

[2] Psychological data are temporal only, not spatial, and hence mathematics cannot apply to them. Consequently, in the *Metaphysical Foundations of Natural Science*, Kant asserts that empirical psychology 'can never . . . be anything more than an historical, and as such, as far as possible systematic natural doctrine of the internal sense, i.e. a natural description of the soul, but not a science of the soul'. (Ak., IV, 471) In speaking of psychology and theology in the Dialectic, Kant is obviously more interested in their systematic than in their necessary character (see above, pp. 12–14). Although neither one can be an empirical science in the strict sense, they can be systematic, and, at least to that extent scientific.

Kant insists that 'these concepts of reason are not derived from nature; on the contrary, we interrogate nature in accordance with these ideas, and consider our knowledge as defective so long as it is not adequate to them'. (B673–4) The ideas direct scientific investigations of nature in the first place; they are not derived from them. Moreover although the ideas of the thinking subject, of the world as a whole, and of God have been taken to denote objects, when properly understood each is seen to be, in fact, only 'an analogon of a schema of sensibility' (B695), by means of which we can symbolize the systematic unity to which we attempt to bring empirical knowledge. The 'objects' of the ideas

> 'ought not to be assumed as existing in themselves, but only as having the reality of a schema – the schema of the regulative principle of the systematic unity of all knowledge of nature. They should be regarded only as analoga of real things, not as in themselves real things.' (B702)

Kant's characterization of the regulative idea of a science as the analogon of a schema of sensibility shows that he is drawing a clear parallel between the role of the ideas in bringing a body of knowledge to systematic unity, and the role of the schemata in bringing sensible intuitions to the unity of the categories. The schemata supply the rules of procedure whereby the manifold of sensible intuitions is unified under the categories, and, in an analogous fashion, the ideas supply rules of procedure for bringing the ordinary knowledge of the understanding to the systematic unity which is required to make it scientific. It is in this sense that an idea can be viewed as the analogon of a schema; but, since no object of sensible intuition can ever be adequate to the ideas, they are not genuine schemata.

> 'There is in fact only a schema for which no object, not even a hypothetical one, is directly given, and which only enables us to represent to ourselves other objects in an indirect manner, namely in their systematic unity, by means of their relation to this idea.' (B698)

Thus, although there is no genuine schema for the systematic unity of our empirical knowledge which reason demands, we are able to provide a symbolic representation of that unity through an analogy with something of which we have experience.[1] The symbolic representation

[1] Cf. *Critique of Aesthetic Judgement*, 59: 352. 'All intuitions by which *a priori* concepts are given a foothold are, therefore, either *schemata* or *symbols*. Schemata contain direct, symbols indirect, presentations of the concept. Schemata effect this presentation demonstratively, symbols by the aid of an analogy (for which recourse is had even to empirical intuitions), in which analogy judgement performs a double function: first in applying the concept to the

functions as a rule of procedure which directs our efforts to bring the empirical knowledge of nature into systematic unity.

> 'Thus the idea of reason is an analogon of a schema of sensibility; but with this difference, that the application of the concepts of the understanding to the schema of reason does not yield knowledge of the object itself (as is the case in the application of categories to their sensible schemata), but only a rule or principle for the systematic unity of all employment of the understanding.' (B693)

In accordance with this doctrine, the ideas serve as schematic representations of the systematic unity of various sciences, or, bearing in mind Kant's reservations about empirical psychology, of various inquiries into nature which aim at the systematization of knowledge, and which are to that extent scientific. The idea of the absolute unity of the thinking subject is the schema for psychology; the idea of the world as a whole is the schema for physics; and the idea of God is the schema for the science which is the union of the two. For example,

> 'we shall . . . in psychology, under the guidance of inner experience, connect all the appearances, all the actions and receptivity of our mind, *as if* the mind were a simple substance which persists with personal identity (in this life at least), while its states, to which those of the body belong only as outer conditions, are in continual change'. (B700)

If we regard the mind in this way, we acquire a rule of procedure for bringing psychological phenomena to systematic unity, by treating them as diverse manifestations of a simple and unchangeable substance.

Kant denies that the ideas of reason can be given a proper transcendental deduction, as could the categories.

> 'But if they are to have the least objective validity, no matter how indeterminate that validity may be, and are not to be mere empty thought-entities . . . a deduction of them must be possible, however greatly (as we admit) it may differ from that which we have been able to give of the categories.' (B697–8)

object of a sensible intuition, and then, secondly, in applying the mere rule of its reflection upon that intuition to quite another object, of which the former is but a symbol. In this way a monarchical state is represented as a living body when it is governed by constitutional laws, but as a mere machine (like a hand-mill) when it is governed by an individual absolute will; but in both cases the representation is merely *symbolic*. For there is certainly no likeness between a despotic state and a hand-mill, whereas there surely is between the rules of reflection upon both and their causality.'

The deduction takes the form of showing that the three transcendental ideas, as rules for bringing empirical knowledge to systematic unity, 'contribute to the extension of empirical knowledge, without ever being in a position to run counter to it'. (B699) Consequently,

> 'we may conclude that it is a necessary maxim of reason to proceed always in accordance with such ideas. 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 principles of the understanding.' (*ibid.*)

What is interesting about this argument is that Kant is willing to call it a 'transcendental deduction'. In the Transcendental Deduction of the Categories, he claimed to prove that the categories are necessary conditions of all objective knowledge and experience. But in the present argument he is attempting to demonstrate the legitimacy of the rules or principles embodied in the ideas, not by showing that they must have objective reference or that they are required for all objective knowledge, as he did for the categories, but by showing that they are required for a certain *kind* of knowledge, namely, systematic or scientific knowledge. This would mean that, whereas the categories are conditions of *all* knowledge, with scientific knowledge as a specific, if most important, instance, the ideas of reason and the principles to which they give rise are not conditions of all knowledge, but only of *scientific* knowledge. Kant gives them a quasi-transcendental deduction by showing that they are necessary as regulative principles, without which we would have no coherent and systematic body of knowledge. But they cannot be given a proper transcendental deduction, because their 'objects' are such that they can never be given in any experience. The unities to which they refer are goals which we may approach but can never reach. It is, in fact, only when he is talking about their objects that Kant denies that the ideas can be given a deduction; that is, he denies that they can be shown to have objective validity in the sense of having objects to which they refer (see B395). But they can, he believes, be given what might be called a 'regulative' deduction by being shown to be necessary for the systematization of knowledge.

II. THE IDEA OF A MECHANISM

Although Kant stresses the ideas of the thinking subject, the world as a whole, and God, and attempts to show that they have a legitimate regulative employment, they are not the only ideas which he recognizes. They are the *transcendental* ideas whose status he was most concerned to analyse because of their intimate connection with metaphysical doctrines. But there is another idea, which can be used as an illustration of the way in which the ideas function. Kant mentions it only once in an example he gives of how we would proceed if we wished 'to explain the chemical interactions of bodies in accordance with the idea of a mechanism'. (B674) The idea of a mechanism would here function as an instance of the idea

> 'of the form of a whole of knowledge – a whole which is prior to the determinate knowledge of the parts and which contains the conditions that determine *a priori* for every part its position and relation to the other parts'. (B673)

That is to say, it would function as the rule or principle according to which we might try to systematize a body of empirical knowledge. In attempting to explain the chemical interactions of bodies in accordance with this idea,

> 'every kind of matter is reduced to earths (*qua* mere weight), to salts and inflammable substances (*qua* force), and to water and air as vehicles (machines, as it were, by which the first two produce their effects)'. (B674)

In other words, in explaining anything mechanically, we abstract from all features except weight, force, and mechanical agency and use the latter features in effecting an explanation. This would mean that a science regulated by the idea of a mechanism would be concerned simply with those features of phenomena which are capable of quantitative treatment and would ignore others as irrelevant. Kant points out that 'pure earth, pure water, pure air', are not to be found in nature; they are 'classifications', as he calls them, which are useful to the natural scientist working according to the idea of a mechanism.

In his *Commentary* Kemp Smith says of this passage:

> 'The citation... of the concepts of "pure earth, pure water, pure air" as being "concepts of Reason" is especially bewildering. They are, even in the use which Kant himself ascribes to them, simply empirical hypotheses, formulated for the purposes of purely physical ex-

planation; they are in no genuine sense universal, regulative principles.' (p. 551)

Kemp Smith's bewilderment is difficult to understand. Kant is not speaking here of 'universal regulative principles', nor does he so call the concepts in question. The only *universal* regulative principle in reason's idea of 'the form of a whole of knowledge'. Yet this idea, as it stands, is so indeterminate as to be useless; and that is why we must give it an 'object' to pin it down; that is, we must symbolize it by means of the analogon of a schema. The point about the regulative ideas is that they are intended to be *used* by us in systematizing our knowledge; and it is difficult to see how the mere idea of the form of a whole of knowledge could be used without further definition or without being made more specific. In this case Kant is speaking about the general regulative idea as specified in a particular way for the purpose of a particular inquiry. The idea of the form of a whole of knowledge is here that of a mechanism; knowledge is to be systematized according to the idea of a mechanical system. And this specific regulative idea determines the kind of parts which will be admitted as relevant to such a system, namely, parts which are purely quantitative. These abstractions are the result of a decision, in the light of the regulative idea of a mechanism, that certain features of nature are alone important for explaining it mechanically. Like the regulative idea itself, these quantitative abstractions are not found in nature, but are introduced into nature for our own convenience in explaining it.

On Kemp Smith's other charge, that such concepts are formulated for the purpose of a purely physical explanation, it is evident that this is precisely why we try to systematize our knowledge – for the sake of physical explanation. Kant is not talking about systems which we construct for intellectual exercise but about systems which will enable us to explain the phenomena we are presently studying, as well as phenomena which we will encounter in future. Presumably, too, an attempt could have been made to explain the chemical interactions of bodies in accordance with another idea besides that of a mechanism. For, as we have seen, Kant believed that chemistry could never be scientific, whereas he considered an explanation in mechanical terms to be the paradigm of scientific explanation; and if we can attempt to explain chemical phenomena mechanically, he is implicitly admitting that we could have tried to explain them in some other way. And this in turn implies that, although the mechanical categories are constitutive of

nature, the idea of a mechanical explanation is not, but is merely regulative of our inquiries into nature. This interpretation will be given added weight in the *Critique of Judgement*, where Kant explicitly calls the ideal of mechanical explanation 'regulative'.

III. THE IDEA OF GOD AND PURPOSIVE UNITY

The function of reason in its logical employment is to bring empirical knowledge to systematic unity. By symbolizing the unity at which reason aims or, as Kant otherwise expresses it, 'by giving to the idea of *this unity an object*' (*B709*), we acquire a rule of procedure for attaining it. However,

> 'the object which we have to assign to the idea is not such as experience can ever supply. This object, as thus entertained by reason, . . . is a mere idea; it is not assumed as a something that is real absolutely and *in itself*, but is postulated only problematically (since we cannot reach it through any of the concepts of the understanding) in order that we may view all connection of the things in the world of sense *as if* they had their ground in such a being. In thus proceeding, our sole purpose is to secure that systematic unity which is indispensable to reason. . . .' (*ibid.*)

The 'objects' which can be given to the idea of systematic unity are themselves ideas, and, as we have seen, three such ideas are the thinking subject, the world as a whole, and God. Kant believes that the idea of God differs from the other two, in that it serves to symbolize or 'schematize' the *highest* form of systematic unity to which empirical knowledge can be brought – 'the *purposive* unity of things'. (B714) In order to see what this type of unity would be like, Kant's account of the function of the idea of God must be examined in some detail. Moreover, this idea is the one that is important for Kant's later treatment of teleology, and his discussion of its function in the Dialectic of the *Critique of Pure Reason* anticipates some of the features of the theory of teleology which he will develop in detail in the *Critique of Judgement*. He says:

> 'This highest formal unity, which rests solely on concepts of reason, is the *purposive* [*zweckmässige*] unity of things. The *speculative* interest of reason makes it necessary to regard all order in the world as if it had originated in the purpose [*Absicht*] of a supreme reason. Such a principle opens out to our reason, as applied to the field of experience, altogether new views as to how the things of the world may

be connected according to teleological laws, and so enables it to arrive at their greatest systematic unity. The assumption of a supreme intelligence, as the one and only cause of the universe, though in the idea alone, can therefore always benefit reason and can never injure it.' (B714–15)

The idea of God, or of a supreme intelligence, enables us to symbolize the highest systematic unity through an analogy with something encountered in experience – human art or technique. In the light of this analogy we can approach nature *as if* it had been produced by a supreme intelligence, and the idea of God will then serve to regulate scientific inquiry by leading us to treat nature *as if* it were a purposive whole. We will treat natural phenomena as if they are all purposively interrelated,[1] and consider it our task to search for connections among them which reflect this purposiveness. However, although we are led to look for purposive connections in nature, these must be considered supplementary to mechanical connections, not a substitute for them.

'The worst that could happen would be that where we expected a teleological connection (*nexus finalis*), we find only a mechanical or physical connection (*nexus effectivus*). In such a case we merely fail to find the additional unity; we do not destroy the unity upon which reason insists in its empirical employment.' (B715–16)

The assumption of a wise purposive arrangement of nature is to assist us in looking for mechanical explanations, not for substitute or concurrent explanations of a different kind. Moreover, we do not reach any knowledge of God through the employment of the idea of God.

'For it is always an idea only, which does not relate directly to a being distinct from the world, but to the regulative principle of the systematic unity of the world, and only by means of a schema of this unity, namely, through the schema of a supreme intelligence which, in originating the world, acts in accordance with wise purposes.' (B725)

[1] See B719 where Kant asserts that we must 'consider from a teleological point of view not merely certain parts of nature, such as the distribution of land, its structure, the constitution and location of the mountains, or only the organization of the vegetable and animal kingdoms, but make this systematic unity of nature completely *universal*, in relation to the idea of a supreme intelligence. For we then treat nature as resting upon a purposiveness, in accordance with universal laws, from which no special arrangement is exempt, however difficult this may be to establish in any given case. We then have a regulative principle of the systematic unity of teleological connection. . . .'

We may well wonder what kind of questions would be asked by a scientist working on the assumption of a purposive unity of nature. Obviously they would not be 'Newtonian' questions but questions of a different type; broadly speaking, they would be 'why' questions rather than 'how' questions, and the mechanical principles of Newtonian science would be inadequate and improper for this kind of question. Kant gives an example which illustrates what he has in mind:

> 'If, in studying the shape of the earth (which is round, but somewhat flattened), of the mountains, seas, etc., we assume it to be the outcome of wise purposes on the part of an Author of the world, we are enabled to make in this way a number of discoveries.' (B715)

We ask, that is, 'Why, or for what purpose, is the earth the shape it is?', and go on to look for answers such as: because 'its spheroidal flattening alone prevents the continental elevations, or even the smaller hills, thrown up perhaps by earthquakes, from continuously, and indeed quite appreciably in a comparatively short time, altering the position of the axis of the earth'. (*ibid.*, note a) This means that, instead of asking *how* the axis of the earth is maintained unaltered, and looking for purely physical factors which will account for this, we start from a certain physical fact, in this case the shape of the earth, and ask what purpose is served by its being that shape; we ask *why* it is the shape it is. However, although the asking of 'why' questions on the assumption of a wise purposive arrangement of nature, turns our attention to areas and possibilities which would perhaps never occur to us when intent upon asking 'how' questions, the answers to such questions cannot be taken as actual reasons for things being as they are. We can never know that we have in fact found *the* reason, although we may have found a *possible* reason, because we have no insight whatever into an intelligent cause of the universe. So although we may employ the idea of an intelligent cause as a regulative or heuristic principle of our inquiries into nature, we may not use it as a premise from which to explain the purposiveness we must seek to discover.

> 'We cannot, without contradicting ourselves, ignore the universal laws of nature – with a view to discovering which the idea alone was adopted – and look upon this purposiveness of nature as contingent and hyperphysical in its origin. For we were not justified in assuming above nature a being with those qualities, but only in adopting the idea of such a being in order to view the appearances as systematically

connected with one another in accordance with the principle of a causal determination.' (B728)[1]

We cannot, that is to say, transform the idea of an intelligent cause of the purposive order in the world into an explanatory ground of that order. For if we were to do this, we would be starting out from what should properly be our goal.

'If . . . I begin with a supreme purposive being as the ground of all things, the unity of nature is really surrendered, as being quite foreign and accidental to the nature of things, and as not capable of being known from its own universal laws. There then arises a vicious circle; we are assuming just that very point which is mainly in dispute.' (B721)

Moreover, just as reason must presuppose that the basis of the systematic unity it seeks to achieve actually exists in nature, so it must presuppose that purposiveness exists in nature to be discovered. 'For if the most complete purposiveness cannot be presupposed a priori *in* nature, that is, *as belonging to its essence*, how can we be required to search for it?' (*ibid.*)

In view of Kant's firm attachment to Newtonian science and to mechanical categories as those which alone provide us with objective knowledge of the world, it is surprising to find him asserting now that the highest form of systematic unity to which our knowledge can be brought is a purposive unity and that the assumption of purpose in nature has a regulative usefulness. His willingness to assert this is evidence that he is far from having altogether abandoned the notion that the world is possibly a teleological system. He is by no means asserting that it *is* such a system, because his conclusions from the Analytic rule out the possibility of any such assertion. If the only conceptual system which can lead to knowledge of the world is based on mechanical categories, then teleological concepts such as 'end', 'purpose', 'design', have no place in any body of scientific knowledge. But Kant believes that this does not prevent us from approaching nature *as if* it were ultimately teleological, thus becoming aware of possibilities which can never be given proof but which may suggest avenues of investigation which would have remained unknown to us on a strictly mechanical

[1] Cf. B719-20. 'What we may presume to do is to follow out the physico-mechanical connection in accordance with universal laws, in the hope of discovering what the teleological connection actually is. In this way alone can the principle of purposive unity aid always in extending the employment of reason in reference to experience, without being in any instance prejudicial to it.'

approach. Nor does it prevent us from attempting to systematize our knowledge under the guidance of a teleological idea. The purposive systematic unification of knowledge which we achieve under the direction of such an idea will not be constitutive of nature, since we have no way whatever of proving its objective validity. That is, we have no way of proving that connections which we take to be purposive are so in fact, because we have no insight into God's existence or into His purposes if He does exist. But a purposive system of knowledge will have a regulative validity in so far as it suggests ways in which further knowledge may successfully be brought into systematic unity.

The assumption of purposive unity as a regulative principle of our investigations of nature must not, however, lead us to abandon the only kind of *explanation* which we may legitimately give of natural phenomena. We may ask why certain arrangements in nature are as they are or even why nature as a whole is as it is; but once we have given an answer in terms of purposes, we must go on to search for the mechanical connections whereby the result has taken place. As Kant puts it, 'teleology . . . is intended to aid us merely in completing the unity of nature in accordance with universal laws'. (B720)[1] If an intelligent cause of the universe has wisely arranged things, Kant is quite convinced that it must have done so in accordance with mechanical laws and that, in fact, these would be deliberately established by such a being for the purpose of bringing about its effects. Mechanical laws would thus be part of the over-all purposive order of the universe, not isolated from it. We may 'regard seemingly purposive arrangements as purposes [*Absichten*], and so derive them from the divine will, though, of course, mediately through certain natural means, themselves established in furtherance of that divine will'. (B726–7) But we may do this

> 'only on condition that we regard it as a matter of indifference whether it be asserted that divine wisdom has disposed all things in accordance with its supreme ends, or that the idea of supreme wisdom is a regulative principle in the investigation of nature and a principle of its systematic and purposive unity, in accordance with universal laws, even in those cases in which we are unable to detect that unity. In other words, it must be a matter of complete indifference to us, when we perceive such unity, whether we say that God

[1] Here, as elsewhere in the Appendix to the Dialectic, when Kant speaks of 'universal laws', he is speaking about 'universal laws of material mechanism'. (B719) He is not, obviously, speaking about categorial principles.

in his wisdom has willed it to be so, or that nature has wisely arranged it thus. For what has justified us in adopting the idea of a supreme intelligence as a schema of the regulative principle is precisely this greatest possible systematic and purposive unity – a unity which our reason has required as a regulative principle that must underlie all investigation of nature.' (B727)

IV. THE ROLE OF THE CONCEPT OF AN ORGANISM

Kant's discussion of the logical employment of reason, and of the regulative function of the ideas to which that employment gives rise, is an elaboration and examination of the further presuppositions which he believes to be involved in scientific investigations of nature, in addition to the categorial principles. He believes that such presuppositions are required if ordinary knowledge is to be systematized and thereby given the logical coherence which is necessary for scientific explanation. We have seen that the fundamental presupposition is that order and system are to be found in nature itself and that this presupposition is made specific by means of ideas which symbolize the various kinds of systematic unity aimed at in various sciences. The main idea is the idea of a creative intelligence, and it symbolizes the highest kind of systematic unity to which Kant believes that knowledge can be brought – the purposive unity of things. Consequently, if the highest unity to which knowledge can be brought is a purposive unity, we must equally presuppose that nature is ultimately purposive. We would not be free to suppose that nature is *ultimately* mechanical, any more than we are free to suppose that it is ultimately quite heterogeneous and incapable of being brought into systematic unity.

We can see from this that part at least of what Kant is saying is that our scientific investigations must be regulated by the principle that the variety of nature can be explained by a minimum number of laws, but that this principle can itself be made intelligible to us only on the assumption of design in nature. He believes that we cannot *prove* that God is the ground of those features of nature which figure in the system of knowledge which we construct in the light of the idea of a purposive intelligence; but this at least remains a possibility and so serves both to provide some degree of intellectual satisfaction *and* to direct us toward further systematization. At least it provides a *possible* ultimate premise for all systematic knowledge and so has a regulative usefulness.

Kant nowhere makes clear what a system of knowledge constructed

on the assumption of purposiveness in nature would be like, probably because he was not clear about it himself at this stage. Presumably it would be a system whose parts are related, not just logically, but purposively as well; a system which in some way makes us aware of possible reasons 'why' the parts are related as they are, although, again, what this means is not clear. But whatever it is that Kant has in mind in the Dialectic of the first *Critique*, when we examine the *Critique of Judgement* we will find that he no longer believes that purposive relations will have a place in the body of knowledge we construct. He there adopts the more intelligible position that if we are to have a system of empirical knowledge, we must presuppose that nature has been purposively arranged to make this possible – but without any purposes figuring in the system we construct.

One of the most interesting results which emerges from Kant's discussion of the ideas of reason, and which is important for his later treatment of teleology, is his evident conviction that the highest form of systematic unity to which knowledge can be brought is *organic* in type. In fact his conception of a system of knowledge is such that it can be interpreted in either logical or organic terms, and his descriptions of the ideas and of the systems to which they give rise are sometimes illustrated by analogies drawn from biology. In the Transcendental Doctrine of Method, for example, he says:

> 'By a system I understand the unity of the manifold modes of knowledge under one idea. This idea is the concept provided by reason – of the form of a whole – in so far as the concept determines *a priori* not only the scope of its manifold content, but also the positions which the parts occupy relatively to one another. The scientific concept of reason contains, therefore, the end [*Zweck*] and the form of that whole which is congruent with this requirement. . . . The whole is thus an organized unity (*articulatio*), and not an aggregate (*coacervatio*). It may grow from within (*per intus susceptionem*), but not by external addition (*per appositionem*). It is thus like an animal body, the growth of which is not by the addition of a new member, but by the rendering of each member, without change of proportion, stronger and more effective for its purposes.' (B860–1)

In the same section he gives another illustration which leans even more heavily on a biological analogy, when he says:

> 'Systems seem to be formed in the manner of lowly organisms, through a *generatio aequivoca* from the mere confluence of assembled

> concepts, at first imperfect, and only gradually attaining to completeness, although they one and all have had their schema, as the original germ, in the sheer self-development of reason.' (B863)

'*Generatio aequivoca*', which Kant defines in the *Critique of Judgement* as 'the generation of an organized being from crude inorganic matter' (80: 420), refers to a biological theory which he held to be absurd, except in the case of 'lowly organisms'.[1] 'The original germ in the sheer self-development of reason', on the other hand, is an allusion to one of the most widely held embryological theories of Kant's century, sometimes called the theory of preformation or *emboîtement*. The theory

> 'declared that not only all species but all individual organisms have existed from the beginning. The individuals, no doubt, unlike the species, seem to increase in numbers and to undergo change, but in reality this is a mere expansion or "unfolding" (*evolutio*) of structures and characters that were already pre-delineated, on a minute scale of magnitude, in the primeval germs which lay encased one within another like a nest of boxes.'[2]

In this analogy Kant is saying that, although systems of knowledge seem to grow accidentally, without any plan, in fact the idea which governs their formation is present beforehand and gradually unfolds and becomes clearer as more material is unified. Were it not for this antecedent idea, however ill-defined at the beginning, the system could never have been formed, any more than could individual organisms, had their structures and characters not been present in germ from the start.

For Kant, then, the idea of a system of knowledge is not just a logical notion but has strong organic connotations; and the highest systematic

[1] This is the theory of spontaneous generation, which goes back at least as far as Aristotle, and continued to be held in Kant's century and after. According to the theory, simple organisms could come into existence directly from inorganic matter. Aristotle, for example, 'envisaged the spontaneous generation of the lowest forms of life as a process which took place continually under the influence of heat, along the banks of rivers and in compost heaps' (S. Toulmin and J. Goodfield, *The Architecture of Matter*, London 1962, p. 88). In the *Critique of Judgement* Kant speaks of maggots being produced as a result of the decomposition of matter. (78: 411) But neither Aristotle nor Kant believed that higher organisms could be produced in this way. The theory of spontaneous generation continued to figure in discussions of the origin of organic life until Pasteur closed the door on it in the late nineteenth century. For a good discussion of the theory, see Toulmin and Goodfield, Part III, esp. Ch. 15.

[2] Arthur O. Lovejoy, *The Great Chain of Being*, Cambridge, Mass. 1936, pp. 243–4.

unity to which knowledge can be brought is clearly an organic unity, namely, the purposive unity of things. This point about the ideas was noted by Weldon:

> 'He [Kant] does not in fact adhere to his statement that the only ideas of reason are God, the self, and the universe as a whole. Indeed, as he goes on (especially in [the *Critique of Judgement*]), it becomes obvious that what he really understands by "idea" is the concept of any kind of organic whole as contrasted with a mere aggregate or mechanism. This concept is in no way inconsistent with his official doctrine, since God, the self, and the universe are obvious instances of what he has in mind. . . . Nor is it quite safe to say without qualification that the object of an idea is always an organism since he held that the idea of space (since it was a whole the concept of which preceded that of its parts) was an idea of pure reason. All that can be said without misrepresentation is that the concept of an organic whole is often helpful in elucidating his account of the function of the ideas.' (*Kant's 'Critique of Pure Reason'*, p. 239)

Near the beginning of the Dialectic, when discussing the ideas in general, Kant makes an interesting comment on Plato, which provides a clue to his reasons for regarding the ideas as organic. He says:

> 'It is not only where human reason exhibits genuine causality, and where ideas are operative causes (of actions and their objects), namely, in the moral sphere, but also in regard to nature itself, that Plato rightly discerns clear proofs of an origin from ideas. A plant, an animal, the orderly arrangement of the cosmos – presumably therefore the entire natural world – clearly show that they are possible only according to ideas, and that though no single creature in the conditions of its individual existence coincides with the idea of what is most perfect in its kind . . . these ideas are none the less completely determined in the Supreme Understanding, each as an individual and each as unchangeable, and are the original causes of things.' (B374)

It is evident from this passage that Kant sees a resemblance between organisms and the world as a whole; and the resemblance is their purposive organization. When he says that such things are clearly possible only according to ideas, he is implicitly admitting that there are features both of the world as a whole, and of some things within it, which cannot be accounted for in terms of concepts based on the categorial principles. When we remember that Kant began with a Newtonian nature and that the categories were predestined to be Newtonian in type, we

can see why he believes this to be so. The categorial principles extend only to external, mechanical relations, to mere aggregates brought about by mechanical laws. There is no way in which they can be used to deal with the purposive features of organisms. Kant is therefore implying that in order to reach an understanding of organic wholes, we must take account of a different kind of relation, an internal or organic relation. In order to do this, we require at least the possibility of a different conceptual system from the one founded on the categories, a conceptual system which is suited to organic subject-matter and which must therefore include concepts such as 'end', 'purpose', and 'design'. Such a conceptual system can be derived from the idea of a supreme intelligence as cause of the world.

Kant is obviously impressed by the fact that there is a similarity between what he sees as the distinctive feature of the highest kind of systematic unity which we demand of knowledge and the distinctive feature of organisms, including the world as a whole. Both are internally organized and not mere aggregations of their parts. That is, he believes that when we follow through the requirements of reason with regard to knowledge, we find that it finally demands that knowledge be an organic whole; that the idea of the whole precede and determine the parts and that the parts be organically related, not form a mere aggregate. This is similar to organisms; just as a system of knowledge, being organic, cannot be formed without a prior idea governing its formation, so Kant believes that we cannot imagine natural organisms – plants, animals, even the universe as a whole – being formed without an antecedent idea which determines them as well. Only by thinking an antecedent determining idea can we comprehend how their organic nature could have developed. Such an idea can never be used constitutively in order to *explain* organic features; but it can be used regulatively, both for the intellectual satisfaction we derive from it as a *possible* explanation, and for suggesting new avenues of investigation. For example,

> 'although an anatomist can be convicted of error when he assigns to some member of an animal body an end [*Zweck*] which it can be clearly shown not to subserve, it is yet quite impossible to *prove* in any given case that an arrangement of nature, be it what it may, subserves no end whatsoever. Accordingly, medical physiology extends its very limited empirical knowledge of the ends served by the articulation of an organic body, by resorting to a principle for which pure reason has alone been responsible; and it carries this prin-

ciple so far as to assume confidently, and with general approval, that everything in an animal has its use, and subserves some good purpose [*Absicht*]. If this assumption be treated as constitutive it goes much further than observation has thus far been able to justify; and we must therefore conclude that it is nothing more than a regulative principle of reason, to aid us in securing the highest possible systematic unity, by means of the idea of the purposive causality of the supreme cause of the world. . . .' (B716)

Kant's attempt to give an account of the further presuppositions involved in scientific knowledge and activity thus leads him to a conclusion we should not have expected after the Analytic, namely, that the ultimate aim of scientific theorizing should be to reach a purposive unification of the facts of experience. Such a unity is not found *in* experience; but we must postulate it and work toward it in order to gain the fullest understanding of the world. We may assume that the world as a whole is ultimately purposive, and investigate it in the light of that assumption. And even though the only laws we may legitimately use to *explain* the world are mechanical laws, the final structure of knowledge will itself be purposive or organic. It seems, then, that the *ideal* aim of our inquiries into nature is to reach an understanding of the world which is non-mechanical – an understanding in which the mechanical type of explanation functions as a means to a *possible* higher explanation which itself has value only for its heuristic or suggestive fruitfulness. The latter type of explanation can never be more than regulative, since it points to a possibility which can never be proven true or false; but Kant still wishes to leave a place for 'why' questions, however inferior that place may be. It will become even more evident when we examine the *Critique of Judgement* that he was at least tempted to believe that the world is in fact purposive in the final analysis; but because he has excluded any possibility of *proving* this, he must be satisfied with a doctrine which gives us reason for acting as though it were.

3

THE SPECULATIVE BACKGROUND AND HUME'S *DIALOGUES*

In view of Kant's conviction that mechanical categories are those which alone give objective knowledge of the world, it is at first sight puzzling to find him introducing the idea of purpose as a useful regulative principle for our investigations of nature and asserting that the highest form of systematic unity to which we should attempt to bring empirical knowledge is the purposive unity of things. Some of his reasons for doing so are not immediately evident, if they are evident at all, from the critical corpus itself. In order to be clear about what these were, it is necessary to examine an important, though often overlooked, feature of the speculative background against which Kant worked.

I. PURPOSE IN NATURE AND THE ARGUMENT FROM DESIGN

It is one of the commonplaces of histories of science that in the seventeenth century final causes were eliminated from natural science. Scientists focused their attention on *how* nature works, on discovering the laws which govern natural phenomena; they ignored altogether any possible purposes which God or nature might have, the reasons *why* nature behaves as it does. Such purposes might indeed exist, but they were considered to have no scientific value, and it was felt that the scientist should not attempt to discover them. Francis Bacon, for example, emphatically asserts that the introduction of final causes 'rather corrupts than advances the sciences, except such as have to do with

human action'.[1] Descartes is equally definite: '. . . the species of cause termed final, finds no useful employment in physical [or natural] things; for it does not appear to me that I can without temerity seek to investigate the [inscrutable] ends of God.'[2] And Galileo, in the *Dialogue Concerning the Two Chief World Systems*, says that '. . . it is brash for our feebleness to attempt to judge the reason for God's actions . . . '.[3] The scientific world-picture, after the elimination of final causes, was of a universe of particles of matter moving in accordance with precise mathematical laws. The descriptive model which appeared to fit this conception of the scientific universe was found in a return to the atomistic or corpuscular hypothesis of the ancient Greek atomists. According to this hypothesis, all the properties and alterations of material things could eventually be explained solely in terms of the size, shape, and motion of the minute particles of which they are composed.

Although purposes or final causes had been eliminated from natural science, no considerable thinker of the seventeenth or eighteenth centuries, with the single exception of Spinoza, doubted that they nevertheless operated in the world. Philo, in Hume's *Dialogues Concerning Natural Religion*,[4] expresses a representative opinion when he says:

> 'In many views of the universe, and of its parts, particularly the latter, the beauty and fitness of final causes strike us with such irresistible force, that all objections appear (what I believe they really are) mere cavils and sophisms; nor can we then imagine how it was ever possible for us to repose any weight on them.' (p. 202)

Later, Philo puts it even more plainly: 'A purpose, an intention, or design strikes everywhere the most careless, the most stupid thinker; and no man can be so hardened in absurd systems, as at all times to reject it.' (p. 214) In fact, it is 'the inexplicable contrivance and artifice of nature' which gives rise to the methodological principle '*that nature does nothing in vain*', a principle

> 'established in all the schools, merely from the contemplation of the works of nature, without any religious purpose; and, from a firm

[1] *Novum Organum*, Book II, Aphorism ii, in *Philosophical Works of Francis Bacon*, ed. Ellis and Spedding, re-ed. J. M. Robertson, London 1905, p. 302.
[2] *Meditations*, IV, in *Philosophical Works of Descartes*, trans. Haldane and Ross, Cambridge 1931, Vol. I, p. 173.
[3] Trans. Stillman Drake, Berkeley and Los Angeles 1953, p. 368.
[4] Ed. Norman Kemp Smith, 2nd edition, London 1947. References to the *Dialogues* are to this edition.

conviction of its truth, an anatomist, who has observed a new organ or canal, would never be satisfied till he had also discovered its use and intention'. (*ibid.*)

In his discussion of the physico-theological proof for the existence of God in the *Critique of Pure Reason*, Kant is equally explicit:

'This world presents to us so immeasurable a stage of variety, order, purposiveness, and beauty, as displayed alike in its infinite extent and in the unlimited divisibility of its parts, that even with such knowledge as our weak understanding can acquire of it, we are brought face to face with so many marvels immeasurably great, that all speech loses its force, all numbers their power to measure, our thoughts themselves all definiteness, and that our judgement of the whole resolves itself into an amazement which is speechless, and only the more eloquent on that account. Everywhere we see a chain of effects and causes, of ends [*Zwecke*] and means. . . .' (B650)

It was the almost universal agreement about the presence of purpose and design in nature which led inevitably to a recognition that the corpuscular hypothesis was severely limited as an adequate model for understanding the production of certain purposive features of the world. In fact, it was precisely the inability of natural science, which assumed the corpuscular model, to make those features intelligible, which gave a spur to speculations in cosmology and natural theology. The corpuscular model, which attributed all natural productions to chance, thereby denying the possibility of purpose and design in nature, was for that very reason, and to that extent, generally dismissed as plainly absurd. Bacon went so far as to argue that the corpuscular hypothesis, far from supporting the absence of design, tended to prove exactly the reverse. Thus, in his essay *Of Atheism*, he writes:

'That school which is most accused of atheism doth most demonstrate religion; that is, the school of Leucippus and Democritus and Epicurus. For it is a thousand times more credible, that four mutable elements, and one immutable fifth essence, duly and eternally placed, need no God, than that an army of infinite small portions or seeds unplaced, should have produced this order and beauty without a divine marshal.'[1]

But, in general, the attitude toward the corpuscular hypothesis was one of ridicule, and this was directed precisely against the notion that the chance movements of atoms could have resulted in the manifest

[1] Ellis and Spedding, p. 754.

design in nature. Voltaire, in his *Philosophical Dictionary*, gives a splendid example of this attitude:

> 'Epicurus and Lucretius . . . admitted atoms and the void. Gassendi supported this doctrine, and Newton demonstrated it. . . . In this Epicurus and Lucretius appear to have been true philosophers. . . . But when Epicurus afterwards tells us that his atoms declined in the void by chance; that this declination formed men and animals by chance; that the eyes were placed in the upper part of the head and the feet at the end of the legs by chance; that ears were not given to hear, but that the declination of atoms having fortuitously composed ears, men fortuitously made use of them to hear with – this madness, called physics, has been very justly turned into ridicule.'[1]

Newton himself, in the *Opticks*, says, ' . . . blind fate could never make all the planets move one and the same way in orbs concentric. . . . Such a wonderful uniformity in the planetary system must be allowed the effect of choice.'[2] In the *Dialogues* Philo expresses a similar opinion when he asks: 'How could things have been as they are, were there not an original, inherent principle of order somewhere, in thought or in matter? . . . Chance has no place, on any hypothesis, sceptical or religious.' (p. 174)[3] And Kant, in the *Critique of Judgement*, while discussing the various kinds of system which have attempted to account for the purposiveness in nature, states that 'the system of accidentality [*Kasualität*], which is attributed to Epicurus or Democritus, is, in its literal interpretation, so manifestly absurd that it need not detain us'. (72 : 391) Bishop Butler declares that

> 'there is no doubt the eye was intended for us to see with. And the more complex any constitution is, and the greater variety or parts there are which thus tend to some one end, the stronger is the proof that such end was designed.'[4]

Since elements of purpose and design exist in nature, and since the corpuscular hypothesis, which was believed to have been given its most definitive statement by Newton, could not account for them, it seemed

[1] 'Atoms', in *Voltaire's Philosophical Dictionary*, trans. W.F.Fleming, New York 1901, Vol. I, pp. 140–1.

[2] Query 31. Contained in *The Leibniz-Clarke Correspondence*, ed. H.G. Alexander, Manchester 1956, p. 180.

[3] See also p. 182, where, in speaking of the Epicurean hypothesis, Philo says: 'This is commonly, and I believe, justly, esteemed the most absurd system, that has yet been proposed.'

[4] Sermon II, in *Fifteen Sermons*, ed. W.R.Matthews, London 1953, p. 47.

prima facie reasonable to go on and infer the existence of a designing cause. During the eighteenth century the argument from design, the teleological argument for the existence of God, attained a pre-eminence which it retained until well into the next century. Both Hume and Kant rejected the other two traditional arguments, the ontological and the cosmological, because, as Kant puts it:

> 'The sophistries in both these inferences need not be exposed here. . . . All I need now say is that, let such proofs be defended with all the forms of dialectical subtlety you please, yet they will never descend from the schools and enter into everyday life or be able to exert the smallest influence on ordinary healthy intelligence.' (*Critique of Judgement*, 'General Remark on Teleology', 476)

The argument from design, on the other hand, 'is deserving of all respect. It appeals to the intelligence of the man in the street with the same convincing force as it does to the most subtle thinker.' (*ibid.*) Hume is equally definite:

> 'The argument *a priori* has seldom been found very convincing, except to people of a metaphysical head. . . . Other people, even of good sense and the best inclined to religion, feel always some deficiency in such arguments, though they are not perhaps able to explain distinctly where it lies. A certain proof, that men ever did, and ever will, derive their religion from other sources than from this species of reasoning.' (Philo, *Dialogues*, pp. 191–2)

But the argument from design seemed to Hume to carry such conviction that he subjected it to a close examination in the *Dialogues*, in order to assess the grounds on which it rested, and thereby determine whether the conviction was warranted. Kemp Smith sums up the eighteenth-century attitude to the argument in the following terms:

> 'Whatever supplementary arguments for God's existence might be put forward, the argument from design was regarded as the all-sufficient ground of belief. To attack it was to assault the very citadel of religion, and might not be excused even by the plea that reason and argument were here usurping the prerogatives of faith. The "argument" from design was really counted to be not argument, but a body of fact in which the interpretation so patently coincided with the facts as itself to share their self-evidencing character.'[1]

It is important to emphasize that the argument from design, as it existed in the eighteenth century, was not a version of an Aristotelian

[1] Introduction to the edition of the *Dialogues* cited above, p. 44, n. 4.

type of teleological argument. It did not, in other words, assert or imply that nature is directed toward some end or purpose having value; rather it depended upon an alleged analogy between certain apparently purposive things and arrangements to be found in nature and things produced by human technique. Just as when we see a house or a picture we can infer an intelligent cause, so when we see a vegetable or animal organism, or the structure of the solar system, we can do the same. And it is at once evident that the analogy is based on the assumption that organisms, and certain other natural arrangements do not, any more than the products of human technique, ultimately rest on any internal ordering principle; that they are not self-organizing, but must be organized from without.

This latter point is particularly apparent if we look at the most popular analogue upon which the argument from design was based prior to Hume. This analogue was, appropriately enough for the age of mechanism, a mechanical one, the watch or clock. Robert Boyle, for example, compared the world to the great clock at Strasbourg, because the corpuscular hypothesis assumes

> 'the whole universe (the soul of man excepted) to be but a great Automaton or self-moving engine, wherein all thing are performed by the bare motion (or rest), the size, the shape, and the situation or texture of the parts of the universal matter it consists of . . .'.[1]

It seems almost inevitable that thinkers who believed that the laws of nature were mechanical throughout, when confronted with what they took to be obvious elements of design and purpose in nature, vegetable and animal organisms, and other natural arrangements, should view the latter as analogous to machines like the watch or clock. For, while the principles of such machines are entirely mechanical, the machines themselves are nonetheless designed for a particular purpose.

It was not until the latter half of the eighteenth century that the notion that teleology in nature is analogous to the teleology of a mechanical artifact was seriously subjected to critical examination, first by Hume and later by Kant. Most of Hume's discussion of teleology is to be found in the *Dialogues*, which were published posthumously in 1779, and Kant's main treatment of it is contained in the *Critique of Judgement*, published in 1790. Before examining Kant's treatment of teleo-

[1] *Works*, London 1772, IV, p. 49. Quoted by R.F. McRae, 'Final Causes in the Age of Reason', *University of Toronto Quarterly*, XIX, No. 3 (April 1950), p. 251.

logy, however, it will be useful first to look briefly at some of the main points which Hume raises in the *Dialogues*, not only because he was the first critic of the machine analogy, but also because of the possible effect of his criticisms on Kant. I say 'possible effect' because, aside from internal evidence to be found in the *Critique of Judgement* and in Kant's discussion of the physico-theological proof for the existence of God in the first *Critique*, there seems to be no clear indication of what that effect was.[1]

II. HUME'S EXAMINATION OF THE ARGUMENT FROM DESIGN

We have noted Hume's conviction that purpose and design are found in nature. It is against the background of this conviction that Hume sets out in the *Dialogues* to consider what reasons we have for supposing that the purposiveness we encounter must be attributed to an intelligent cause outside nature. He begins with an examination of the argument from design, which rests on an alleged close analogy between certain natural things and arrangements, and human artifacts. It starts from something which is apparently found in experience, namely, evidence of design, and proceeds by analogy to the cause of such design. To take as an example the argument put forward in the *Dialogues* by Cleanthes, which purports to demonstrate that the organization and arrangement in nature originates in an intelligent cause:

[1] In the Introduction to his edition of the *Dialogues*, Kemp Smith points out that they appeared in a German translation in 1780 and that Kant read them 'on the eve of the publication of his *Critique of Pure Reason*. Recognizing Hume's main criticisms as unanswerable, he at once incorporated them in his discussion of the teleological argument in his final revision of the *Critique*. They were also among the influences leading Kant to a reformulation of the problems of teleology in his *Critique of Judgement*.' (p. 30) Elsewhere, however, Kemp Smith admits that it is not possible 'to establish in any specific manner the exact influence which Hume's *Dialogues* may thus have exercised upon the argument' of the section of the first *Critique* where Kant discusses natural theology. (*Commentary to Kant's 'Critique of Pure Reason'*, p. 539, n. 3) Nor, one might add, is the case any different for the *Critique of Judgement*. But there are a few striking similarities between some of Hume's conclusions in the *Dialogues* and certain of the conclusions which Kant reaches in the third *Critique*, which might be taken to show that the former had some influence on the latter, however difficult it may be to determine its precise extent. It would probably be claiming too much to say with certainty that in the *Dialogues* Hume awoke Kant from his dogmatic slumbers for a second time, but since he certainly read them – see *Prolegomena* (Ak., IV, 358) – it will be interesting to examine some of Hume's main points, and later to compare them with what Kant has to say in the third *Critique*.

'Look round the world: Contemplate the whole and every part of it: You will find it to be nothing but one great machine, subdivided into an infinite number of lesser machines, which again admit of subdivisions to a degree beyond what human senses and faculties can trace and explain. All these various machines, and even their most minute parts, are adjusted to each other with an accuracy, which ravishes into admiration all men, who have ever contemplated them. The curious adapting of means to ends, throughout all nature, resembles exactly, though it much exceeds, the productions of human contrivance; of human design, thought, wisdom, and intelligence. Since therefore the effects resemble each other, we are led to infer, by all the rules of analogy, that the causes also resemble; and that the Author of nature is somewhat similar to the mind of man; though possessed of much larger faculties, proportioned to the grandeur of the work, which he has executed. By this argument *a posteriori*, and by this argument alone, we do prove at once the existence of a Deity, and his similarity to human mind and intelligence.' (p. 143)

Philo immediately begins to set out the main objections to the argument.[1] In the first place, no argument of this type can ever be stronger than one where there is an exact similarity between the cases employed within it.

'But wherever you depart, in the least, from the similarity of the cases, you diminish proportionably the evidence; and may at last bring it to a very weak *analogy*, which is confessedly liable to error and uncertainty.' (p. 144)

For example,

'if we see a house . . . we conclude, with the greatest certainty, that it had an architect or builder; because this is precisely that species of effect, which we have experienced to proceed from that species of cause. But surely you will not affirm, that the universe bears such a resemblance to a house, that we can with the same certainty infer a similar cause, or that the analogy is here entire and perfect. The dissimilitude is so striking, that the utmost you can here pretend to is a guess, a conjecture, a presumption concerning a similar cause.' (*ibid.*)

[1] The objections to the argument are all given by Philo. There has been a great deal of discussion about which of the two main characters in the *Dialogues*, Philo or Cleanthes, is speaking for Hume. Following Kemp Smith's interpretation, which he supports, I believe conclusively, in his Introduction to the *Dialogues*, I have taken it to be Philo. It is important to note, too, that Kant thought Philo to be speaking for Hume. (See *Prolegomena*, Ak., IV, 358.)

In order to be able to infer with certainty from the universe to its cause, as we can from a house to its cause, we would first have to show that the purposiveness which is found in nature really resembles that which is present in a house or machine. But it is evident that the lack of resemblance is more striking than the resemblance.

The second objection to the argument which Cleanthes has presented is that it starts with the fact that some purposive things, such as houses, depend upon an intelligent cause, and ends with the inference that the entire universe must depend upon the same kind of cause. It transfers to the universe as a whole what has been experienced to hold for only a small part of the universe. As Philo puts the objection:

> 'Thought, design, intelligence, such as we discover in men and other animals, is no more than one of the springs and principles of the universe, as well as heat or cold, attraction or repulsion, and a hundred others, which fall under daily observation. It is an active cause, by which some particular parts of nature, we find, produce alterations on other parts. But can a conclusion, with any propriety, be transferred from parts to the whole? . . . What peculiar privilege has this little agitation of the brain which we call thought, that we must thus make it the model of the whole universe?' (pp. 147–8)

Philo's third objection is that, although experience has shown that there is a causal connection between architects and houses, so that when we see a house we are entitled to infer an architect as its cause, it has revealed no such connection between the universe and an intelligent cause. The argument from design, therefore, cannot be, as its exponents insist it is, an argument from experience.

> 'When two *species* of objects have always been observed to be conjoined together, I can *infer*, by custom, the existence of one wherever I *see* the existence of the other: And this I call an argument from experience. But how this argument can have place, where the objects, as in the present case, are single, individual, without parallel, or specific resemblance, may be difficult to explain. And will any man tell me with serious countenance, that an orderly universe must arise from some thought and art, like the human; because we have experience of it? To ascertain this reasoning, it were requisite, that we had experience of the origin of worlds.' (pp. 149–50)

The conclusion to be drawn in the light of the three objections which Philo has put forward is that the argument from design gives us no real justification for supposing that the cause of nature is an external

intelligence. The entire question is, in fact, one which 'exceeds all human reason and enquiry'. (p. 151) Yet, despite this conclusion, Hume is still convinced that the presence of purpose and design in nature is an undeniable fact. One of the fundamental assumptions of the argument from design is that the purposiveness in nature can be adequately understood only by analogy with the purposiveness to be found in a house, a machine, or some other complex human artifact. But, since Hume has shown that there is no basis for supposing that the cause of nature is a mind analogous to the human, if we had no option but to continue to view nature as similar to a watch or a house, we would be faced with an insuperable difficulty. Philo's earlier restatement of Cleanthes' argument clearly expresses the difficulty.

> 'Throw several pieces of steel together, without shape or form; they will never arrange themselves so as to compose a watch: Stone, and mortar, and wood, without an architect, never erect a house. But the ideas in a human mind, we see, by an unknown, inexplicable oeconomy, arrange themselves so as to form the plan of a watch or house. Experience, therefore, proves, that there is an original principle of order in mind, not in matter. From similar effects we infer similar causes. The adjustment of means to ends is alike in the universe, as in a machine of human contrivance. The causes, therefore, must be resembling.' (p. 146)

It is to avoid this difficulty that Hume finds it necessary to go on and attempt a more adequate characterization of the purposiveness found in nature. In this way he hopes to determine whether we are compelled, despite Philo's first objection, to continue to regard nature as analogous to a watch or house, or whether an alternative analogy can be found.

The conclusion of Cleanthes' argument was that 'the Author of nature is somewhat similar to the mind of man'. Accordingly, before continuing with his own positive characterization, Hume deals a final blow to the doctrine that mind is the only possible principle of organization and design in nature. His aim is to prove 'that there is no ground to suppose a plan of the world to be formed in the divine mind, consisting of distinct ideas . . . in the same manner as an architect forms in his head the plan of a house which he intends to execute'. (p. 160) Indeed, what would be gained by such a supposition? If there is a plan of nature in the divine mind, it must be complete and specified in every detail. Nothing will be found in nature which is not found in the plan; both will be identical in their complexity. So if nature requires a cause of its

organization, the plan will require one as well. But Cleanthes cannot appeal to a further mind, as the cause of organization in the first, without becoming involved in an infinite regress. Nor, on the other hand, can he avoid the regress simply by arguing that the divine mind orders itself, because, if this suggestion is intelligible, why is it not equally intelligible to suppose that nature is capable of doing the same?

> 'To say, that the different ideas, which compose the reason of the supreme Being, fall into order, of themselves, and by their own nature, is really to talk without any precise meaning. If it has a meaning, I would fain know, why it is not as good sense to say, that the parts of the material world fall into order, of themselves, and by their own nature? Can the one opinion be intelligible, while the other is not so?' (p. 162)

It appears, then, that the only way a regress can be avoided is to follow up the suggestion that the material world may organize itself. This Hume proceeds to do by emphasizing features of the world other than those which seemed to lend support to the watch analogy, thereby opening the way for his own more adequate characterization of the purposiveness found in nature. He draws attention to the fact that there are many things in nature, aside from minds, which, unlike machines, do not appear to depend on any external source or organization. And this suggests that, just as mind seems to organize itself, so animals, vegetables, and perhaps the whole of nature, do the same.

> 'We have . . . experience of ideas, which fall into order, of themselves, and without any *known* cause: But, I am sure, we have much larger experience of matter, which does the same; as in all instances of generation and vegetation, where the accurate analysis of the cause exceeds all human comprehension.' (p. 162)

Thus experience itself gives us every reason for drawing a clear distinction between what might be called 'external' and 'internal' purposiveness. The purposiveness found in a watch or house is of the first sort, since their organization and design are imposed from without; but the purposiveness found in an animal or vegetable is internal, since it springs from an inner, although unknown, source.

The many instances of internal purposiveness in the world show that there is no good reason for insisting that nature is analogous to a machine or any other human artifact, and refusing to admit that an alternative analogy is possible.

> 'I affirm, that there are other parts of the universe (besides the

machines of human invention) which bear still a greater resemblance to the fabric of the world, and which therefore afford a better conjecture concerning the universal origin of this system. These parts are animals and vegetables. The world plainly resembles more an animal or a vegetable, than it does a watch or a knitting-loom. Its cause, therefore, it is more probable, resembles the cause of the former. The cause of the former is generation or vegetation. The cause, therefore, of the world, we may infer to be something similar or analogous to generation or vegetation.' (pp. 176–7)

This, then is Hume's alternative to the machine analogy on which the argument from design rests. He admits that he is unable to *explain* generation and vegetation; but, as he is quick to point out, the proponents of the argument from design are equally unable to explain the operations of mind in forming a plan of the world. Both types of operation are essentially incomprehensible. There are, however, two reasons for adopting the organism analogy rather than the machine analogy. In the first place, cases of generation and vegetation are much more numerous than are those of intention and design.

'A tree bestows order and organization on that tree which springs from it, without knowing the order: an animal, in the same manner, on its offspring: a bird, on its nest: And instances of this kind are even more frequent in the world, than those of order, which arise from reason and contrivance. To say that all this order in animals and vegetables proceeds ultimately from design is begging the question.' (p. 179)

Secondly, 'judging by our limited and imperfect experience, generation has some privileges above reason: For we see every day the latter arise from the former, never the former from the latter'. (pp. 179–80) We have seen mind emerge in the course of organic development; but we have had no experience of mind producing such development. Consequently, in the final analysis, organic development, the most striking and abundant example of purposive development, is temporally, and perhaps causally, prior to mind, rather than the reverse.

This, in brief, is the general direction of Hume's examination of the argument from design in the *Dialogues*. It should be emphasized, however, that despite his apparent demolition of the position that mind is the only conceivable source of order and design in nature, he nevertheless concludes in the end that 'the whole of natural theology . . . resolves itself into one simple, though somewhat ambiguous, at least undefined

proposition, *that the cause or causes of order in the universe probably bear some remote analogy to human intelligence*'. (p. 227: Hume's emphasis) He does not, that is, conclude by denying altogether that something not entirely different from human intelligence is the source of the order and design in the universe; but he does insist that such a doctrine is certainly obscure as it stands, and yet is 'not capable of extension, variation, or more particular explication'. (*ibid.*)

The relevant conclusions which emerge from the discussion are three in number. First, some things in the universe, and perhaps the universe as a whole, cannot be understood on the analogy of a machine, since they appear to be self-organizing; they appear to have an *internal* ordering principle. Secondly, organization, which is the term Hume uses for animal and vegetable life, cannot be accounted for by means of the mechanical laws of natural science alone, since that would be tantamount to making it depend on chance; organization is, in fact, basically a mystery. Finally, the cause or causes of order in the universe, including animal and vegetable life, 'probably bear some remote analogy to human intelligence', although we cannot make this any more definite. We shall find that, in the *Critique of Judgement*, when Kant examines in detail the nature and origin of the purposiveness and design which he too believes are manifestly present in the world, the terms in which he sees the problem, and some of the conclusions he reaches, resemble the terms and conclusions of Hume's discussion in the *Dialogues*.

4

TELEOLOGY IN SOME OF KANT'S MINOR WRITINGS

The *Critique of Judgement* is in two parts, the first of which deals with aesthetic judgement, and the second with teleological judgement. At first sight the second part, the *Critique of Teleological Judgement*, is puzzling to someone who comes to it after reading the *Critique of Pure Reason* and the *Critique of Practical Reason*. It is not immediately apparent why Kant should feel it necessary to embark upon a full-fledged examination of teleology within the framework of the critical philosophy. It seems almost as if he had suddenly undertaken the task for no apparent reason and without any obvious connection with his earlier work. In fact, however, the examination of teleology in the third *Critique* is a fuller and more systematic treatment of the doctrines which Kant had begun to develop in the Appendix to the Dialectic in the *Critique of Pure Reason*. It is also a discussion of considerations similar to those which Hume raised in the *Dialogues*.

In three letters written in June 1771, February 1772, and June 1787,[1] Kant gives a clear indication that he is engaged with a theory of aesthetics, or, as he calls it, 'a theory of taste'. (Ak., x, 123) But only the last letter contains any reference to teleology. He says:

> '... now I recognize three parts of philosophy, each of which has its a priori principles, which can be enumerated and for which one can delimit precisely the knowledge that may be based on them:

[1] Ak., x (Letters 67, 70, 313).

theoretical philosophy, teleology, and practical philosophy,' (Letter to Reinhold, *ibid.*, 514–15)[1]

In a subsequent letter to Reinhold in March 1788, he says that he hopes to finish his *Critique of Taste* by Michaelmas, and so complete his critical work. (*ibid.*, 532) And in a further letter, in May 1789, he tells Reinhold that the *Critique of Taste* is *part* of the *Critique of Judgement* which will be published by Michaelmas. (Ak., XI, 39) The letters show that somewhere along the line Kant decided to broaden the scope of his forthcoming work, but they give no clear indication that he is about to publish a full-scale critique of teleological judgement nor any hint of his reasons for doing so. In fact, there is no indication that teleology, as it is treated in the second half of the third *Critique*, was on his mind at all. However, in three papers which he published in 1775, 1785, and 1788, Kant gives some clues from which we can infer the lines along which the problem of teleology had developed for him.

In 1775 Kant delivered a 'preliminary announcement' to his lectures on Physical Geography, taking as his topic 'On the Different Races of Men'.[2] This was the first of his discussions of a problem in physical anthropology which increasingly came to occupy his attention: to establish the limits between the different races of men. He returned to it in an article in the *Berliner Monatsschrift* for November 1785, entitled 'Elucidation of the Concept of a Race of Men'.[3] For our purposes the chief interest of the two essays is not in their treatment of the problem of race but rather in some of the suggestions which Kant makes about the use of teleological concepts.

In the paper of 1775, Kant points out that the causes which determine the development of any plant or animal are inherent in its nature.

> 'In birds of the same species, destined to live in different climates, there are germs [*Keime*] for the development of an additional layer of feathers when they live in cold climates; but these germs remain undeveloped when the birds are destined to live in moderate climates. Wheat has a predetermined capacity or natural tendency [*natürliche Anlage*] gradually to produce a seed of thicker hull in a cold country . . .' (Ak., II, 434)

He attributes this kind of modification to 'an admirable providence of

[1] Trans. Armulf Zweig, *Kant: Philosophical Correspondence 1759–99*, Chicago 1967, p. 128.

[2] *Von den verschiedenen Racen der Menschen* (Ak., II, 429–43).

[3] *Bestimmung des Begriffs einer Menschenrace* (Ak., VIII, 89–106).

nature to equip her creatures, through hidden inner provisions, for all eventualities, so that they may survive and adapt to the variations of climate and soil'. (*ibid.*) Then, in a passage which sounds strange in view of Kant's firm adherence to mechanical explanation in the first *Critique*, he goes on to state:

> 'Chance or general mechanical laws cannot produce these adaptations. Therefore we must regard such occasional developments as prefigured. But even where there is nothing purposive [*Zweckmässiges*], the mere potentiality to transmit any acquired characteristic by inheritance is sufficient evidence that a special germ for it must have been present in the organism. External circumstances may occasion, but cannot be the efficient causes of, characteristics that are necessarily inherited and transmitted. Just as chance and physico-mechanical causes cannot originally produce an organized body, neither can they add anything to its reproductive power, i.e., produce any effect that reproduces itself, either as a special form or interrelationship of parts. Air, sun and food can modify the growth of an animal body, but they cannot endow such modification with a regenerative power which might be able to reproduce itself again without these causes; but whatever is to reproduce itself must have been already present in the procreative power, predestined to occasional unfolding according to circumstances in which the creature may find itself, and in which it is to survive. . . . Man was destined for all climates and every kind of terrain; consequently there must lie dormant within him various germs and natural dispositions to be occasionally developed or suppressed, so that he may become adapted to his place in the world, and in the course of generations appear to have been destined for it. We propose, according to these concepts, to go through the whole human species in the entire world, and to adduce purposive causes [*zweckmässige Ursachen*] for its deviations, where natural ones are not easily found, and natural causes where we are not aware of the purposes.' (*ibid.*, 435)

[1] In fact, he was aware of it much earlier. In the *Allgemeine Naturgeschichte und Theorie des Himmels* (1755), he asserts that whereas one can say, 'Give me matter and I will build a world from it', one cannot say, 'Give me matter and I will show you how a caterpillar can be produced.' He then states quite emphatically that 'the formation of all heavenly bodies, the cause of their movements, in short the origin of the entire present structure of the universe can be comprehended, rather than the production of a single herb or caterpillar shown clearly and completely on mechanical grounds'. (Ak., 1, 230) In *Der einzig mögliche Beweisgrund zu einer Demonstration des Daseins Gottes* (1763), he

It is immediately evident from this passage that, even before he read Hume's *Dialogues* or finished the *Critique of Pure Reason*, Kant was aware that in some way organisms formed an exception to the general mechanical treatment of nature. Neither chance nor 'general mechanical laws' can either produce organic creatures[1] or bring about the adaptations which we find in them, with the obvious, but unstated, corollary that they can never be explained mechanically. Mechanical factors may be the occasion for the appearance of an inherited characteristic, but they cannot produce it. The potentiality for the development of a certain modification or adaptation under different circumstances must be due to factors which nature wisely implanted in the generative system of the organism. Accordingly, Kant believes that if he searches for purposive causes of the deviations to be found among men living in different parts of the world, he will, by this means, be able to give some account of them. But he also believes that such causes should be brought forward only when natural ones cannot easily be found and that the latter should be used when we are unaware of the presence of any purposes.

The paper of 1785 does not develop the suggestions contained in the passage quoted above; Kant confines himself entirely to the problem of further clarifying the concept of a race of men, and he does so along the lines suggested in the earlier paper, namely, by explicitly assuming that certain racial characteristics are present because they serve a purpose. But in his considerably longer paper of 1788, entitled 'On the Use of Teleological Principles in Philosophy',[2] he shows, quite explicitly, that he has moved close to the position he will present in the *Critique of Judgement*, and to the terms in which he will discuss it. His relevant points are worked out in greater detail and are more carefully stated than they were in the paper of 1775. However, despite its title, which would lead one to expect something different, the paper of 1788 is a further and more detailed examination of the concept of a race written in reply to an article which had appeared criticizing his approach in the paper of 1785.[3]

says that 'it would be absurd to consider the first creation of a plant or animal as a mechanical side effect of general natural laws'. (Ak., II, 114)

[1] Later Kant weakens this claim. See below, p. 117 n.

[2] *Über den Gebrauch teleologischer Prinzipien in der Philosophie* (Ak., VIII, 157–84). Page references are to this edition.

[3] The criticism was by Georg Forster and appeared in the *Deutsche Merkur* in October and November 1786 (see *ibid.*, 160).

Kant begins his reply by asserting that Forster has failed to understand clearly his point that 'where theoretical sources of knowledge [*theoretische Erkenntnisquellen*] are insufficient, the teleological principle may be used'. (160) He claims that 'in a short essay about the human races', he has 'attempted to prove the . . . advisability, or even necessity, of resorting to a teleological principle where theory proves inadequate'. (159)[1] This is a much wider claim than any he has made for the teleological principle in the *Critique of Pure Reason*, and, in fact, it is the position he will defend in the *Critique of Teleological Judgement*. The passages where he elaborates and supports the principle are worth noting, although they contain no clue as to why he later links it with the faculty of judgement.

One point of dispute between Kant and Forster is over the way in which inheritable racial characteristics, such as skin colour in the white and negro races, are to be accounted for. Forster believes that such characteristics can only be explained on the assumption that there were two original stems (*ursprüngliche Stämme*), one for each race. Kant, on the other hand, contends that it is more in keeping with the philosophical manner of explanation (*philosophische Erklärungsart*) 'to regard them as the development of original purposeful tendencies [*zweckmässige erste Anlagen*] implanted in one stem'. (169) He believes that there is no reason why he and Forster should not reach agreement on the matter, particularly since 'the original physical source of organic beings remains unknowable to both of us, as it does in general to human reason'. (*ibid.*) Moreover, Forster's hypothesis does not make it any easier to understand the presence of such characteristics, while Kant's is simpler since it has no need to appeal to 'local creations' (*Lokalschöpfungen*) to account for different characteristics which may be encountered elsewhere. Finally, Kant believes that his hypothesis 'does not impose any new burden on natural research [*Naturforschung*] above and beyond those of which it can never rid itself anyway, namely,

[1] It is not clear whether the 'short essay' is meant to be the one of 1775 or that of 1785. It seems unlikely that it was the second, since Kant had not mentioned this point there; but he is overstating his case considerably if he is alluding to the paper of 1775, where he had only mentioned purposive causes as a means of explaining or understanding organic modifications but without any attempt at what could be called a proof. His memory may have been faulty. But whatever the explanation, the much more general claim which he is now making for the teleological principle shows the lines along which it has developed in his thinking.

in this case merely to follow the principle of purpose'. (*ibid.*)

Kant's hypothesis is that the human species was provided in the beginning with distinct elements in its germ plasm, in order to prepare its later members for contingencies which had not yet arisen, and which, in fact, might never arise. He gives a clear illustration of what he means by this in the case of the skin-colour of the negro:

> 'The presence of purposiveness in an organism is the general ground from which we infer an original preparation in the nature of a living being, having this [purpose] in view, and – if the purpose is only later fulfilled – infer the existence of duly furnished germs [*Keime*]. Now, this purposiveness can be in no race so clearly shown as in the negro. . . . It is already known that human blood turns black simply through becoming overcharged with phlogiston (as may be seen from the underside of a cake of blood). Now the strong odour of the negro, which cannot be removed by any degree of cleanliness, already leads us to surmise that his skin eliminates a great deal of phlogiston from the blood, and that Nature must have so organized his skin that it is capable, in much greater degree than ours, of dephlogisticating the blood – this being, with us, accomplished chiefly by the lungs. But the true negroes live in lands where the air, because of the thickness of the trees and the marshiness of the surroundings, is so heavily phlogisticated that, according to Lind's account, English sailors run the risk of death from this cause when they ascend the river Gambia even for a single day. . . . It was, therefore, a very wise arrangement of Nature so to organize the skin of the negroes that their blood, even if the lungs do not sufficiently eliminate phlogiston, is yet far more thoroughly dephlogisticated than ours. Their blood must therefore deposit a great deal of phlogiston in the ends of the arteries, so that at this place – that is to say, just under the skin – it shows through as black, though in the interior of the body it is red enough.' (Ak., VIII, 102–3)[1]

I have cited the above passage because it contains a clear example of the way in which Kant believes that the teleological principle, the con-

[1] Trans. by Arthur O. Lovejoy in 'Kant and Evolution', in *Forerunners of Darwin: 1745–1859*, ed. Bentley Glass *et al.*, Baltimore 1959, p. 187. The passage is from the essay of 1785; but since Kant briefly mentions the same point in the essay presently being examined (Ak., VIII, 169–70), I have included it here. Lovejoy believes that since this passage 'was published two years after Lavoisier's direct and decisive refutation of the phlogiston theory', it indicates

cept of purpose, can be employed in the study of organic nature and because its very clarity inevitably gives rise to a number of questions about his present position with regard to the principle. He seems, *prima facie*, to be adopting a naively teleological approach to the explanation of certain organic characteristics. How then does this fit in with the view of natural science which he had taken such trouble to justify in the first *Critique*? What, for Kant, is the relationship between teleology and science? Does he feel that the appeal to a teleological principle really *explains* anything at all? The answers to these questions will emerge only in the *Critique of Teleological Judgement*. But some of the things which he goes on to say about natural science and teleology show that his position is considerably more complex than it appears to be at first sight.

Kant states that both he and Forster agree 'that in natural science everything must be explained naturally, because otherwise it does not belong to this science'. (178)

> 'But is is precisely this principle that everything in natural science must be explained naturally which delineates the boundaries of this science. Because we have reached its outermost limits when we use the last among all the grounds of explanation which can still be verified through experience. When this stops, and when we must begin to operate on the matter with self-invented forces [*selbst erdachte Kräfte*], according to unheard of and unverifiable laws, then we are well beyond the realm of natural science, even though we may continue to designate natural things as causes, while attributing to them forces the existence of which cannot be proved, and even the possibility of which can hardly be consistent with reason. Since the very concept of an organized being presupposes that its matter functions alternatively as end and means [*Zweck und Mittel*], and that the

that Kant was 'by no means abreast of the best chemistry of his time'. (op. cit., p. 186, n. 20) By 'the best chemistry of his time' Lovejoy appears to mean the chemistry which came to be accepted in the long run, and this is not something which Kant or anyone else could have predicted with certainty. It is interesting to note that Joseph Priestley, although at first inclined to accept Lavoisier's arguments, performed a rival experiment in 1783 which seemed to support the phlogiston theory even more strongly than Lavoisier's tended to refute it. Accordingly, Priestley continued to hold the theory until his death in 1804. Consequently, even if Kant knew about Lavoisier's refutation, he should hardly be criticized for not abandoning the phlogiston theory. (See Toulmin and Goodfield, *The Architecture of Matter*, pp. 226–7.)

whole may be thought of solely as a system of final causes [*Endursachen*] within which the possibility that it may have a teleological explanation, but in no sense a physico-mechanical one, occurs for the purposes of human reason, then it cannot be asked in physical science whence this very organization itself originates. The answer to this question, if it is accessible to us at all, is revealed outside natural science in metaphysics. I, for my part, derive all organization from organic beings (through reproduction), and subsequent forms according to laws of gradual development on the basis of original tendencies [*Anlagen*] . . . which are to be found in the organization of their stem. How this stem itself originated, this question lies completely outside the bounds of a humanly possible physical science, within which I had thought I must confine myself.' (178–9)

It is clear from this passage that Kant does not think that he is doing natural science when using a teleological principle to account for organic beings and their modifications. The question of their origin is not one with which natural science concerns itself; it is, indeed, a question which cannot even be asked within that science. Organisms immediately strike Kant as so essentially different from mechanical products that he feels they can never be explained in physico-mechanical terms but require instead a different kind of explanation. Hence his appeal to purposive tendencies implanted in the original stem. But the question of how this organized stem originated is forever excluded from any 'humanly possible physical science'. And yet he believes that it somehow accounts for the development and peculiar features of organisms, although he does not make clear in what way it does so. In a later passage he gives further clues to his present thinking on the matter:

'The concept of an organized being is this: that it is a material being which is possible only through the interrelationship as end and means of all that which is contained in it (as indeed any anatomist, as physiologist, proceeds from this concept). A fundamental force, which creates an organization, must therefore be thought of as a cause operating on the basis of purposes, and in such a way that these purposes must be basic to the possibility of the effect. But we know such forces according to their intentional basis, through experience, only in ourselves, that is to say, in our reason and will, as the cause of the possibility of certain effects directed entirely toward ends, namely, artifacts. Reason and will are with us fundamental forces, of which the latter, insofar as it is determined by the former, is the capacity to

produce something according to an idea, which is called the purpose. Independently of all experience we are not to invent any new fundamental forces, such as would be one that would work purposively in a being without however having the basis for its purpose in an idea. Consequently the concept of the ability of a being to act in a purposive way, but without purpose or intention in itself or in its cause – as a special fundamental force of which experience knows no example – this concept is therefore completely invented and empty, that is to say, without the slightest guarantee that there is any object whatsoever which corresponds to it. There may thus be found in the world or outside it the cause of organized beings, but we must either decline to say anything about the determination of their causes, or we must think of the addition of an intelligent being; not as if we understood . . . that such an effect is impossible from any other cause: but because in order to posit any other cause, to the exclusion of final causes, we must invent a fundamental force, which reason has no business to do; because if reason did that, it would have no trouble at all explaining anything it might wish in any way it might wish.' (181–2)

Kant is here using the only method open to him to account for the purposiveness which he does not for a moment doubt is present in organisms – the method of analogy. The way in which the parts of an organism are related to one another, and to the whole of which they are parts, is, for Kant, ground enough for the inference that whatever force produced them must be understood on the analogy of an intelligence. The only force in our experience which produces things intelligently, that is, according to a prior idea, is our own reason and will when we plan and produce artifacts; and such artifacts are purposive because we design them with some end in view. We have no experience whatever of any force which acts in a purposive way without its having some prior purpose or intention to do so. Consequently we cannot give any real meaning to the idea of such a force and cannot appeal to it in any explanation; it would explain everything and hence explain nothing. Kant concludes that

'purposes have direct relationship to reason, be it someone else's reason or our own. But in order to put them into someone else's reason, we must use our own reason as a basis, at least by way of analogy; because without this they cannot be imagined at all.' (182)

In the *Vorarbeit zu Über den Gebrauch teleologischer Prinzipien in der Philosophie*, which is included in the *Nachlass* (Ak., XXIII, 75–6),

Kant expresses some of his points more clearly than he does in the paper itself, and he adds one important point which was omitted from it. Two passages are worth quoting in full:

> 'The basic principle of purposiveness [*Zweckmässigkeit*] in the construction of organic (mainly living) creatures is connected with reason in the same manner as the basic principle of efficient causes [*wirkende Ursachen*] in respect to all changes in the world. To assume that any part of a creature which is always present in the species is without purpose [*zwecklos*], is just like assuming that any occurrence in the world has come about without a cause. Because we cannot think of the possibility of such beings, in which one part exists for the sake of all parts, and all parts for the sake of one, in any other way than through an idea which lay at the basis of their coming into being. I have also occasionally attempted to steer into the gulf of assuming here a blind mechanism of nature as the cause, and had thought to discover a passage to an artless concept of nature [*kunstloser Naturbegriff*], but I was constantly stranded by reason, and have therefore preferred to hazard myself upon the shoreless ocean of ideas.'

> 'We are led to this idea by the incomprehensible constancy of species and genera in the presence of so many causes streaming in upon them and modifying their development. From which I conclude that, if varieties spring up which are without exception hereditary, these could not have been brought about by a merely accidental cause [*zufällige Ursache*], but could only have been developed [*entwickelt*], and that even for this development there must be found in nature original and purposive tendencies [*zweckmässige Anlagen*]. Because, proceeding from here, if we assume that variations can be lacking in purpose, and can nevertheless perpetuate themselves, then it must also be assumed that the first tendency for the determination of the creature was also lacking in purpose. . . .' (*ibid.*)

The new point which emerges from these passages is Kant's very strong claim that we can as little assume that some invariable characteristic of a species is without purpose as we can assume that an event has occurred without a cause. This is a strange and puzzling claim for him to make. The principle that 'every event has a cause' is a categorial principle and is therefore a condition of experience. Is Kant now claiming that some such principle as 'there is no part of an organism which does not serve a purpose' is a similar principle? He appears to be saying that the latter

principle shares in some sense the objective necessity possessed by categorial principles, although he does not explain how far, and in what way, this is the case. Part at least of his meaning seems to be that, just as the causal principle is a condition of our objective experience in general, so the principle of organic purposiveness is a condition of our experience of organisms. Without such a principle we should not experience organisms as organic; and in this sense the second principle is a condition of our experience of *organic* nature, just as the causal principle is a condition of our experience in general.

Mechanical causes are 'blind', if taken by themselves, and hence mechanical concepts cannot be used to comprehend the peculiar nature of organisms which appear to manifest intelligent design. Instead, concepts must be used which are suited to the task because they share in some way the very characteristics which make mechanical concepts inappropriate. Such concepts are the ideas of reason. Kant's appeal to an idea which must be assumed if we are to understand the possibility of organisms is an echo of the doctrine which he only briefly suggested in the Dialectic of the first *Critique*. In the latter context, as we saw, he was interested in elucidating the notion of a systematic unity of knowledge. He defined a system as a unity of diverse knowledge under one idea; and the idea was a concept provided by reason 'of the form of a whole – insofar as the concept determines *a priori* not only the scope of its manifold content, but also the positions which the parts occupy relatively to one another'. (B860) The idea of a systematic unity of knowledge 'postulates a complete unity in the knowledge obtained by the understanding, by which this knowledge is to be not a mere contingent aggregate, but a system connected according to necessary laws'. (B673) If we are to bring our empirical knowledge into systematic unity, we must presuppose that it does not form a mere agreggate of isolated statements but can be brought into logical connection. Kant went on to assert that the highest form of systematic unity to which knowledge can be brought is the purposive unity of things; and this latter unity is symbolized by means of an analogy with human art or technique. Nature as a whole is regarded as the work of a supreme intelligence which acted according to wise purposes in the creation of the world. We are thus led to the idea of a creative (i.e., purposive) intelligence, an idea which has regulative usefulness in directing us toward a purposive unity of knowledge. And, as Kant plainly stated, this would be an organized unity, not an aggregate.

As the present context makes clear, organisms are similar to what Kant meant by a system in the first *Critique*. In both, 'one part exists for the sake of all parts, and all parts for the sake of one'; both are more than mere aggregates of their parts. Consequently, just as systems require a prior idea of the whole which determines in advance the scope of their content and the relative positions of their parts, so organisms seem to require the same. We cannot comprehend their possibility other than by assuming an idea which lay at their basis and determined their particular design. Moreover, since, as Kant argued in an earlier passage (see above, pp. 63–4), the only forces in our experience which operate on the basis of ideas are our own reason and will, we are compelled to ground the idea which underlies an organism in an intelligence which acts purposively.

Much that Kant says about the teleological principle in the papers we have examined remains mysterious. Perhaps the main question which arises concerns the status of the purposive intelligence which he believes we must assume if we are to understand the peculiar nature of organisms. Does he believe that the purposiveness which we discern in organisms gives us grounds for inferring the *existence* of an intelligent cause, which we can then go on to use as the ground of the purposiveness from which we began? There seems no good reason to believe that this is Kant's present position, particularly in the light of his treatment of the physico-theological proof in the first *Critique*. And whether or not this is his position, what is the value of the introduction of a purposive intelligence? Does it have any *explanatory* role? Kant has emphatically excluded it from natural science, within which alone, he believes, physical explanations can proceed; and he nowhere admits any other kind of explanation. The most that can safely be said here is that Kant is attempting to come to terms with what Toulmin and Goodfield have called 'a certain general picture of Nature, which was widely taken for granted at this period by physiologists and others'.

> 'The more that men thought about the special character of living things, the more it seemed clear to them that the vital world within the organism worked quite differently from the inanimate world outside it. Bodily processes were functional and directed; outside the body, all was causal and chaotic; and this contrast between the two worlds could be explained only by seeing the internal workings of the body as governed by some "vital principle".' (*The Architecture of Matter*, pp. 320–1)

For Kant, the vital principle, whatever it may be, can only be intelligible to us if we regard it as operating intelligently, that is, in conformity with a prior idea. What this means becomes clearer in the *Critique of Teleological Judgement.* His problem can be stated briefly in the following terms: there are things in nature which exhibit purposiveness or design, and the only principles available to account for them are either mechanical or teleological. But mechanism is blind and so could not produce purposive things. Hence Kant must make some sense of the alternative which remains – teleology. This he attempts to do in the *Critique of Judgement.*

5

THE INTRODUCTION TO THE *CRITIQUE OF JUDGEMENT*

Apart from aesthetic judgement, with which this study is not concerned, Kant deals with two seemingly quite distinct topics in the *Critique of Judgement*. The first of these can be summed up broadly as the problem of induction, which he deals with in the Introduction. The second is an examination of organic purposiveness as it manifests itself in certain things in the world, and, by extension, possibly in the world as a whole. The latter examination occupies a large portion of the *Critique of Teleological Judgement*, which forms the second part of the *Critique of Judgement* and connects directly with the suggestions in the three papers which we have just examined. Kant elaborates and develops these suggestions in the course of a sustained attempt to come to terms with the apparent evidence of purpose and design in nature, particularly animal organisms, as Hume had tried to do in the *Dialogues*. His discussion of the problem of induction, on the other hand, connects with the examination of the further presuppositions involved in scientific knowledge which he began in the Appendix to the Dialectic in the *Critique of Pure Reason*. At first sight it is not apparent what the connection is between the problem of induction and the problem of organic purposiveness which would lead Kant to treat them both in a single work. In order to make clear what he believed the connection to be, I shall first examine the Introduction[1] and then go on to examine the *Critique of Teleological Judgement*.

[1] Kant wrote two Introductions to the *Critique of Judgement*, the first of which is considerably longer than the second. He suppressed the longer version and

1. THE PRINCIPLE OF REFLECTIVE JUDGEMENT

I can think of no passage of comparable length in the Kantian corpus which is more thoroughly architectonic and riddled with faculty-talk than the Introduction to the *Critique of Judgement*. For much of the time Kant seems to be interested in little else than making neat divisions among mental and cognitive faculties, assigning principles to them, and setting out the areas of experience within which the principles apply. Nothing of any great value for the purposes of this study is to be gained from examining his architectonic divisions in detail, particularly since the functions which he assigns to different faculties seem to interweave and overlap in a number of ways. But because here, as elsewhere, he appears to attach some importance to faculty-divisions, and since the very title of the present work is more correctly rendered as *Critique of the Faculty of Judgement*,[1] it will be necessary to pay some attention to his faculty-terminology.

Kant's most succinct statement of his reasons for writing a critique of judgement, and of the problem with which it is concerned, appears in the Preface to the first edition. He tells us that the *Critique of Pure Reason* has set out and justified the *a priori* principles of the understanding, and the *Critique of Practical Reason* has done the same for the *a priori* principle of reason.

> 'But now comes judgement, which in the order of our faculties of knowledge [*Erkenntnisvermögen*] forms a middle term between understanding and reason. Has it also got independent *a priori* principles? If so, are they constitutive, or are they merely regulative . . . ?
>
> This is the topic to which the present *Critique* is devoted.' (168)

Kant's way of stating his problem sounds highly artificial: there are three faculties of knowledge; two of them have been shown to possess *a priori* principles; so let us examine the third and see whether it too has similar principles. But despite his passsion for architectonic symmetry which perhaps leads him to state his problem in these terms, it is by no

published the shorter one with both the first and second editions of the *Critique* in 1790 and 1793. In a letter to Beck on 4th December 1792, Kant says that the first Introduction was discarded 'solely because of its disproportionate extensiveness for the text' (*für den Text unproportionirten Weitläufigkeit*). (Ak., XI, 396) Since there are no differences in doctrine between the two and since the second Introduction is the one which now invariably appears with the *Critique*, I shall confine my examination mainly to it and will refer to the longer version only where amplification is needed.

[1] *Kritik der Urteilskraft; Urteilskraft* – power or faculty of judgement. In what follows, unless otherwise noted, 'judgement' will be used in this sense.

means an artificial one. In order to specify the problem in a more acceptable way, it is useful to recall the role of judgement in the first *Critique*.

In the early part of the *Critique of Pure Reason* Kant abandoned the traditional rationalist view that conceiving, judging, and reasoning, are quite distinct and separate processes. His doctrine there was that all thinking without exception is given expression in judgement; that judgement is the basic function of the understanding. Thus he says: 'we can reduce all acts of understanding to judgements, and the *understanding* may therefore be represented as a *faculty of judgement* [*ein Vermögen zu urteilen*]'. (B94) Again, in speaking about the division of the table of categories, he says: 'this division is developed systematically from a common principle, namely, the faculty of judgement [*das Vermögen zu urteilen*] (which is the same as the faculty of thought)'. (B106) It will be remembered, too, that it was in the functions of unity in judgements that Kant believed he had found the clue to the categories of the understanding. 'The functions of the understanding can, therefore, be discovered if we can give an exhaustive statement of the functions of unity in judgements.' (B94) In this part of the *Critique*, Kant speaks as if the understanding judges; as though the making of judgements is the function of understanding. This is further borne out in the *Prolegomena* where he talks about 'an act of the understanding which contains all the rest', and says: 'this act of understanding consists in judging'. (Ak., IV, 323)

However, at the beginning of the Analytic of Principles, Kant makes a clear distinction between understanding and judgement and assigns a specific function to the latter faculty. He tells us that 'if understanding in general be viewed as the faculty of rules, judgement will be the faculty of subsuming under rules; that is, of distinguishing whether something does or does not stand under a given rule'. (B171) This is the first time that Kant introduces the distinction between understanding, now viewed only as a faculty of rules, and judgement viewed as the faculty of subsuming under rules. It is, in fact, the first time he has distinguished judgement as a separate faculty. It is tempting to follow Kemp Smith here when he says: 'Kant is bent . . . upon forcing the contents of the *Critique* into the external framework supplied by the traditional logic viewed as an architectonic.' (*Commentary*, p. 332) But although architectonic considerations undoubtedly play a part in this new departure, they are not the only ones at work. A further reason, for Kant, was

the importance which he attached to the doctrine of schematism, a doctrine which, however misguided it may appear to many contemporary philosophers, he regarded as essential if he was to show how the pure categories of the understanding could be applied to the manifold of experience. He believed that some agency had to be at work in bringing phenomena under the categories, and he found judgement lying ready for the purpose in the convenient division of general logic. But at all events, this role of judgement as subsuming particulars under rules, for whatever reasons it was originally introduced, is one which Kant uses and further develops in the Introduction to the *Critique of Judgement*.

In the Introduction, Kant introduces a division within judgement itself by distinguishing between what he calls 'determinant judgement' (*bestimmende Urteilskraft*) and 'reflective judgement' (*reflectierende Urteilskraft*).

> 'Judgement in general is the faculty of thinking the particular as contained under the universal. If the universal (the rule, the principle, the law) is given, then the judgement which subsumes the particular under it is determinant. This is so even if, as transcendental judgement, it furnishes *a priori* the conditions in conformity with which subsumption under that universal is alone possible. If, however, only the particular is given, and the universal has to be found for it, then the judgement is simply reflective.' (III: 179)

This passage keeps intact the later doctrine of the first *Critique* that judgement is a faculty of subsuming the particular under the universal, but introduces the distinction between the determinant and reflective uses on the basis of whether the universal is already known or has to be found. The assertion that judgement is determinant even when it provides *a priori* the conditions of subsumption under the universal suggests that in this role it has both a transcendental and an empirical use.[1] But since Kant is primarily interested in discovering whether judgement possesses any *a priori* principles of its own, he tends in what follows to concentrate entirely on the transcendental use of determinant judgement.

Kant goes on to explain the distinction between determinant and re-

[1] This is supported in the *Critique of Teleological Judgement* where Kant says that determinant judgement 'must conform to the laws, either universal or particular, given by understanding'. (71: 389) The phrase 'particular laws' is often used by him as a synonym for 'empirical laws'. Cf. the Introduction, V: 186, VI: 187. At VIII: 193 he uses the phrase 'particular (empirical) laws' (*besonderen [empirischen] Gesetzen*).

flective judgement. He says that determinant judgement is concerned with 'universal transcendental laws furnished by understanding', and its task is to subsume phenomena under them. Moreover, 'it has no need to devise a law for its own guidance to enable it to subordinate the particular in nature to the universal'. (*ibid.*) Kant is here emphasizing the role of determinant judgement in applying the categorial principles to phenomena. He sees no problem involved in this, since unless such principles applied to phenomena we would have no experience of them. Thus we require no rule or principle to enable us to see, for example, that anything which we experience had a cause. Unless it had a cause it would not be experience for us. We do not require a rule to guide us before we can recognize any particular event as an instance of the causal principle. It is determinant judgement which first brings about a system of nature according to categorial principles, and this, as we have already seen, is the first way in which Kant speaks of nature as a unity. We have also seen, however, that he speaks of nature as a unity in a second sense, the sense in which the empirical laws of nature constitute a system. It is with this latter system that reflective judgement is concerned.

We know *a priori* that nature must constitute a system in accordance with the categorial principles, and we know what these principles are. But we do not know the empirical laws of nature *a priori*, nor do we know that when they are discovered they will constitute a system. We have no *a priori* guarantee that we will be able to arrange the empirical laws which we discover in a logical system wherein particular laws are brought under more general ones. And unless this can be done we will be unable to understand or explain phenomena. Kant states the problem in the following passage:

> 'There are such manifold forms of nature, so many modifications, as it were, of the universal transcendental concepts of nature, left undetermined by the laws given *a priori* by the pure understanding, because these only concern the general possibility of a nature (as an object of sense), that there must be laws for these [forms] also. These laws being empirical, may be contingent [*zufällig*] as far as the light of our understanding goes; but still, if they are to be called laws (as the concept of a nature requires), they must be regarded as necessary in virtue of a principle of the unity of the manifold, though it be unknown to us. The reflective judgement, which is compelled to ascend from the particular in nature to the universal, stands, therefore, in

need of a principle. This principle it cannot borrow from experience, because what it has to do is to establish just the unity of all empirical principles under higher, though likewise empirical, principles, and thence the systematic subordination of higher and lower. Such a transcendental principle, therefore, the reflective judgement can only give as a law from and to itself. It cannot derive it from any other quarter. . . . Nor can it prescribe it to nature, for reflection on the laws of nature adjusts itself to nature, and not nature to the conditions according to which we strive to obtain a concept of it, a concept which is quite contingent in respect of these conditions.' (IV: 179–80)

Part of this passage has already been cited in the discussion of Kant's examination of the logical employment of reason in bringing empirical knowledge into systematic unity. It is broadly the same problem which concerns him here. It is not enough to regard nature simply as a system in accordance with the categorial principles; we must also suppose that empirical laws can be systematized as well. But the categorial principles do not guarantee anything about a system of empirical laws. The principle of the Second Analogy, for example, does not guarantee in any way that regularities will occur in nature, that particular causal sequences will repeat themselves, or that similar causes will have similar effects. And unless such regularities occur, we will be confronted with what Körner has aptly called 'only an aggregate of isolated propositions or of isolated clusters of such, without any systematic interconnexion'.[1]

It is here that reflective judgement enters as the activity of attempting to formulate empirical laws for the particulars which we encounter in experience and to bring empirical laws themselves into systematic unity. But Kant believes that if these laws, even though empirical, are to be called 'laws', we must regard them as in some sense necessary. The categorial principles do not guarantee them to be necessary in any way. In fact, as far as the latter principles are concerned, empirical laws are entirely contingent. To regard them as ultimately contingent, however, would be the same as to admit that there is no reason for their being as they are. Kant is not here concerned about the fact that any empirical laws we may formulate are falsifiable; he is concerned about chance. Unless there is some reason for the empirical laws of nature being what they are, essentially for nature being what it is, then we will never be able to be certain that the regularities on the basis of which we have formulated laws may not change tomorrow. Unless there is some

[1] S. Körner, *Kant*, Harmondsworth 1955, p. 178.

reason for nature being what it is, we have no guarantee of its uniformity. We have, in short, no basis for making inductive inferences.[1] This is the real problem with which Kant is concerned in the Introduction to the *Critique of Judgement*, and he is concerned with it in a much more conscious way than he was in the Dialectic of the first *Critique*. I will return later to consider in more detail the connection, as Kant sees it, between chance and the problem of induction. As we shall find, the spectre of chance looms large both in his treatment of induction and in his analysis of organic purposiveness. In fact, it is chance which unites them both and requires their treatment in a single work, although what this means precisely will have to be left until later for explanation.

It is the contingency of the empirical laws of nature which leads Kant in the present passage to conclude that reflective judgement requires a principle for its task of finding a system of empirical laws. The principle is based on an analogy:

> 'As universal laws of nature have their ground in our understanding, which prescribes them to nature (though only according to the universal concept of it as nature), particular empirical laws must be regarded, in respect of that which is left undetermined in them by these universal laws, according to a unity such as they would have if [*als ob*] an understanding (though not ours) had supplied them for the benefit of our cognitive faculties, so as to render possible a system of experience according to particular natural laws.' (IV: 180)

The categorical principles, or universal laws of nature as Kant calls them here, are based in our understanding. It is because they determine whatever we experience that nature is a unity in the first sense in which he speaks of the unity of nature. Consequently, Kant believes that we can think of a systematic unity of *empirical* principles only by means of an analogy with our own understanding and the categorial principles which it imposes. He believes that we must regard such empirical unity *as if* it had been imposed upon nature by a non-human understanding in a way analogous to that in which our understanding imposes the categorial unity, and moreover, imposed by it for the specific purpose of

[1] In the *Logic*, Kant says that reflective judgement proceeds 'from the particular to the general'. (Ak., IX, 131) 'In proceeding from the particular to the general, in order to formulate general judgements on the basis of experience, . . . judgement concludes either from many to all things of a kind, or from many determinations or properties shared by many things of a kind, to the remaining ones. . . . The former kind of conclusion is called a conclusion by induction; the latter a conclusion according to analogy.' (*ibid.*, 132)

enabling us to discover the unity for ourselves through the empirical investigation of nature. Kant goes on to say quite unequivocally that this does not commit us to the assumption that such an understanding actually exists. It is simply an idea which reflective judgement uses as a principle in its investigation of nature; it is not a principle by which we attempt to determine anything in nature. As Kant puts it, 'this faculty rather gives by this means a law to itself only, and not to nature'. (*ibid.*)

Kant's statement of the principle of reflective judgement gives a further indication of what he believes to be the connection between the problem of induction and the problem of organic purposiveness. In our examination of the Dialectic in the first *Critique*, we noted his conviction that every system requires a prior idea which determines the scope and relative position of its content, and that systems are organized unities, comparable to animal bodies, not just aggregates of their parts. (B860) Aggregates, such as a heap of stones or a ridge of sand, can be produced by random causes: by the action of wind, water, or some other natural agency. Such things can be produced haphazardly and by chance in the sense that they can be produced without design or intelligent reason. But the presence of systematic organization, Kant believes, immediately leads us to suppose that an intelligence has been at work. In the *Critique of Teleological Judgement* he gives an illustration which is helpful in clarifying the present point. He asks us to imagine a man in an uninhabited country coming upon a regular hexagon traced in the sand and asks how the man would account for it. He would immediately be aware that, as Kant puts it, there is a 'unity of principle' present in the construction of the figure.

> 'His reason would then forbid him to consider the sand, the neighbouring sea, the winds, or even animals with their footprints, as causes familiar to him, *or any other irrational cause* [*vernunftlose Ursache*], as the ground of the possibility of such a form. For the chance [*Zufälligkeit*] against meeting with such a concept, which is only possible in reason, would appear to him so infinitely great that there might just as well be no law of nature at all in the case. Hence it would seem that the cause of the production of such an effect could not be contained in the mere mechanical operation of nature [*in der bloss mechanisch wirkenden Natur*], but as if [*als ob*], on the contrary, a conception of such an object, as a conception that only reason can give and compare the object with, could be what alone contains that causality.' (64: 370: my emphasis)

With suitable modifications, this illustration can be applied directly to the case of organisms. Organisms are, by definition, organized unities, not mere aggregates. Moreover, they are organized in such a striking and thoroughgoing way that we cannot conceive how they could have been produced merely by the random workings of the mechanism of nature, because, as Kant clearly indicates, the mere mechanical operation of nature is an *irrational* cause. Organisms immediately strike us as systems, and hence, like any system, they seem to point to a prior idea which is responsible for the precise organization of everything that is contained within them. They appear to point to, and to demand an *intelligent* cause.

Kant believes that there is a similar requirement in the case of the systematic unity of empirical laws which it is the task of reflective judgement to discover. The empirical detail of nature is entirely contingent as far as we are concerned. The systematic unity to which we bring it will not be a unity which we impose upon nature but will be discovered in nature. We hope to find, in other words, that nature is in fact a systematic unity, and if it is, then like every other system it seems to require a prior idea which is in some sense the ground of its organization. The system of empirical laws appears to depend on a possible non-human intelligence. Moreover, since so far as we can see there is no *a priori* reason why we should be able to discover the empirical laws of nature and their systematic connection, we must consider nature as if the intelligence in question had designed it so as to make it possible for us to know it. And as we have already seen, this does not commit us to the assumption that such an intelligence exists. This, then, is the connection which Kant sees between the problem of induction and the problem of organic purposiveness. I will have more to say about this in due course; but for the moment it is important to clarify the principle of reflective judgement in order to be in a position to understand and assess the claims Kant makes for it.

Kant proceeds to give a definition of purpose (*Zweck*) and purposiveness (*Zweckmässigkeit*), neither of which is satisfactory as it stands.

> 'The concept of an object, so far as it contains at the same time the ground of the actuality of this object, is called its purpose, and the agreement of a thing with that constitution of things which is only possible according to purposes, is called the purposiveness of its form.' (IV: 180)

Both definitions, and particularly the first, are obscure and puzzling.

Nowadays we would tend to regard the purpose of some object as either the function it was designed to fulfil or the function it presently fulfils, whether originally designed for it or not. We should not want to say, as Kant seems to be saying here, that the concept of an object is itself the purpose of the object. In fact, where he talks about the 'concept of an object', we would probably talk of its plan or design. And plans or designs are in no sense the purpose of their objects. It is perhaps true that plans would not be what they are if the objects of which they are the plans were not to serve a certain purpose. But, all the same, the plan does not 'contain', or even necessarily reflect, the purpose of its object. Nor does it make much sense when Kant talks about a concept containing 'the ground of the actuality of the object'. This would seem to make concepts sole efficient causes of their objects; and, if we substitute 'plan' for 'concept', it is immediately apparent that the plan of a house is not its sole efficient cause. If it were, it would be a sufficient condition of it. But plans are not sufficient conditions of their objects; they are only necessary conditions. We cannot imagine an apparently designed object coming about without a prior plan; but we know that plans often remain unfulfilled. Lewis White Beck's brief comment on this passage gives some help: 'The idea is one of the efficient causes of the object by virtue of being one of the factors which determine the person's action which, in turn, will produce the object. An object is a purpose if we ascribe its realization to a chain of causes one member of which is an idea or conception of the object which determines the person's behaviour in actually producing the object.'[1] This way of stating Kant's point shows clearly that if we attempt to interpret his definition in terms of the purpose *of* an object, we will miss the point which is characteristic in his treatment of the problem of purposiveness. He is not speaking about any purpose which is *served* by the purposive objects he is concerned with, organisms and nature as a system. He is speaking only about the peculiar way in which they are organized, a way which seems to have been designed to be what it is and so appears to depend upon an antecedent plan or idea in the mind of an intelligent being.[2]

[1] *A Commentary on Kant's Critique of Practical Reason*, Chicago 1960, pp. 91–2.

[2] Cf. *Critique of Aesthetic Judgement*, 10: 220. 'When not merely the knowledge of an object, but the object itself in its form and existence, is regarded as an effect which is possible only through a concept of it, there is the thought of a purpose [*denkt man sich einen Zweck*]. Here the representation of the effect is the determining ground of its cause, and is prior to it.' Cf. also Kant's assertion

In the first Introduction Kant gives an equally obscure, but ultimately more workable, definition. He says, 'we call that purposive the existence of which seems to presuppose a prior representation of the same thing'. (Ak., XX, 216) At the risk of undue repetition, what this means is simply that organized unities, like organisms, or even the entire system of the empirical laws of nature,[1] appear to be of such a character that they could not have been produced by chance or, which is the same thing for Kant, by blind mechanism, but seem to require instead a prior idea of what they were to be, which was among the efficient causes leading up to their production. For Kant, this is just another way of saying that such things are purposive. As he puts it again in the first Introduction: 'purposiveness is the conformity to law of the contingent as such[*Gesetzmässigkeit des Zufälligen als eines solchen*] '. (*ibid.*, 217) And, as we have seen, this was a view which was widely shared by his contemporaries, and one from which even Hume did not entirely free himself.

In the light of the above definitions, Kant is able to give a more precise formulation of the principle of reflective judgement. 'Accordingly, the principle of judgement, in respect of the form of the things of nature under empirical laws generally, is the purposiveness of nature in its multiplicity. In other words, by this concept, nature is represented as if [*als ob*] an understanding contained the ground of the unity of the manifold of its empirical laws.' (IV:181) In the first Introduction he gives a different formulation of the principle which emphasizes the logical character of the system of empirical laws which judgement must attempt to discover. 'The specific principle of judgement is therefore as follows: *Nature specifies its universal laws into empirical laws in accordance with the form of a logical system* [*die Form eines logischen Systems*] *on behalf of the faculty of judgement.*' (Ak., XX, 216: Kant's emphasis) Both these formulations of the principle were, in fact, already implicit in the passage examined earlier (see p. 75 above), and we have discussed Kant's reasons for believing it to be required by reflective judgement. We must now examine the status which he believes the principle to have.

that the 'concept' of a purposiveness of nature 'is entirely different from practical purposiveness (in human art or even in morals) though it is doubtless thought after this analogy'. (V: 182)

[1] '. . . natural laws which are so constituted and related to one another as if judgement had designed them for its own needs are similar to a possibility of things which presupposes a representation of these things as their ground'. (*ibid.*)

II. THE STATUS OF THE PRINCIPLE OF REFLECTIVE JUDGEMENT

Kant's original question in the Preface to the *Critique of Judgement* was whether judgement, like understanding and reason, possesses any *a priori* principles of its own. His opening steps in answering the question have centred on reflective judgement's task of bringing empirical knowledge to systematic unity, and it is immediately evident that this is in fact a further examination of an activity which he had assigned to reason in the Dialectic of the *Critique of Pure Reason.* In the Dialectic it was reason which was concerned to systematize the empirical detail of nature and which was required to presuppose that nature is not so heterogeneous that it will prove impossible to do so. But in the Introduction to the third *Critique* Kant has assigned this activity, and the presupposition underlying it, to reflective judgement. Reflective judgement must presuppose that nature is a unity such as it would be if a creative intelligence had designed it so that we might succeed in systematizing our empirical knowledge; and this, more specifically than in the first *Critique,* is to say that we must presuppose that nature is purposive for our scientific knowledge. I do not think that there is anything of philosophic significance hidden in the change from reason to reflective judgement. The change may be due to the fact that in the *Critique of Practical Reason* Kant assigned a specific function to reason in its practical employment, and he now wishes clearly to distinguish reason as practical from the activity of scientific investigation by giving another name to the latter activity. Or it may be that he has made the change for purely architectonic reasons, for example, from a desire to show that each faculty of knowledge possesses *a priori* principles. But whatever his reason, his present examination of reflective judgement is simply a continuation in greater detail of the examination of the problem of induction which he began in the first *Critique.*

However, although Kant is presently concerned with the problem of induction, his way of carrying on his examination in terms of whether reflective judgement has a principle of its own tends to obscure this, as does his faculty-talk in general. No contemporary philosopher would carry on a similar examination in terms of different mental faculties having specific principles; he would be more likely to begin by characterizing inductive activity and then attempt to show its presuppositions. But, in fact, we do not have to look too closely before becoming aware that, in his own way, Kant has been doing, broadly, the same thing.

The principle of reflective judgement is the presupposition that, as Körner puts it:

> 'if science is to be possible the human understanding must be regarded as capable of apprehending the laws of nature, and that if God has created the world he has created an understandable world. Its import is similar to that of Einstein's aphorism, inscribed on the wall of the Princeton Institute for Advanced Study, that "God is sophisticated but not malicious".' (*Kant*, p. 179)

Kant's next step is to attempt to determine whether or not the principle of reflective judgement is an *a priori* principle. Again, few contemporary philosophers would be interested in such a question, because few of them would be likely to agree that there are a group of *a priori* conceptual principles to which all human experience must conform and, consequently, they would not be interested, as Kant was, in determining whether or not some newly discovered principle is a candidate for membership in the group.[1] They might, however, be interested in deciding whether some activity, such as inductive inquiry into nature, requires a prior principle or presupposition, what kind of justification such a principle can be given, and what reasons, and what kind of reasons, there might be for holding it. Here again, we shall find that, despite his characteristic way of stating the problem, this is Kant's aim as well.

Kant begins this part of his discussion by defining a transcendental principle as 'one through which we represent *a priori* the universal condition under which alone things can become objects of our knowledge in general'. (V: 181) The chief instances of such principles are, of course, the categorial principles. It is therefore somewhat surprising when Kant goes on to say that 'the concept of a purposiveness of nature belongs to transcendental principles'. (V:182) He asserts, moreover, that this is evident from the maxims of judgement which we use *a priori* in our investigation of nature, maxims which are concerned with no more than the possibility of experience and therefore with the possibility of acquiring knowledge of nature, 'but of nature not merely in a general way, but as determined by a manifold of particular laws'. (*ibid.*) Kant lists three such maxims, two of which he included among the three which he listed in the Appendix to the Dialectic in the first *Critique*.

'Nature takes the shortest way (*lex parsimoniae*)[2]; yet it makes no

[1] P.F. Strawson seems to be one of the few exceptions. See his Introduction to *Individuals*, London 1959.

[2] This seems to be a rough statement of the least-action principle, which was

leaps, either in the sequence of its changes, or in the juxtaposition of specifically different forms (*lex continui in natura*); its vast variety of empirical laws is yet unity under a few principles (*principia praeter necessitatem non sunt multiplicanda*); and so forth.' (*ibid.*)

The final phrase indicates that there are other maxims of this type, so that there is no reason to suppose that Kant now wishes to exclude the 'law of specification' which he had included among the principles on which scientists proceed in the first *Critique*.[1]

Kant's next point is that we cannot account for these principles by the psychological method (*auf dem psychologischen Wege*) without violating their sense, because they do not tell us how we in fact judge nature but how we *ought* to judge it; and we cannot derive this kind of 'logical

discovered by Maupertuis in 1746. Kant was aware of the principle as early as 1763, because he notes in his *Only Possible Argument for a Demonstration of the Existence of God* that 'Maupertuis proved . . . that the most universal laws according to which matter in general operates . . . are themselves subject to an overriding rule according to which the greatest economy is observed in every action'. (*Ak.*, II, 98–9) Bentley Glass, in his essay on Maupertuis in *Forerunners of Darwin*, calls the principle 'one of the greatest generalizations in all physical science, although not fully appreciated until the advent of quantum mechanics in the present century'. He goes on to say that 'Maupertuis arrived at this principle from a feeling that the very perfection of the universe demands a certain economy in nature and is opposed to any needless expenditure of energy. Natural motions must be such as to make some quantity a minimum. It was only necessary to find that quantity, and this he proceeded to do.' (p. 53) Maupertuis himself noted that 'the spectacle of the universe becomes so much the grander, so much the more beautiful, the worthier of its Author, when one knows that a small number of laws, most wisely established, suffice for all movements'. (quoted by Glass, op. cit.) Cf. Max Planck's comment on the principle: 'It is certainly no wonder that the discovery of this law – the so-called least-action principle . . . – made its discoverer Leibniz, and soon after him also his follower Maupertuis, so boundlessly enthusiastic; for these scientists believed themselves to have found in it a tangible evidence for a ubiquitous higher reason ruling all nature. In fact, the least-action principle introduces a completely new idea into the concept of causality . . . the *causa finalis* for which . . . the future . . . serves as the premise from which there can be deduced the development of the processes which lead to this goal.' ('Religion and Natural Science', 1947, in *Scientific Autobiography and Other Papers*, New York 1949, pp. 179–80) Charles Taylor refers to the principle of 'least effort' as a 'teleological principle'. (*The Explanation of Behaviour*, London 1964, p. 9, n.) Cf. also Hume's comments: '*That nature does nothing in vain*, is a maxim established in all the schools, merely from a contemplation of the works of nature'; and 'One great foundation of the Copernican system is the maxim, *that nature acts by the simplest methods, and chooses the most proper means to any end.*' (*Dialogues*, p. 214.)

[1] See also the principles listed at V: 185 of the Introduction.

objective necessity' (*logische objective Notwendigkeit*) from merely empirical principles. A passage in the first Introduction amplifies Kant's point. He asserts that a judgement that 'claims to be universally valid, and consequently claims necessity for what it asserts', can never be explained psychologically:

> 'If we conceded to such a judgement a claim of this kind, it would be absurd to vindicate it by explaining the origin of the judgement psychologically. In doing so we should defeat our own end; for if we were completely successful in the attempted explanation, this would only prove that the judgement could lay absolutely no claim to necessity, for the very reason that we can demonstrate its empirical origin.' (Ak., XX, 238)

The maxims or principles in question, therefore, since they claim to be universally valid, cannot be explained psychologically. They are not empirical principles on the basis of which we *happen to* investigate nature, but principles on the basis of which we *must* investigate it. What this means is by no means clear at this stage. But at all events, Kant's conclusion is that the principle of reflective judgement, that nature is purposive for our knowledge of it, on which he believes maxims of this kind to be based, is a necessary (i.e., transcendental) principle and so requires a transcendental deduction. This he proceeds to give.

As in the case of the so-called deduction of the regulative ideas in the Dialectic of the first *Critique*, the question that immediately suggests itself is: why would Kant want to call his ensuing argument a transcendental deduction? We saw that in the first *Critique* he tried to demonstrate the legitimacy of the principles embodied in the regulative ideas, not by showing that they must have objective reference, nor by showing that they are a requirement for all objective experience, but by showing that they are required for a certain kind of knowledge, namely, scientific knowledge. He does precisely the same thing here when he tries to show that the principle of reflective judgement is a requirement for inductive inquiries into nature.

Kant begins the 'deduction' by repeating that, although nature is subject to the categorial principles, these only determine nature in a very general way. In applying such principles, judgement is determinant, having nothing else to do than subsume under them what is encountered in experience. Thus, for example, determinant judgement is able to subsume events under the causal principle because it is able

'to furnish *a priori* the condition of subsumption under the concept of understanding placed before it: this we get in the succession of the determinations of one and the same thing'. (v: 185)

> 'But besides this formal time-condition, the objects of empirical knowledge are determined, or so far as we can judge *a priori*, are determinable, in many ways, so that specifically different things, over and above what they have in common as things of nature in general, are further capable of being causes in an infinite variety of ways; and each of these ways must, on the concept of a cause in general, have its rule, which is a law, and, consequently, imports necessity: although owing to the constitution and limitations of our faculties of knowledge, we may fail to see this necessity. Accordingly, in respect of nature's merely empirical laws, we must think in nature the possibility of an endless multiplicity of empirical laws, which yet are contingent so far as our insight goes, i.e., cannot be known *a priori*. In respect of these we estimate the unity of nature according to empirical laws, and the possibility of the unity of experience as a system according to empirical laws, to be contingent. (*ibid.*)

Again, it is the contingency of the empirical laws of nature which bothers Kant. We have no way of knowing that it will be possible to discover such laws and bring them to systematic unity. For despite the categorial principles, the *detail* of experience might be so endlessly varied that it would be impossible for us to detect any similarities which would enable us to formulate empirical laws which were more than 'single-instance' statements. Such a state of affairs is entirely possible, consistently with the categorial principles, and any other is, so far as we can see, a matter of chance. But – and this is the crux of Kant's 'deduction' – if our empirical knowledge is to be systematically connected, we must *necessarily* 'presuppose and assume' a systematic unity of nature according to empirical laws. Consequently, in our investigations of nature we must adopt it as an *a priori* principle that the contingent detail which we encounter will be capable of being systematized. For reasons which we have already examined, this is, for Kant, the principle that nature, in respect of its empirical laws, is purposive for our understanding of it. In calling the latter principle 'transcendental', he appears to mean that it is not deduced from our experience of nature as systematic but is what makes that experience possible.

This, surprisingly enough, is the so-called 'transcendental deduction' of the principle of reflective judgement. The kernel of Kant's argument

is an exceedingly simple one, although somewhat obscured both by his characteristic way of stating it and by his excessive repetition of similar points in different ways. He expresses it in each of the following statements:

> 'Such a [systematic unity of the empirical laws of nature] must be necessarily presupposed and assumed, as otherwise we should not have a thoroughgoing connection of empirical knowledge in a whole of experience.' (v: 185)
>
> 'Were it not for this presupposition [i.e., that nature is purposive for our knowledge of it], we should have no order of nature in accordance with empirical laws, and, consequently, no guiding-thread . . . for an investigation of them.' (v: 185)
>
> 'We must investigate [nature's] empirical laws throughout on that principle [i.e., the principle that nature is purposive for our knowledge of it] and the maxims founded thereon, because only so far as that principle applies can we make any headway in the employment of our understanding in experience, or gain knowledge.' (v:186)

It is important to emphasize that Kant is *not* saying that, unless nature is adapted to our capacity for coming to know it, we shall never be able to know it and hence that nature is so adapted, because the latter is not something he believed could be proved about the empirical detail of nature. He *is* saying that unless it is true that nature is such that we can come to know it, we will never achieve a system of empirical laws, and thus, in our empirical investigations of nature, we must necessarily presuppose it to be true; and this, for Kant, is the presupposition that nature is purposive for our knowledge of it. Without such a presupposition, he believes, we should not be able to discover a system of empirical laws. It is the contrast between the categorial principles, which Kant believes to be necessary for any experience of nature, and empirical laws, which he believes to be contingent so far as we can see, which leads him to state the presupposition in terms of nature being purposive for our understanding of it. The contingency of empirical laws does not arise for the contemporary philosopher in the same way it did for Kant, and so the notion of nature being purposively designed would not figure in a contemporary account of the presuppositions involved in inductive reasoning. We can ignore the notion of purposiveness for the time being, however, and say simply that in our scientific investigations of nature we must presuppose that nature is such that we can systematize it. what way has Kant shown this to be true?

The term 'presupposition' is a vexed one which still requires careful examination. Since Kant believes that the principle of reflective judgement is a presupposition of scientific *activity*, I will use the term in the following way in attempting to make sense of what he is saying, because it points to a peculiarity about presuppositions which he may have failed to notice. A presupposition of an activity (A) is any statement (P) which is related to (A) in such a way that to deny (P) and still perform, or attempt to perform, (A) would be futile and senseless. For example, if it were a presupposition of making an automobile trip of 100 miles that the motor would hold up for that distance, it would be futile and senseless to undertake the trip believing the statement, 'The motor will hold up for 100 miles', to be false. But this is *not* to say that before making the trip we must know, or even believe, the statement to be true. We can undertake such a trip without making any assumptions about the trustworthiness of the motor.

Kant's point can be simplified and examined in the light of this feature of presuppositions. In place of his body of possibly quite disparate empirical laws, we can substitute any body of data which we are trying to systematize; and for his principle of reflective judgement, we can substitute the presupposition that the body of data is such that we will be able to systematize it. The statement, 'This body of data is capable of being systematized', is a presupposition of the activity of attempting to systematize it only in the sense that to make the attempt while denying the statement to be true would be futile and senseless. But here again, to say this is quite a different thing from saying that before we can attempt to systematize the body of data we must assume the statement to be true. Thus, for example, someone could say, 'I am going to see whether I can systematize this body of data', without positively assuming that it can be systematized, although he could not sensibly make the attempt while *denying* the truth of the statement. The presupposition is related to the activity, not in a way that demands its conscious adoption, but simply its non-rejection. In other words, it would make poor sense to say, 'This body of data is incapable of being systematized, but I will try to systematize it nevertheless.'

It is here that Kant's claim for the principle of reflective judgement becomes ambiguous. If he is claiming that, before we can attempt to systematize empirical laws, we must *explicitly* assume the truth of the presupposition that it will be possible to do so because nature is fitted to our capacity to understand it, then he is making far too strong a claim.

In approaching nature, the scientist can simply attempt to make inductive generalizations without any explicit assumption about the possibility of success. He can try it on for size, so to speak. But if, on the other hand, Kant is claiming that the principle is *implicit* in scientific activity, in the sense that its denial would make the activity futile, he is on firmer ground. In other words, either nature is or is not knowable: if it is, then we may be successful in our attempt to know it, although even if we fail in the attempt, this does not prove that nature is ultimately unknowable but only that we have not succeeded so far. If nature is not knowable, then there is no sense making the attempt: so if we make the attempt, we must at least not *deny* that it is knowable. We can simply say, 'I don't know whether nature is knowable or not, but I will investigate it and see.' Thus we can say that Kant has shown that some principle of the fitness of nature for our capacity of coming to know it is a presupposition of our scientific investigations, but only in the sense that to *deny* such a principle would be to bring those investigations to a halt.

Körner comes close to this interpretation of the status of the principle of reflective judgement, although I am not certain that he actually adopts it, when he says:

> 'The reasonableness of using inductive reasoning implies, of course, the reasonableness of the assumption that nature is fitted to our capacities of understanding; and to justify the former is *a fortiori* to justify the latter. However, even if for some reason or other we do not adopt induction as a policy of research we are still committed to assuming the principle of reflective Judgement: *for by rejecting it we imply the futility of any search for a system of empirical laws.*' (*Kant*, pp. 179–80: my emphasis)

However, as we have seen, although the rejection of the principle implies the futility of the search, this does not prove that we are therefore committed to assuming it to be true. It may be the case that scientists have, from time to time, consciously assumed that nature is such that we can understand it; but this is quite a different thing from saying that unless they explicity made the assumption, there would be no empirical science. It is also quite different from saying that unless the assumption were true *in fact*, there would be no empirical science. Kant has not, then, shown that we *must* investigate nature according to the principle of reflective judgement, but only that we cannot sensibly investigate it while at the same time denying some such principle to be true.

I think that Kant would like to have proved, and was perhaps sometimes tempted to believe that he had proved, something more than this about the principle of reflective judgement and that this is apparent when he calls it 'transcendental' and attempts to give it a transcendental deduction. If it could be shown that the principle shared in some way the characteristics of universality and necessity possessed by the categorial principles, then there might be some ground for more than just the *assumption* that nature is regular and capable of being brought to systematic unity. I think he was tempted to believe that the fact that we *must* presuppose the principle of reflective judgement did show that it shared those characteristics, and so supported to some degree, if it did not actually prove, the regularity of nature. For, considered simply as presuppositions of scientific inquiry, there is a certain similarity between, for example, the causal principle and the principle of reflective judgement. To deny the causal principle would be to make any search for causes futile, just as to deny the principle of reflective judgement would be to make the search for a system of empirical laws impossible. To this extent they appear to be similar principles.

However, despite Kant's temptation to think along these lines, he is certainly aware that the causal principle is quite different in an important way from the principle of reflective judgement, since he believes that the former principle can be given an independent proof and so be shown to be true quite aside from its role in scientific investigation. But this is not possible for the principle of reflective judgement; it cannot be given independent proof. All that can be shown about it is that unless it is presupposed, scientific investigation is impossible. Perhaps, in the final analysis, all the meaning that can be attached to calling the principle 'transcendental' is that if it were denied, the activity it underlies would cease to exist and, in fact, would never have begun in the first place.

In justifying the principle of reflective judgement, then, Kant has not answered Hume's sceptical doubts about induction; he has not managed to establish that empirical laws are necessary in any objective way. For it is obvious, and despite his temptation to think otherwise he was aware of it, that the principle of reflective judgement does not say anything about whether empirical laws are ultimately necessary, or, what is the same thing for Kant, about whether nature is in fact purposive for our understanding of it. This comes out in a number of passages where he says that the principle of reflective judgement is 'merely

subjective *a priori*' (III: 177), and that judgement gives 'a law to itself alone and not to nature' (IV: 180):

> 'This transcendental concept of a purposiveness of nature . . . attributes nothing at all to the object, i.e., to nature, but only indicates the unique way in which we must proceed in our reflection upon the objects of nature with a view to getting a thoroughly interconnected whole of experience, and so is a subjective principle, i.e., a maxim of judgement.' (V: 184)

> 'Thus judgement also is equipped with an *a priori* principle for the possibility of nature, but only in a subjective respect. By means of this it prescribes a law, not to nature . . . but to itself . . . to guide its reflection upon nature.' (V: 185)

In these and a number of similar passages both in the first and second Introduction, there is an implicit contrast between the principle of reflective judgement, which does not determine nature objectively, and the categorial principles which do. We have no objective reasons for believing that nature is such that we can discover and systematize empirical laws, as we have objective reasons for knowing, for example, that every event will have a cause. All we can do is *presuppose* that it will be possible to find and systematize empirical laws; and this is what Kant means when he says that the principle of reflective judgement is a *subjective a priori* principle. In saying that the principle is subjective, he is saying that it does not necessarily apply to nature, in contrast with the categorial principles which are objective since they *must* apply to nature as an object of our experience. The contrast is simply that for Kant it would make sense to say, 'I am going to see whether the empirical detail of nature can be systematized', whereas it would make no sense to say, 'I am going to see whether this event has a cause'. But although the principle of reflective judgement is subjective, we must nonetheless presuppose it in our own interest in trying to reach scientific knowledge of nature.

III. THE SYSTEM OF EMPIRICAL LAWS AND ORGANISMS

In the Dialectic of the first *Critique* Kant argued that the assumption of a purposive arrangement of nature has a regulative usefulness. He believed that, if we investigate nature in the light of such an assumption, we may discover possible teleological connections among phenomena and so become aware of avenues of investigation which would have remained unknown to us on a purely mechanical approach (see above,

pp. 34ff.). It is important to note that Kant nowhere mentions this application of the notion of purpose in either the first or the second Introduction to the *Critique of Judgement*. The principle of reflective judgement is not discussed in terms of any possible use it might have in suggesting teleological connections among things in nature. There is no reason to suppose that Kant has altered his earlier position, but only that his interest is different in the present context from what it was then. The principle of reflective judgement is introduced and discussed solely in terms of its role as the basic presupposition underlying any attempt to discover and systematize the empirical laws of nature. Kant is interested in showing that without the presupposition that nature is purposive for our knowledge of the system of its empirical laws, we should never be able to discover that system. Moreover, there is no indication that he believed that any statement about purposes would figure in the system we construct. It is to be a system of mechanical laws; it is not in any sense to be a system containing teleological laws. A natural scientist might conduct his investigations on the assumption of a purposive arrangement of nature and so discover *possible* teleological connections; but having found such connections, he must, as Kant pointed out in the Dialectic, go on to look for the mechanical laws which produced them. And it is only the latter laws which will be included in a system of empirical laws.

We have noted Kant's conviction that there is a certain similarity between organic systems and the system of empirical laws which we hope to find in nature. Both are organized in such a way that they could not have been produced by chance causes but appear to depend upon an intelligent cause. This is, in fact, the defining characteristic of things which Kant calls 'purposive': they are not mere aggregates, but systems, and thus seem to depend upon an idea. The question then arises whether he believes that the system of empirical laws will be organized in the way in which particular natural organisms are organized. How far will it share the organic characteristics which we find in plants or animals? In the paper of 1788[1] Kant gave a definition of a natural organism which shows fairly clearly what he considered its peculiar characteristics to be: 'The very concept of an organized being presupposes that its matter function alternately as end and means, and that the whole may be thought of solely as a system of final causes.' In the light of the

[1] *Über den Gebrauch teleologischer Prinzipien in der Philosophie*; see above, pp. 59ff.

above definition, it is safe to infer that Kant does not believe that the system of empirical laws will be organic in this way. In other words there is no reason to suppose that he believes that the empirical laws of nature will function alternately as ends and means, or even be related as ends and means, or that the whole can be thought of only as a system of final causes. In fact, without assuming a completely teleological view of nature, it is hard to see how he could believe this. When we examine the *Critique of Teleological Judgement*, we will find that Kant discusses and rejects the view that we can construct any system of knowledge on premises which assert that one thing in nature exists because it serves the purpose of another. For the present we can take it that the system of empirical laws is not organic for Kant in the thoroughgoing way in which natural organisms are organic; there is not a complete similarity between the two. It is in fact, as we have seen, not so much that both are organic in the same way which leads him to suggest the possibility of an intelligent cause for both, as it is his belief that we can neither understand nor anticipate the possibility of a system of empirical laws by means of the categorial principles, nor of organisms by means of mechanical laws.

In the first Introduction Kant emphasizes, more than he does in the second, that the system of empirical laws is to be a *logical* system and that the principle of reflective judgement is a *logical* principle. He asserts that logic does not tell us anything about whether or not we will find in nature a number of objects sharing common characteristics but that

> 'this condition of the possibility of applying logic to nature is a principle of the representation of nature as a system for our judgement; a system in which the manifold, divided into genera and species, makes it possible, through comparison, to bring all existent forms of nature[1] to concepts of greater or lesser generality'. (Ak., XX, 211 n.)

Here, as in the Dialectic of the first *Critique*, Kant's use of the terms 'genera' and 'species' might lead one to suppose that he is concerned with the mere classification of the empirical data of nature; and to some extent this is true. But if we recall his account of the logical employment of reason in the first *Critique*, it will be apparent that classification is simply the first step in the construction of a deductive system which

[1] 'Forms of nature' (*Naturformen*) are, for Kant, particular natural objects, such as animals, trees, stones, planets, etc., as distinct from particular laws of nature.

will enable us to explain empirical facts. Moreover, although Kant speaks as if he were interested only in classifying particular *things* in nature, the emphasis he has placed on bringing empirical laws to systematic unity by ascending from the less to the more general shows that he sees the final result of this activity as the classification of empirical *laws*. But it will be a *logical* classification which enables us to deduce lower-level laws from higher ones and so explain them.

Since we must attempt to bring empirical laws into systematic *logical* unity, the principle of reflective judgement needs to be specified beyond the bare notion of the purposiveness of nature for our knowledge of it. 'The principle of reflective judgement, whereby nature is thought of as a system according to empirical laws, is merely a principle for the logical employment of judgement. Even though it originates as a transcendental principle, this is only for the purpose of viewing nature *a priori* as qualified to be logical system of variety under empirical laws.' (Ak., XX, 214) Consequently, 'the specific principle of judgement is therefore as follows: Nature specifies its universal laws into empirical laws in accordance with the form of a logical system, on behalf of the faculty of judgement'. (op. cit., 216) The import of this is similar to that of the aphorism 'God is a mathematician', except that for Kant it would seem to be more accurate to say that He is an Aristotelian logician.

In the first Introduction Kant goes on to say that although judgement must assume a purposiveness of nature 'in the specification of its forms through empirical laws', these forms themselves cannot for that reason be considered as purposive. 'It is only their *relation* to one another and their conformity to a logical system of empirical concepts, in spite of their great variety', which is thought of as purposive. (*ibid.*) We must, in other words, make a distinction between the purposiveness for our scientific knowledge of the system of relations which holds between particular things in nature and the purposiveness of any of those things themselves. The fact that we must presuppose the first kind of purposiveness does not give us grounds for supposing that the second will be found to exist. For, as Kant goes on to say, a purposive system of the empirical laws of nature is entirely possible without such particular purposive things. Stated in different terms, this simply means that no assumption which we may make about the regularity of the laws of nature will say anything about the character of the things which are subject to them. We can only discover the character of such things empirically.

In the second Introduction Kant makes only a passing allusion to this

point; but in the first Introduction he elaborates on it in some detail. Since it forms a transitional link with the discussion of organic purposiveness in the *Critique of Teleological Judgement*, it will be worthwhile to examine what he says about it here. He asserts that although nature conforms to our subjective requirement that we be able to bring empirical laws to systematic unity, 'this conformity does not, from its usefulness, lead to the inference of a real conformity in its products, i.e. it does not allow the bringing forward of individual things in the form of systems'. (Ak., XX, 217) For individual things could still be 'mere aggregates', while nonetheless having been produced in accordance with empirical laws which were purposively established. In other words, the fact that empirical laws are assumed to have been purposively organized into a logical system on behalf of our knowledge of them is no reason to make the further assumption that anything produced in accordance with them will, or must, be itself a purposive system, or even a system at all. Consequently, we are not called upon to assume that all particular things in nature are themselves systems which have been produced in accordance with an idea.

> 'In like manner we regard earth, stones, minerals, and similar things, as mere aggregates [*blosse Aggregate*] without any purposive form; but we nevertheless regard their inner character and grounds of cognition as so related to their possibility that they are useful for the classification of things in a system of nature according to empirical laws, without, however, indicating in themselves a systematic form.' (*ibid.*)

Nature may have arranged its particular objects in such a way that they are susceptible to systematic classification, and in that sense they can be considered to be purposive; but they need not for that reason be purposive *systems*.

We have already noted Kant's belief that a distinction must be made between particular things in nature which seem to be systematically organized and mere aggregates which do not. The need for such a distinction is based in his growing awareness that organisms form an exception to the general mechanical view of nature which it was partly the task of the first *Critique* to justify. But since Kant also believed that the only legitimate type of explanation open to us is mechanical explanation, the question immediately arises as to how we are to explain organisms, the defining characteristic of which is precisely their non-mechanical nature. The *Critique of Teleological Judgement* contains Kant's

definitive treatment of this question; but some of his remarks about it in the present context are worth noting.

Kant proceeds to introduce a new term, 'absolute purposiveness' (*absolute Zweckmässigkeit*), which he defines as follows: 'By an absolute purposiveness of the forms of nature I understand an external configuration or inner structure which is so constituted that our judgement must base its possibility on an idea.' (Ak., XX, 217) In the present context the implicit contrast is between the purposiveness of the system of empirical laws, which could be called 'logical purposiveness',[1] and the purposiveness of particular things in nature. Kant now turns his attention for the first time to the second kind of purposiveness. He suggests that we encounter certain natural objects, namely organisms, which do not appear to be the result of the blind operation of the mechanism of nature but which seem to have been intelligently designed. Consequently, we may, and perhaps even must, make a distinction between two different ways of estimating (*beurteilen*) natural objects. We must estimate that

> 'in respect of its products as aggregates, nature behaves mechanically, as mere nature; but in respect of them as systems, e.g., in the formation of crystals, all kinds of forms of flowers, or in the inner structure of plants and animals, nature proceeds technically,[2] i.e., as in art'. (*ibid.*)

Later on, Kant contrasts the technique and the mechanism of nature in a more precise way when he says:

> 'I give the name "technique of nature" to its causality in respect of the form of its products as purposes [*Zwecke*]. This is opposed to the mechanism of nature which consists in its causality through the connection of the manifold without its type of unity being based on any concept.' (op. cit., 219)

This distinction, and Kant's reasons for drawing it, should be fairly familiar by now; it is related to his settled view that systems of any kind are so organized that it is incomprehensible to us how they could have come into existence through the mechanical operation of nature, and therefore they seem to demand an intelligence as their cause. He is careful to point out, however, that the principle of a technique of nature

[1] H. W. Cassirer uses this term. See his *A Commentary on Kant's 'Critique of Judgment'*, London 1938, pp. 123–36, *passim*.

[2] Earlier in the first Introduction Kant announced that he would use the term 'technique' in cases where particular things in nature are judged by us as if their possibility depended on an art. (Ak., XX, 200)

cannot be used to *explain* organisms, since it is not an objective principle, but only a subjective one which reflective judgement must use to *estimate* them.[1] That is to say, reflective judgement, whose task it is to classify particular things in nature in order to bring them under a system of empirical laws, encounters certain things which seem incapable of being treated as mechanically produced like the rest of nature. Yet their existence demands that some attempt be made to understand them, and since this is impossible on mechanical grounds, judgement resorts to the only other type of causality we know, the causality of an intelligence. However, as Kant goes on to say, it is quite conceivable, so far as we are able to know, that one and the same object *may* be capable of being explained (*erklärt*) mechanically but, since we cannot understand how this could be possible, must be estimated (*beurteilt*) as the result of a technique of nature. I shall have more to say later about Kant's belief that there is no incompatibility in conceiving an organism as perhaps ultimately capable of mechanical explanation. But for the present it will be helpful to have a more general idea of what he is saying here.

It is apparent by now that when Kant talks about reflective judgement, he is talking about the activity of attempting to discover empirical laws which will explain the detail of nature; he is talking about scientific inquiry. He has stated and attempted to justify the presupposition on which this activity rests. But he also believes that in the course of our investigations of nature we will discover certain things whose character makes them immune to mechanical explanations. The empirical laws which we attempt to find and systematize are, in fact, mechanical laws which are concerned only with those characteristics of objects which are capable of mathematical treatment. Everything in nature, whether a system or an aggregate, an animal body or a stone, is subject to them. Thus, for example, an animal and a stone are both subject to the law of falling bodies, and in that sense there is no real

[1] Whenever Kant talks about the possibility of an objective explanation, for example a mechanical explanation, he uses the word *erklären*. When talking about the possibility of reaching an understanding of organisms, however, he uses the word *beurteilen*, which means 'to estimate or form an opinion of'. *Beurteilen* is vaguer even than *urteilen*, which carries connotations of a more definite conclusion. In order to emphasize the contrast with *erklären*, which is always implicit in Kant's use of *beurteilen* when speaking of investigations of organic life, I have translated the latter term throughout as 'estimate', even though this may sound somewhat awkward.

difference between them.[1] But when we examine the structure of animals and stones we find that they differ in a striking and important way. Stones are simply aggregates of externally related parts, while the parts of animals seem to be related, not just externally, but through some inner principle of organization. Kant believes that if something is entirely the result of the operation of mechanical laws, then it is the result of the chance or haphazard combining of its parts. The particular character of one part is neither determined by, nor does it determine, that of any other. Such things as earth, stones, and minerals, are, for Kant, things which could have resulted simply from the random combining of their parts. Organisms are strikingly different; their parts do not seem to have been thrown together at random but to have been determined by an over-all plan of what the whole would be like. Consequently, in trying to understand the nature and existence of organisms, we are forced to regard nature as if it were an artist or craftsman which has produced a designed product. We do not, and cannot, *explain* any organism in this way, since, as Kant says later, 'experience can exhibit purposes; but it cannot prove in any way that these are also intentions'. (Ak., XX, 234) But he believes that this way of looking at organisms is a necessary first step to any understanding of them.

All this leads to a paradoxical conclusion. The laws of nature, which we presuppose to have been purposively designed so that we can systematize them, are mechanical laws; but even if it were a fact that such laws were designed so that they would fit into a logical system, this would not entail that they operate purposively. Kant believes that they in fact operate blindly, and, so far as we can see, produce only aggregates of externally related parts; we cannot comprehend, or even imagine, how they could have produced organic systems. It is because

[1] Organisms, like everything else in nature, are objects of experience and so are subject to the categorial principles. To this extent organisms are no different from other physical objects. But despite the fact that they are subject to the categories, Kant believes that there are certain features of organisms which, so far as we can see, cannot be accounted for mechanically; and hence, if we are to reach any understanding of such features, and of the whole organism which exhibits them, we must attempt to apply another kind of principle, the teleological principle. Kant is not casting into doubt the application of the categorial principles to organisms as objects of experience, but simply our ability to explain them on mechanical lines. Cf. *Critique of Practical Reason* (Ak., V, 97), '. . . all events in time according to natural law can be called the "mechanism of nature", even though it is not supposed that things which are subject to it must really be material machines'.

mechanical laws work blindly that we must approach things which are not mere aggregates in some other way. Thus we get a paradoxical split between a system of purposively organized empirical laws and the particular purposive things which we cannot imagine being produced by them. Mechanical laws, in other words, do not work purposively, and even if they did we could not understand it. In view of his firm attachment to Newtonian physics, and the elimination of final causes from physics, Kant could not consistently have reached any other conclusion. But the upshot of calling the operation of the only scientific laws we know *blind*, is that, so long as organisms are, we might almost say *defined as*, the result of the operation of laws which are *not* blind, then they will never be capable of scientific explanation.[1] This is, in fact, the position which Kant explicitly adopts in the *Critique of Teleological Judgement*; but it is already implicit in the present context. There is an irreconcilable dualism in his view of nature, irreconcilable, that is, so long as he clings to the doctrine that the only objective principles we possess are mechanical, and that organisms are by their very nature entirely non-mechanical. The essence of Kant's view seems to be that if we are to get any insight into the nature of organic life, we must approach it differently from the way we approach particles of matter moving in accordance with mathematical laws. We can never hope to understand organisms unless we do, and would, in fact, entirely fail to recognize their essential nature if we did not.

[1] Cf. the Introduction to the *Critique of Teleological Judgement* (360) where, in talking about the structure of a bird, Kant says that 'nature, regarded as mere mechanism, could have fashioned itself in a thousand different ways without lighting precisely on the unity based on a principle like this, and ... accordingly, it is only outside the conception of nature, and not in it, that we may hope to find the least ground *a priori* for that unity'.

6

THE ANALYTIC OF TELEOLOGICAL JUDGEMENT

I. EXTERNAL AND INTERNAL PURPOSIVENESS

Kant has already given some indication of what he considers to be the peculiar character of organisms which requires us to approach them differently from mechanical aggregates. In the Analytic of Teleological Judgement, which forms the first main division of the *Critique of Teleological Judgement*, he subjects their character to a more detailed analysis than he has previously done. He distinguishes at the outset between four different kinds of purposiveness, only two of which are of interest to us here. The two kinds in question are what he calls 'relative' (*relative*) and 'internal' (*innere*) purposiveness of nature.[1] In the course of his analysis he makes it clear that, like Hume, he does not believe the watch analogy to be adequate as a model for understanding organic life and that he sees as clearly as Hume did that animals and vegetables are quite unlike machines. It will be necessary to follow his analysis in some detail.

Kant begins by asserting that experience leads us to the notion of a purpose of nature whenever we are confronted with something whose existence we cannot comprehend other than by basing it on an idea:

'Now this can be done in two ways: we may regard the effect as being,

[1] The distinction might better have been drawn either between relative and absolute purposiveness, which would have retained the terminology of the first Introduction where Kant introduced and defined the latter term, or between external and internal purposiveness. In fact, however, in the course of his present discussion he uses 'external [*äussere*] purposiveness' as a synonym for 'relative purposiveness', and 'internal purposiveness' as a synonym for 'absolute purposiveness'. See also Sec. 82 of the *Critique*.

as it stands, an art-product [*Kunstprodukt*], or we may only regard it as what other possible natural creatures [*Naturwesen*] may employ for the purposes of their art. We may, in other words, look upon the effect either as an end [*Zweck*], or else as a means which other causes use in the pursuit of ends. The latter purposiveness is termed utility, where it concerns human beings, and adaptability where it concerns any other creatures. It is a purely relative purposiveness. The former, on the contrary, is an internal purposiveness belonging to the thing itself as a natural object.' (63 : 367)

Both kinds of purposiveness are such that they might at first sight appear to depend upon an intelligence which planned them to be the way they are. But there, Kant believes, the resemblance ends.

Kant deals with relative or external purposiveness first. Certain natural things and arrangements are such that we might be tempted to think that they had been planned for the benefit of mankind or of other living things in nature. To use Kant's own examples, in the course of time rivers deposit large amounts of sediment at their mouths, thus increasing the extent of arable land which is useful for man. Similarly, it might seem as if grass exists for the sake of the herbivora, which in turn exist for the sake of the carnivora, and so on. Or, to take yet another case, when the primeval sea receded from the land, it left behind large tracts of sandy soil in northern regions, thus producing conditions favourable for the growth of extensive pine-forests. However, the utility of certain things for man, and the adaptability of others for other natural creatures, is no basis on which to regard these things as themselves objectively purposive – 'as if the sand, as such, could not be conceived as the effect of its cause, the sea, unless we made this cause look to a purpose, and treated the effect, namely the sand, as an art-product [*Kunstwerk*]'. (63 : 368) Such things possess merely a *relative* purposiveness, which is, so far as we can see, only contingently connected with them. For although it is true that, for example, 'various kinds of grass, considered in their own right, are to be estimated as organized products of nature, and therefore as things of art [*kunstreich*], yet in relation to the animals that feed on them, they are to be regarded as mere raw material'. (*ibid.*) Moreover, it would not be safe to infer that natural things which are used by man were designed for that purpose, because 'man's reason informs him how to adapt things to his own arbitrary whims, whims for which he was not himself at all predestined by nature'. (*ibid.*)

Kant concludes that the utility or adaptability of a thing for other

things can be regarded as a relative or external natural purpose only on the condition that the thing to which it is immediately or mediately useful is itself an objective purpose of nature.[1] But we can never decide this from the study of nature alone. 'Hence it follows that relative purposiveness, although on a certain hypothesis it points to a natural purpose, does not warrant any absolute teleological judgement [*absolutes teleologisches Urteil*].' (63 : 369)[2] That is to say, we have no warrant for asserting that just because something in nature is useful to man or adapted to other creatures, it was therefore designed with such usefulness or adaptation in mind. I shall return later to Kant's further treatment of relative purposiveness; but first it is necessary to examine his analysis of absolute purposiveness with which he later contrasts it.

Much of what Kant says here about absolute purposiveness will be familiar by now, since he repeats points from the Introduction which we have already examined. Thus he begins his analysis by stating quite categorically that:

> 'A thing is possible only as a purpose where the causality to which it owes its origin must not be sought in the mechanism of nature, but in a cause whose capacity of acting is determined by conceptions. What is required in order that we may perceive that a thing is only possible in this way is that its form is not possible on purely natural laws, i.e., laws which can be known by us through the understanding alone when applied to objects of sense; but that even the empirical knowledge of it, as regards its cause and effect, presupposes concepts of reason.' (64 : 369–70)

[1] Cf. 82 : 425. 'By external purposiveness I mean that which exists where one natural thing serves another as means to an end. Now even things which have no internal purposiveness, and whose possibility presupposes none, e.g., earth, air, water, and so forth, may nevertheless be very purposive externally, that is, in relation to other beings. But the latter must always be organized beings, that is, be natural purposes; for otherwise the former could not be estimated as means to them. Thus water, air, and earth, cannot be considered as means to the growth of mountains, since mountains contain in themselves nothing that requires a ground of their possibility according to purposes.'

[2] Kant uses two terms, *Naturzweck* and *Zweck der Natur*, which, I have translated as 'natural purpose' and 'purpose of nature' respectively. They are not synonymous terms. He generally uses the first when talking about living organisms *per se*, and sometimes when talking about apparently purposive connections in nature. He uses the second term when discussing the possibility that an organism, or something else, might in fact be an intentional purpose of nature. Meredith translates *Naturzweck* as 'physical end' and *Zweck der Natur* as 'end of nature'.

Kant goes on to emphasize what is by now his standard position, namely, that the form of such a thing is entirely contingent as far as the mechanical laws of nature are concerned. We cannot see that such a form was necessary in any way, which is tantamount to saying that we cannot comprehend the conditions which produced it. It is, in fact, the very contingency of the form of some natural things which leads us to suppose that they could have resulted only from an intelligence. What, then, are the peculiar features, which some natural forms are found to possess, which require us to regard them as purposive, or, as Kant otherwise puts it, as natural purposes?

Kant now offers a 'provisional' definition of a natural purpose. He says, 'a thing exists as a natural purpose *if it is* (though in a double sense) *both cause and effect of itself*'. (64: 370: Kant's emphasis) He then proceeds to illustrate what this means, using a tree as an example, before going on to give a complete analysis of a natural purpose. In the first place, a tree produces or generates (*zeugt*) another of the same genus and thus might be said to preserve its genus, which in turn can be regarded as both cause and effect, 'continually generated from itself and likewise generating itself'. (64: 371) Secondly, a tree not only produces a member of the same genus; it also produces itself as an individual. For in the course of growth it assimilates and organizes matter from outside itself in such a way that the whole process can be considered to be one of self-production. In the organization of the raw material which it receives into itself,

> 'we find an original capacity for selection and construction on the part of natural beings of this kind such as infinitely surpasses the efforts of art, if the attempt is made to reconstitute those products of the vegetable kingdom out of the elements which it obtains through their analysis, or else out of material which nature supplies for their nourishment'. (*ibid.*)

Growth, as Kant says, must be understood as 'totally different from any increase according to mechanical laws'. (*ibid.*) Thirdly, the parts of a tree are dependent on the whole, and *vice versa*. The leaves, for example, are produced by the tree; but at the same time they conserve it, in the sense that repeated defoliation would kill it. Moreover, if a part of a tree is injured, the defect is made good by the other parts:

> 'the abortions or malformations in growth, where, on account of some chance defect or obstacle, certain parts adopt a completely new formation, so as to preserve the existing growth, and thus produce an

anomalous creature [*anomalisches Geschöpf*] . . . are among the most wonderful properties of the forms of organic life'. (64: 372)[1]

Kant thinks that, despite the tree illustration, the notion of a natural thing being both cause and effect of itself is 'somewhat inexact and indeterminate'. He proceeds, therefore, to subject what he calls 'natural purposes' to a detailed analysis. The section in which he presents his analysis is entitled 'Things considered as natural purposes are organized beings [*organisierte Wesen*]'. (65: 372) However, in what follows I shall refer to the objects of his discussion as 'organisms', thereby avoiding the rather unwieldy alternatives.

He begins his detailed analysis by drawing a distinction between two kinds of causal connection, the connection of efficient causes and that of final causes (*Endursachen*). The series of efficient causes is a progressive one; that is to say, causes produce their effects, but the effects cannot be regarded as in any way the causes of what has produced them. The series proceeds from causes of effects, and not the reverse. This does not seem to be the case, however, with the series of final causes. The latter series 'would be one in which the thing that for the moment is designated effect deserves none the less, if we take the series regressively, to be called the cause of the thing of which it was said to be the effect'. (*ibid.*) A series of final causes appears to involve 'regressive as well as progressive dependency'. (*ibid.*) For instance, a house is the cause of the money which is received as rent; but, at the same time, the thought of

[1] On this last point, cf. E.S. Russell: 'Coming to a definite end or terminus is not *per se* distinctive of directive activity, for inorganic processes also move towards a natural terminus. . . . What *is* distinctive is the active persistence of directive activity towards its goal, the use of alternative means towards the same end, the achievement of results in the face of difficulties.' (from *The Directiveness of Organic Activities*, Cambridge 1945, p. 144, quoted by R.B. Braithwaite in *Scientific Explanation*, Cambridge 1953, p. 329) Braithwaite calls this distinctive feature of directive activity 'the "plasticity" of goal-directed behaviour'. He says, 'plasticity is not in general a property of one teleological causal chain alone; it is a property of the organism with respect to a certain goal, namely that the organism can attain the same goal under different circumstances by alternative forms of activity making use frequently of different causal chains'. (*ibid.*) For example, 'an animal can move to get its food in many ways, a great variety of physiological processes can be called into play to repair damaged tissue, a bird can adapt its nest-building to the kind of material available'. (*ibid.*, p. 331) It is this feature of being able to attain an end-state under different circumstances and in the face of difficulties, which Braithwaite considers to be the criterion of 'teleological causal chains' as opposed to those which are non-teleological. Kant has put his finger on a similar point.

the rent which would be derived from it was the cause of the building of the house. Kant's reasons for introducing this distinction are not readily apparent in the present context and do not become so until later. Before continuing with his analysis of organisms, however, it is interesting to note some of the comments of a contemporary philosopher of science on the reversibility of the series of final causes.

R. B. Braithwaite points out that teleological explanations 'have one feature which distinguishes them from causal explanations, and that this feature has proved very puzzling to philosophers, whether concerned with philosophical psychology or with the philosophy of biology':

> 'In a causal explanation the explicandum is explained in terms of a cause which either precedes or is simultaneous with it: in a teleological explanation the explicandum is explained as being causally related either to a particular goal in the future or to a biological end which is as much future as present or past. It is the reference in teleological explanations to states of affairs in the future, and often in the comparatively distant future, which has been a philosophical problem ever since Aristotle introduced the notion of "final cause".' (*Scientific Explanation*, p. 324)

However, Braithwaite goes on to say, in one type of teleological explanation, the reference to the future does not present any difficulty. This is where we give an explanation in terms of human intention; such explanations are 'reducible to causal explanations with intentions as causes'. Braithwaite admits that such explanations present a difficulty for philosophical psychology; but they present none in dealing with the problem of how a reference to the future can occur in an explanation:

> 'The difficulty about the future reference occurs . . . in all teleological explanations which are not reducible to explanations in terms of a conscious intention to attain the goal. Here one cannot obviously reduce the teleological answer, which explains a present event by means of a future event, to a non-teleological answer in terms of a present or past cause. It is teleological explanations which cannot obviously be so reduced which present the philosophical problem.' (op. cit., p. 325)

An example of a teleological explanation which is not reducible to an explanation in terms of a conscious intention to attain a goal would be: 'The heart beats in order to circulate the blood.' The present event, the beating of the heart, is explained by reference to a future event – the circulation of the blood. Apparently Kant does not see any problem in a teleological explanation which appeals to conscious human intentions,

since he tries later to come to terms with, and make some sense of, organisms by suggesting the *possibility* of an intention as their cause, albeit one based in a non-human intelligence. That is to say, organisms seem to him to depend on some notion of what they were intended to be, and he can deal with this future reference only by retaining the notion of an intention and making it the possible cause of the organism. It is in this way that he attempts to avoid the problem of future reference. This will have to be qualified in the light of what Kant says later about the possibility and status of teleological 'explanations'; but it will be worthwhile to remember that this is the line on which he is proceeding.

The first feature of an organism is

> 'that its parts, both as to their existence and form, are only possible by their relation to the whole. For the thing is itself a purpose [*Zweck*], and is, therefore, comprehended under a concept or an idea that must determine *a priori* all that is to be contained in it.' (65 : 373)

This again is a repetition of a point which Kant has already stated a number of times. Organisms are systems whose parts are so intimately interrelated that they appear to depend on an idea or plan of what the whole was to be like. However, as he goes on to point out, this is not a sufficient characterization of what is peculiar about *organisms*, since a thing could satisfy this condition and yet be nothing but a work of art. That is to say, it could be

> 'the product of an intelligent cause, distinct from the matter or parts of the thing, and one whose causality, in bringing together and combining the parts, is determined by its idea of a whole made possible through that idea, and consequently, not by external nature'. (*ibid.*)

A watch, or most other artifacts, would satisfy this first condition.

But if an organism is to be regarded as a product of *nature*, and thus as possible independently of an intelligent cause which is distinct from it, a further condition must be fulfilled:

> 'It is necessary for this that its parts should combine to form the unity of a whole by being reciprocally causes and effects of each other's form. For only in this way is it possible that the idea of the whole should conversely (reciprocally) determine the form and combination of all the parts: not as cause – for then it would be an art-product – but as the cognitive ground [*Erkenntnisgrund*] for estimating the systematic unity of the form and combination of all the manifold contained in the given material.' (*ibid.*)

There are two important points in this rather obscure passage. The

first is that if we are to get rid of the notion of an external cause, then we must regard organisms as themselves producing their characteristic organization and unity. The reciprocal interaction of the parts of an organism must be responsible for the form taken by the whole, and, conversely, what the whole is to be must in turn determine the way in which the parts will interact on one another to produce it.[1] The second point is that the idea of what the organism is to be must not be regarded as its cause; for, since ideas exist only in minds, that would be to make organisms dependent on an *external* cause. But nonetheless, Kant believes that the idea of the whole can be used *by us* as a basis for reaching some understanding of why the parts interact and organize themselves the way they do. He does not, however, say that the idea can be used to *explain* the organism, but only that it gives *some* insight into the reasons for its internal structure being what it is. This, at least, is Kant's official doctrine. Here, as in the Dialectic of the first *Critique*, the idea of the whole functions only regulatively or methodologically; it has no explanatory role to play.

We have seen that, for Kant, all systems *appear* to depend on an intelligent cause. In the above passage, for the first time, he clearly distinguishes organisms from all other systems by pointing out that they produce their own organic unity. However, although he believes that organisms cannot be regarded as art-products, that is, as the planned products of a mind, he continues to hold that we must consider them *as if* they depend on an idea in the mind of a non-human intelligence. Thus he goes on to say that the parts of an organism

> 'must in their collective unity reciprocally produce one another alike as to form and combination, and thus by their causality produce a whole, the conception of which, conversely – in a being possessing a causality according to conceptions that is adequate for such a product – *could* in turn be the cause of the whole according to a principle'. (65 : 373 : my emphasis)

This might seem to be taking back with one hand what has been

[1] Cf. *Dialogues*, pp. 170–1, where Hume gives his reasons for comparing the universe to an animal or other organism. 'Now if we survey the universe, so far as it falls under our knowledge, it bears a great resemblance to an animal or organized body, and seems actuated with a like principle of life and motion. A continual circulation of matter in it produces no disorder: A continual waste in every part is incessantly repaired: The closest sympathy is perceived throughout the entire system: And each part or member, in performing its proper offices, operates both to its own preservation and to that of the whole.'

given by the other. But we shall find that the status and explanatory role of this non-human intelligence is, officially at least, entirely regulative for Kant. That he continues to require it, even regulatively, is due to the fact, already mentioned, that it was the only way in which he could deal with the difficulty presented by the need for a future reference in understanding the development of organisms. What they *are to be* seems to determine in some way the lines along which their parts develop; and, as it stands, this feature of organisms appears to have been an utter mystery to Kant. He could not give it a non-teleological explanation in terms of a present or past cause, because the degree to which biology had developed in his day would not allow it; moreover, for him this would have been to give a mechanical explanation, and he could not conceive how any mechanical explanation would do.[1] Nor could he come to terms with it by appealing to a conscious intention in the parts of an organism to attain a goal. Consequently, the only course open to him was to appeal to a *possible* intention in the mind of a *possible* being who knew what organisms were to be and so arranged things that they would develop inevitably in that direction.

II. THE TELEOLOGICAL PRINCIPLE FOR ESTIMATING ORGANISMS

The two defining characteristics of an organism, then, are that its parts are possible only by their relation to the whole and, what is most important, that they reciprocally produce one another. This is quite different from the way in which the parts of a human artifact, such as a

[1] Kant never wavers in his conviction that organisms are entirely contingent as far as mechanical laws are concerned. In *The Explanation of Behaviour* Charles Taylor expresses the reason for this conviction even more clearly than Kant does. Taylor asks: 'What . . . does it mean to say that human, or animal, behaviour is purposive?' Except that Taylor is concerned with organic behaviour rather than with organic structure, his answer to the question would have been quite acceptable to Hume, Kant, and the overwhelming majority of eighteenth-century thinkers. He says: 'Central to this claim would seem to be the view that the order or pattern which is visible in animate behaviour is radically different from that visible elsewhere in nature in that it is in some sense self-imposed; the order is itself in some way a factor in its own production. This seems to be the force of the rejection of "blind accident": the prevalence of order cannot be accounted for on principles which are only contingently or "accidentally" connected with it, by laws whose operation only contingently results in it, but must be accounted for in terms of the order itself. . . . The point, then, could perhaps be put in this way: the events productive of order in animate beings are to be explained not in terms of other unconnected antecedent conditions, but in terms of the very order which they produce.' (p. 5)

watch, function. In a watch one part moves another, but it is not the efficient cause which produces another part. Secondly, although one part is present for the sake of the others, and of the whole, it does not come into existence through their agency. Moreover, the cause which produces a watch is an external one; it is not contained in the material of which the watch is composed.

> 'Hence one wheel in the watch does not produce the other, and, still less, does one watch produce other watches, by utilizing (organizing) foreign material; hence it does not of itself replace parts of which it has been deprived, nor, if these are absent in the original construction, does it make good the deficiency through the aid of the rest; nor does it, so to speak, repair itself if it goes out of order. But these are all things which we are justified in expecting from organized nature. An organized being is, therefore, not a mere machine. For a machine has only moving power, whereas an organized being possesses inherent formative power [*bildende Kraft*], and such, moreover, as it can impart to material which is devoid of it – material which it organizes. This, therefore, is a self-propagating formative power, which cannot be explained by the capacity of movement alone, that is to say, by mechanism.' (65 : 374.)

Kant has thus clearly rejected the watch analogy as adequate for the understanding of organic life. Hume, it will be recalled, suggested in the *Dialogues* that organisms have an internal principle of organization which makes them totally unlike machines. He thereby drew a clear distinction between two different kinds of purposive objects, those whose source of organization is external to them, such as watches and houses, and those which are self-organizing, such as animals and vegetables. Kant is here drawing the same distinction:

> 'We do not say half enough of nature and its capacity in organized products when we speak of this capacity as being the analogue of art. For what is here present to our minds is an artist – a rational being – working from without. But nature, on the contrary, organizes itself, and does so in each species of its organized products – following a single pattern, certainly, as to general features, but nevertheless admitting deviations calculated to secure self-preservation under particular circumstances. We might perhaps come nearer to the description of this impenetrable property if we were to call it an *analogue of life* [*Analogon des Lebens*].' (*ibid.*)

There is, in this passage, more than an echo of Hume's conclusion

that 'the world plainly resembles more an animal or a vegetable, than it does a watch or a knitting-loom'. (p. 177) And, like Hume, Kant admits that the capacity of nature for self-organization is basically a mystery – an 'impenetrable property' (*unerforschlichen Eigenschaft*), or, as he otherwise expresses it, 'strictly speaking, the organization of nature has nothing analogous to any causality known to us'. (65 : 375)

Although the self-organizing capacity of organisms is mysterious, they are nonetheless facts of nature, and we must attempt to understand them and give some account of them. Kant therefore states what he calls 'the principle on which the internal purposiveness of organisms is estimated'. (66 : 376)[1]

> 'This principle, the statement of which serves as a definition of organisms, is as follows: *an organized product of nature is one in which every part is reciprocally both end* [*Zweck*] *and means*. Nothing in it is in vain, without a purpose [*Zwecklos*], or to be ascribed to a blind mechanism of nature.' (*ibid.*: Kant's emphasis)

The principle, which could be called 'the teleological principle according to which organisms must be investigated', is not derived from experience, although experience may provide the occasion for adopting it. For Kant believes that it ascribes universality and necessity to the purposiveness which we encounter in organisms and that, like any similar principle, it must be *a priori*. But it is only a *regulative a priori* principle, since

> 'it may be that the purposes in question only reside in the idea of the person forming the estimate, and not in any efficient cause whatever. Hence the above principle may be called a *maxim* for estimating the internal purposiveness of organisms.' (*ibid.*)

What he means in calling the principle *a priori* is brought out in what follows. He tells us that people who dissect plants and animals in order to investigate their structure and see why they are provided with the parts they have, why the parts are arranged as they are, and what end is served by them, 'assume as indisputably necessary the maxim that nothing in such a creature is *in vain*'. (*ibid.*) In making this assumption, Kant believes, they are doing the same kind of thing which is done by the natural scientist in assuming 'the fundamental principle of general natural science, that *nothing* happens *by chance* [*von ungefähr*]'. (*ibid.*)

[1] *Vom Prinzip der Beurteilung der inneren Zweckmässigkeit in organisierten Wesen.*

> 'They are, in fact, quite as unable to free themselves from this teleological principle as from the general physical one. For just as the abandonment of the latter would leave them without any experience at all, so the abandonment of the former would leave them with no guiding thread [*Leitfaden*] to assist their observation of a species of natural things which we have conceived teleologically under the conception of natural purposes.' (*ibid.*)

Initially, perhaps the most puzzling thing about this passage is the fact that Kant calls the principle that nothing happens by chance or accident, 'the fundamental principle of general natural science'. However, in discussing the third postulate of empirical thought in the first *Critique*, he declared that 'the proposition that nothing happens through blind chance [*durch ein blindes Ungefähr*] . . . is an *a priori* law of nature'. (B280) He also declared that it is 'really a consequence of the principle of causality, and so belongs to the analogies of experience'. (B281) That is to say, the assertion of the causal principle is the denial of blind chance in nature. It is clear that in the passage cited above, Kant has identified the causal principle with the proposition that nothing happens by chance, and that is why he calls it the fundamental principle of natural science. This, in itself, is not surprising, since there seems to be little real difference between them.

What is surprising is his assertion that biological investigation can as little do without the teleological principle as scientific investigation can do without the causal principle.[1] However, in saying this, he is not placing them on the same footing. He has already called the teleological principle 'regulative', whereas the causal principle is a condition of objective experience. As he says in the present passage, without the latter principle we would have no experience at all. What Kant is claiming is that the two principles are necessary as *methodological* principles. If the natural scientist were to admit that things could happen by chance, which for Kant means 'without a cause', then there could be no natural science; there would be no data for him to investigate. Similarly, in dealing with organisms, we must assume that none of their parts is without a purpose; we must examine them as if this were the case. If we do not, we will entirely miss their essential nature as organisms, which

[1] Compare the passage from the *Vorarbeit zu Über den Gebrauch teleologischer Prinzipien in der Philosophie*, where he says, 'To assume that any part of a creature which is always present in the species is without purpose, is just like assuming that any occurrence in the world has come about without a cause' (see above, pp. 64-5).

Kant has already analysed.[1] The interaction of parts and whole which is typical of organisms will be surrendered. Once it is admitted that anything in an organism can be without a purpose, then there is no reason not to suppose that everything in them is ultimately without a purpose; and that, for Kant, would be to give up any hope of understanding their organic nature. If organisms are to be in any sense *natural purposes* (*Naturzwecke*), which is his standard position regarding them, then everything within them must have a purpose.

Kant's further reason for believing that all the parts of an organism must have a purpose is that organisms, like all systems, appear to depend upon an idea or plan which determines the character, position, and relation of all their parts. He has already told us that we must consider organisms as if they depend on an idea in the mind of a non-human intelligence, because, as he repeats again here, we cannot conceive how the 'mere mechanism of nature' could be responsible for the thoroughgoing organization which we find in them. This means that if we are going to approach organisms as if they were designed, then we must treat every feature in them as part of the design. The purposes which might have determined the character of the design must be reflected in everything within the organism itself:

> 'For if once we lift such an effect out of the sphere of the blind mechanism of nature and relate it *as a whole* to a supersensible ground of determination, we must then estimate it throughout on this principle. We have then no reason to regard the form of such a thing to be still partly dependent on mechanism, for by such a confusion of heterogeneous principles no reliable rule of estimation would be left.' (66:377)

When Kant says that we must presuppose that no part of an organism is without a purpose, what he is really saying is that we must presuppose that every part serves some essential function. The word '*Zweck*', which I have translated as 'purpose', also carries with it connotations of function – but *designed* function. That Kant is talking about every part of an organism having a function becomes plain when he says that people who dissect plants and animals are interested in finding out the reasons

[1] Cf. Kant's remark later, when he says: 'in respect of those natural products that can only be estimated as designedly formed in the way they are and not otherwise, this maxim of reflective judgement is essentially necessary, if only to have empirical knowledge of their inner constitution. For the very thought of them as organized things is impossible unless we associate it with the thought of their designed production [*Erzeugung mit Absicht*].' (75:398)

why, and the purposes for which, they were provided with such and such parts. That is, they want to find out what *function* is fulfilled by the parts, both in relation to other parts and to the whole. Contemporary biologists are able to ask what purpose is served by a part of an organism without assuming that it was designed, and in asking this, they are simply asking for an account of what the part does. But Kant does not seem to have been able to make a distinction between designed and undesigned function. If a part of an organism serves some essential function, then, he believes, there is reason to suppose that it was designed for that function; the function must be the purpose the part was somehow *intended* to fulfil. Thus, although Kant has clearly pointed out that organisms are peculiar in that they produce themselves, he is nevertheless still in the grip of the design-designer analogy to the extent that he believes that we cannot understand organisms unless we regard them *as if* they were products of a designing mind.

Kant admits that many parts of an animal body, such as skin, bones, and hair, might be conceived as concretions (*Konkretionen*) brought about by mechanical laws. But although this is possible, 'the cause which accumulates the appropriate material, modifies and fashions it, and puts it in its proper place, must always be estimated teleologically'. (*ibid.*) That is to say, although such a cause may have employed mechanical techniques to produce certain parts of an organism, it has done so for a purpose, and hence we must estimate it as if it had acted purposively. Consequently, we must regard everything in an organism as organized, and every part as an organ in relation to the whole.

III. TELEOLOGY AND PHYSICAL SCIENCE

We saw earlier that the external or relative purposiveness of natural objects gives us no reason to suppose that they are purposes of nature, or for treating what Kant calls 'their contingently purposive effects' (*zufällig zweckmässige Wirkungen*) as the grounds of their existence. For although we must assume that every part of an organism serves a purpose or performs a function in relation to other parts and to the whole, we need not assume that any organism or other natural object was intended to serve a purpose in relation to other things in nature. In a section entitled 'The principle on which nature in general is estimated teleologically as a system of purposes' (67 : 377), Kant returns to the subject of relative purposiveness.

He asserts that the fact that rivers facilitate inland commerce and

mountains contain the sources of rivers does not mean that rivers or mountains are, like organisms, in themselves such that we can conceive them to be possible only by assuming a purposive cause. The same applies even to plants and animals when considered simply as things which man can turn to his own various ends. 'The external relationship of things which we have no reason to regard as purposes in their own right can only be hypothetically estimated as purposive.' (67 : 378) This is a repetition of the earlier point that we can regard the adaptability of one thing in nature for another as a relative purpose of nature only if we know that the thing to which it is adapted is itself an objective purpose of nature. But this is something which Kant believes we can never know.

Kant goes on to state that to estimate something as a natural purpose (*Naturzweck*) in virtue of its internal form is quite different from regarding the real existence of the thing as a purpose of nature (*Zweck der Natur*).[1] In order to do the latter, we should have to know what is the final purpose of nature (*Endzweck der Natur*), and that is beyond any teleological knowledge we have of nature, because, as Kant puts it, in order to discover the purpose of the existence of nature itself, we should have to go beyond it.

> 'That the origin of a simple blade of grass is only possible on the rule of purposes is, to our human critical faculty, sufficiently proved by its internal form. But let us lay aside this consideration and look only to the use to which it is put by other natural beings, which means that we abandon the study of its internal organization and look only to external adaptations to purposes. We see then that the grass is required as a means of existence by cattle, and cattle similarly by man. But we do not see why after all it should be necessary that men should in fact exist.' (*ibid.*)

It is only *organized* matter *per se* which leads us to the notion of a natural purpose, because it alone possesses a purposive form which is due entirely to nature, and one which is purposive quite independently of any contingent use to which it may be put by other creatures. But Kant nonetheless believes that, once we have gone this far, the conception of certain things as natural purposes leads us necessarily to the idea of the whole of nature as a purposively ordered system. To this idea 'the whole mechanism of nature has to be subordinated on principles of reason, at least for the purpose of testing phenomenal nature by this

[1] Here Kant has distinguished between '*Naturzweck*' and '*Zweck der Natur*' in the way suggested above, p. 100 n. 2.

idea'. (67: 379) The principle of reason is, however, only a subjective principle or maxim which can be used regulatively in investigation: 'Everything in the world is good for something or other; nothing in it is in vain.' (*ibid.*) The fact of organic purposiveness justifies us in following this principle and in expecting the whole of nature to be purposive; it even encourages us to do so.

This is reminiscent of Kant's conclusion, in the Dialectic of the first *Critique*, that the highest form of systematic unity to which knowledge can be brought is the purposive unity of things. There he argued that the idea of God can be used regulatively in the systematization of knowledge and that, working under the guidance of such an idea, we may reach 'altogether new views as to how the things of the world may be connected according to teleological laws, and so . . . arrive at their greatest systematic unity'. (B714–15)[1] However, he also argued that, since we have no insight whatever into an intelligent cause of the universe, we can use the idea of such a cause only regulatively, not constitutively, as a principle of our inquiries into nature. Nor can we ever know that any apparently teleological connections we may discover are in fact teleological, since we have no way of proving that they were designed. But by assuming such connections, we may come to see further mechanical connections which might otherwise have remained unknown to us.

Kant's position is the same in the present context. The principle that everything in the world is good for something or other is entirely regulative. To use Kant's faculty-terminology, it is not, like the causal principle, a constitutive principle which is applied by determinant judgement; it is a regulative principle which is used by reflective judgement.

> '. . . all that we obtain from it is a clue to guide us in the study of natural things . . . and it helps us to extend physical science according to another principle, namely, of final causes [*Endursachen*], yet without interfering with the principle of mechanical causality. Furthermore, it is in no way thus decided whether anything which we estimate by this principle is a designed [*absichtlich*] purpose of nature, whether, that is, the grass exists for the ox or sheep, and whether these and other things of nature are here for man.' (67: 379)

[1] Cf. Kant's comment later in the *Critique of Judgement*: '. . . we must at least try this maxim of judgement also on nature as a whole, because many of its laws might be discovered in the light of this maxim which otherwise, with the limitations of our insight into its mechanism, would remain hidden from us.' (75: 398)

Although the principle that everything in nature is good for something or other is simply heuristic or regulative for Kant,[1] its regulative status is different from that of the principle that we must estimate everything in an organism to have a purpose. For he has already told us that we *must* estimate organisms in this way, since, if we do not, we will miss what is essential about their organic nature. But we do not *have* to view the world as a whole, as purposively organized. So far as we can see, there is no close analogy between the parts of the world and the parts of an organism. We can experience an organism as a whole, and we can recognize how the parts function in relation to the whole; but we can never reach a similar vantage-point with regard to the world as a whole. Moreover, we will not miss the essential nature of the world as a whole by not judging its parts to be purposively connected in the way in which we would miss the essential nature of organisms. The principle of reason for judging all of nature teleologically is a way in which we *may* investigate nature; but it is not a way in which we *must* investigate it, as we *must* investigate organisms as if they are purposive. Thus, although both this principle and the teleological principle for estimating organisms are regulative, their regulative status is different. We must adopt the teleological principle in estimating organisms, just as we must adopt, or at least not deny, the principle of logical reflection in attempting to discover and systematize the empirical laws of nature; but we are not *required* to consider the whole of nature as a purposive system.[2]

[1] In showing how the principle might be used, Kant gives a number of examples of possible purposes served by certain things in nature, examples which sound like the extreme of naive Panglossian teleology. Thus he suggests that vermin might be a wise provision of nature to incite men to cleanliness, and so to health. Or the mosquitoes in the wilds of North America might be designed to goad the savages to drain the marshes and clear the forests, and so make their abodes sanitary. In fact, 'even what appears to man to be contrary to nature in his internal organization affords, when treated on these lines, an interesting, and sometimes even instructive, outlook into a teleological order of things, to which mere unaided study from a physical point of view would not lead us'. (379) Tapeworms, for example, might make good some deficiency in the internal organs. Kant is plainly suggesting that we should try to discover what function is performed by things in nature; and certainly this would be a valuable thing to know. But since he is unable to make a clear conceptual distinction between designed and undesigned function, he uses teleological terminology in making the suggestion.

[2] Later on, Kant says that 'in respect of the latter employment [to nature as a whole], useful as this maxim of judgement is, it is not indispensable. For nature as a whole is not given to us as organized in the very strict sense above assigned to the word. On the other hand, in respect of those natural products that can

Despite his recognition that the status of the two principles is different, Kant nonetheless believes that we are encouraged by the teleological principle to go on and consider the whole of nature as a possible system of purposes. He tells us that, once we have discovered things in nature which we can conceive to be possible only by assuming that they were purposively designed, we then take a further step. Even things which do not possess organic characteristics, and which are entirely possible according to mechanical laws, lead us to go beyond the mechanism of nature and to consider such things as part of a purposive system. For, in estimating organisms as designed, we have already been led beyond the world of experience to a supersensible principle; and we must then regard the latter principle as valid, not just for organisms, but also, perhaps, for the whole of nature as a system. That is to say, since organisms must be considered *as if* they had been designed by a creative intelligence, there is no reason to restrict the possible operation of that intelligence to organisms; it is legitimate to assume that its operation extends to the whole of nature and to investigate nature as if this were the case.

In the final section of the Analytic, which is entitled 'Of the principle of teleology as an internal principle of natural science' (68: 381), Kant briefly discusses the relation between teleology and physics. As might be expected, he asserts that the idea of God has no place as an explanatory principle in natural science. Natural science 'must not pass beyond its boundaries in order to incorporate into itself as a domestic principle something to whose conception no experience can be adequate, and to which we are entitled to venture only after the completion of natural science'. (68: 382) The question whether organisms are designed or undesigned is a metaphysical question, and one which natural science must completely ignore:

> 'It is true that in teleology we speak of nature as if its purposiveness was designed; but to avoid all suspicion of presuming in the slightest to mix up with our sources of knowledge something that has no place in physics at all, namely, a supernatural cause, we refer to design in such a way that this design is ascribed to nature, that is, to matter. In this way there can be no misunderstanding, since no design in the

only be estimated as designedly formed in the way they are and not otherwise, the above maxim of reflective judgement is essentially necessary, if only to have empirical knowledge of their inner constitution. For the very thought of them as organized things is impossible unless we associate it with the thought of their designed production.' (75: 398)

proper meaning of the word can be ascribed to lifeless matter. We thus give notice that this word here only expresses a principle of the reflective, not of the determinant judgement, and consequently is not meant to introduce a special ground of causality, but only to assist the employment of reason by supplementing investigation on mechanical laws by the addition of another method of investigation.' (68 : 385)

Consequently, teleology does not form a proper part of theoretical natural science but is regarded as an introduction, or transition, to theology. It is kept out of natural science

'in order to restrict the study of the mechanical aspect of nature to that which we can so subject to our observation or experiment that we could produce it ourselves as nature does, or at least do so according to similar laws. For we have complete insight only into that which we can make and accomplish according to our conceptions.' (68 : 384)[1]

But, as Kant has said many times, the form of organisms is entirely contingent as far as the mechanical laws of nature are concerned; and mechanical laws are the only ones we could use if we were to attempt to produce an organism. Thus, 'organization as an inner purpose of nature goes infinitely beyond all ability of a similar presentation through art'. (*ibid.*)

[1] Kant makes a similar point in both the first and the second *Critique* as well. In the first *Critique* he says that 'reason has insight only into that which it produces after a plan of its own'. (Bxiii) In the *Critique of Practical Reason* (Ak., v, 26), he puts it even more plainly. 'The rules of uniform phenomena are denominated natural laws (for example, mechanical laws) only if we really can understand them a priori, or at least (as in the case of those of chemistry) suppose that they could be known in this way if our insight went deeper.'

7

THE DIALECTIC OF TELEOLOGICAL JUDGEMENT

In the Analytic of Principles in the first *Critique*, Kant set out and justified a system of theoretical *a priori* principles which he believes to be the fundamental conditions not only of Newtonian mechanics but of all human experience. He claims to have shown that every physical event occurs in some substance, is causally determined by previous events, and is causally connected with co-existing objects throughout nature. It is because these categorial principles hold for every physical event that we are justified in assuming that all events can be explained in terms of mechanical causality, and it would seem that we have no option but to attempt to explain them along these lines.

However, as we have seen, Kant has singled out one class of physical objects, organisms, and has explicitly stated that we cannot conceive how they could have been produced by mechanical causes alone, since the operation of such causes is blind or undesigned.[1] In order to get some conception of the essential nature of organisms, we must approach them as if they were designed and as if every part is purposive. This immediately raises the question of the relation between the teleological

[1] In the paper of 1775 Kant went further and claimed not only that we cannot *conceive* how organisms are possible through mechanical causes alone, but that they are *in fact* impossible in this way. 'Chance and physico-mechanical causes *cannot* originally produce an organized body' (my emphasis: see above, pp. 58–59). This may have been a slip, or it may be that at that time he was willing to make the stronger claim. But in everything we have examined since, he has only made the weaker one; and, as we shall see, he is now aware that he cannot sensibly make the stronger one, since we have no insight into the ultimate cause of organic existence.

way of approaching organisms and the mechanical way of investigating the rest of nature. Is there now, as I suggested earlier, an irreconcilable dualism in Kant's view of nature between particular purposive things and the mechanical operation of nature as a whole? It is this problem which Kant discusses in the Dialectic of Teleological Judgement and to which we must now turn. In the course of his discussion he attempts to reconcile the teleological view which he believes we must take of organisms with the mechanical view of nature as a whole.

I. THE ANTINOMY BETWEEN MECHANISM AND TELEOLOGY

As in the case of the dualism between natural necessity and freedom in the first *Critique*, Kant believes that the dualism between mechanism and teleology gives rise to an antinomy which must be reconciled in some way. In our investigations of nature we use two maxims of reflective judgement 'which it absolutely requires for the mere purpose of getting to know nature in its empirical laws'. (69 : 386)

> 'Between these necessary maxims of the reflective judgement a conflict may arise, and consequently an antinomy. This affords the basis of a dialectic; and if each of the mutually conflicting maxims has its foundation in the nature of our cognitive faculties, this may be called a natural dialectic, and it constitutes an unavoidable illusion which must be exposed and resolved in the *Critique*, so that it may not deceive us.' (*ibid.*)

The first of these maxims is 'suggested *a priori* by mere understanding', while the second is prompted by our experience of organisms. The first maxim is the proposition (*Satz*): 'All production of material things and their forms must be estimated as possible on mere mechanical laws.' The second maxim is the counter-proposition (*Gegensatz*): 'Some products of material nature cannot be estimated as possible on mere mechanical laws (their estimation requires quite a different law of causality, namely, that of final causes [*Endursachen*]).' (70 : 387) As they stand, there is no antinomy between the two maxims, because, as Kant says, they are only regulative principles of investigation, which, in his own faculty-terminology, means that they are principles which reflective judgement uses in attempting to discover and systematize the empirical laws of nature.

However, if these regulative principles were converted into constitutive principles having the same objective status as the categorial principles, they would read differently. The proposition would be: 'All pro-

duction of material things is possible on mere mechanical laws', and the counter-proposition would be: 'Some production of such things is not possible on mere mechanical laws.' (*ibid.*) It is here that an antinomy would arise, and one of the two propositions would necessarily be false. But Kant believes that there is no contradiction between the maxims of reflective judgement which we use in attempting both to investigate empirical nature as a whole and to reach some understanding of particular organic things which we encounter in the course of this attempt. For to say that we must estimate all material things to be possible according to mechanical laws does not also commit us to saying that such things are only possible in this way, to the exclusion of any other kind of causality. All that is asserted is that we must attempt to push mechanical explanations of nature as far as they will go, because, as Kant says, unless we look for the mechanical connections in nature there will be no proper knowledge of nature at all. However, following the first maxim as far as it will take us does not prevent us from following the principle of final causes whenever the proper occasion presents itself, that is, when we encounter organisms. Moreover, it is not asserted that organisms are not possible on mechanical laws;

> 'it is only asserted that human reason, adhering to this maxim and proceeding on these lines, could never discover a particle of foundation for what constitutes the specific character of a natural purpose, whatever additions it might make in this way to its knowledge of natural laws'. (70 : 388)

Neither maxim supersedes the other, although the mechanical maxim takes precedence, since we must apply it as far as we can in our scientific investigations.

What is puzzling about Kant's discussion in the present context is the fact that he calls the principle, 'All production of material things . . . must be estimated as possible on mere mechanical laws', a *regulative* principle. It would seem that this, or something very like it, was what the Analytic of the first *Critique* was all about, and that, if Kant thinks he has proved anything at all there, it is that we *must* regard material things as due to the operation of mechanical laws. That is, to repeat, he believes he has proved in the first *Critique* that the categorial principles are *constitutive* of nature and that they guarantee that nature is a mechanical system as conceived in Newtonian physics. It is because these principles apply to nature, or, as Kant puts it in the *Prolegomena*, because nature simply *is* the existence of things as determined by categorial

laws (Ak., IV, 294), that we can legitimately attempt to give a mechanical explanation of anything we experience.

However, although Kant may have proved that the whole of nature is subject to mechanical principles, he did not prove that we *must* adopt this view of nature as the sole methodological principle in our physical investigations. An alternative way of putting it would be to say that by proving that the conceptual system which justifies Newtonian mechanics necessarily applies to nature, he did not prove that it was the only conceptual system possible for us. Part of the purpose of the discussion of the ideas of reason in the Dialectic of the first *Critique* was to examine an alternative conceptual system in order to determine its objective status and what use can be made of it. The upshot of the examination was that teleological concepts can only be used regulatively, that is, as methodological principles to guide investigations of nature. Thus Kant asserted that we can approach nature as if it were a teleological system, although because teleological concepts can never be given a theoretical justification and so have no objective status, we can never *explain* nature in this way. In other words, we are free to adopt any methodological principles we like in approaching nature; but the only principles which will result in objective (i.e., genuinely theoretical) explanations are the mechanical principles founded on the categories. Even in the first *Critique*, Kant was aware that some phenomena are approached through different principles from the mechanical, for example, chemical phenomena; but he also suggested that an attempt could be made to explain chemical phenomena according to the idea of a mechanism (see above, pp. 30ff.). And this indicates, I believe, that although Kant thought he had shown mechanical categories to be constitutive of nature, he did not think he had shown that the idea of a mechanism is the only methodological model we can use in our investigations of nature. Thus, in calling the principle that all production of material things must be estimated as possible on mechanical laws 'regulative', he has not weakened his conclusions from the first *Critique*. He is not saying now that any categorial principle is regulative, but only that the mechanical conceptual system is regulative as a methodological principle, and that when occasion arises we may use teleological concepts without contradiction.

Commentators tend to speak as if Kant's entire solution of the antinomy consists simply in pointing out that both propositions are regulative rather than constitutive principles.[1] But, tempting and easy

[1] Körner calls this 'Kant's resolution of the antinomy of reflective judgement'.

though it might be to stop here, there are a number of reasons for supposing that this is not in fact his whole solution. In the first place, the two sections in which Kant presents the antinomy and shows that the first set of propositions are merely regulative are entitled 'Presentation [*Vorstellung*] of this antinomy', and 'Preparation [*Vorbereitung*] to the solution of the above antinomy'. The title of the second section would tend to indicate that just pointing out that as methodological principles there is no conflict between them is not his whole solution, and that there is more to come. Furthermore, the part of his discussion which we have examined occurs at the beginning of the Dialectic of Reflective Judgement and occupies only a small portion of it. And finally, since Kant has not attempted to solve any other antinomy by showing that the thesis and antithesis are regulative,[1] why should we expect this to be his final answer here?

Kant did not solve the third antinomy of the first *Critique*, for example, by showing that both the thesis and the antithesis were false (as he did for the first and second antinomies), nor by showing that both were regulative. He solved it by showing that the thesis and antithesis were both *possible* and that there need be no incompatibility between them. He argued that the thesis and the antithesis *might* both be true (cf. B560), the former if we appeal to the supersensible world, and the latter if we confine ourselves to the world of appearances. And he believed that by appealing to the supersensible, he had succeeded in showing 'that causality through freedom is at least not incompatible with nature'. (B586) In the remainder of the Dialectic of the present *Critique*, Kant tries to do the same thing for the mechanical and teleological principles; he tries to show that they are not incompatible by appealing to the supersensible world.

(*Kant*, p. 208) H. W. Cassirer says: 'Kant's solution of the antinomy is this. Mechanical and teleological principles are both merely regulative principles.' (*A Commentary on Kant's 'Critique of Judgment'*, p. 344.) W. H. Walsh says that Kant's answer 'is to treat *both* the mechanical and teleological principles as belonging to reflective judgement: to say that there is no real clash between them because they are both no more than heuristic maxims elaborated to further the understanding of the given'. (*Reason and Experience*, Oxford 1947, p. 233) A. C. Ewing says: 'The antinomy between mechanism and teleology is . . . solved by declaring both principles regulative.' (*A Short Commentary on Kant's 'Critique of Pure Reason'*, London 1938, p. 260)

[1] Although Beck suggests that he might have attempted to take this line with the third antinomy. See his *A Commentary on Kant's Critique of Practical Reason*, p. 193. Cf. also Graham Bird, *Kant's Theory of Knowledge*, London 1962, p. 204.

Kant's appeal to the supersensible is thus a device which he has used before, and for a quite specific purpose. His reason for using it can be put in the following way: in the first *Critique* he was aware that his conclusions from the Analytic made it impossible for him to say something which he wanted to say; they prevented him from saying that men are free in moral action, and, in fact, they prevented him from using moral language at all, since, unless men are free, there cannot sensibly be a moral language. Consequently, in order to give himself some justification for using a moral-language vocabulary, he appealed to the supersensible and in this way established, at least in his own terms, that freedom is *not impossible*, so that we are not prevented from talking about it.[1] In the Dialectic of Teleological Judgement he proceeds to do the same kind of thing for a teleological vocabulary. The conclusions of the Analytic of the first *Critique* strictly speaking *do* prohibit us from using a teleological vocabulary, which is nonetheless a vocabulary which Kant believes we *must* use in talking about organisms. So he goes on in the present context to appeal to the supersensible in order to establish that a teleological vocabulary is at least *not impossible* and that it can exist along with a mechanical one without contradiction. We might go so far as to say that in this way he solves the antinomy which exists between the mechanical and teleological *vocabularies*. He has, of course, already taken a step in this direction by showing that both the mechanical and teleological regulative principles can be used methodologically without contradiction. But he also wants to establish the more questionable thesis that there need be no contradiction between mechanism and teleology as different aspects of our experience of nature.

There is such a close parallelism between his treatment of freedom in the third antinomy and his treatment of teleology in the remainder of the Dialectic of the present *Critique*, that a passage from the former discussion can easily be modified to apply precisely to his present problem.[2]

> 'Is it a truly disjunctive proposition to say that every effect in the world must arise either from *mechanism* or from *teleology*; or must

[1] Cf. Bird, who says that in the discussion of the third antinomy, 'Kant tries to resolve the conflict between our theoretical or scientific language of causal explanation, and our practical or moral language of freedom and responsibility'. (*Kant's Theory of Knowledge*, pp. 189–90)

[2] 'Mechanism' and 'mechanical' have been substituted for 'nature' and 'natural', and 'teleology' for 'freedom'. Changes have been indicated by italics.

we rather say that in one and the same event, in different relations, both can be found? That all events in the sensible world stand in thoroughgoing connection in accordance with unchangeable *mechanical* laws is an established principle of the Transcendental Analytic, and allows of no exception. The question, therefore, can only be whether *teleology* is completely excluded by this inviolable rule, or whether an effect, notwithstanding its being thus determined according to *mechanism*, may not at the same time be grounded in *teleology*.' (B564)

II. THE REGULATIVE ROLE OF AN INTELLIGENT CAUSE OF NATURE

Before we examine Kant's resolution of the antinomy between mechanism and teleology, it is well to be clear at the outset that in appealing to the supersensible he is not appealing to an intelligent cause as the *objective* source of purposiveness in nature. Had he been able to make this appeal, he would certainly have found grounds which would have justified a teleological vocabulary. But he has not altered his standard position that we have no way of reaching a theoretical knowledge of God, and so this method is not open to him. The passages where he examines the explanatory status of an intelligent cause of nature are worth looking at, not only because they make it clear that he is not appealing to an objective intelligent cause in his final solution of the antinomy, but also because they show that he gives an answer, strikingly similar to the one Hume gave, to the question, 'What is the source of the purposiveness in the world?'

Kant remarks at the outset that 'no one has ever yet questioned the correctness of the principle that when judging certain things in nature, namely organisms and their possibility, we must look to the conception of final causes [*Endursachen*]'. (72: 389) Even when we are not interested in the question of the origin of such things, such a principle is necessary as a 'guiding-thread' (*Leitfaden*) for becoming acquainted with their organic constitution. The question then arises whether this principle of final causes is merely a regulative maxim of judgement or whether it is an objective principle of nature. If we took it to be the latter, then we would be claiming that there is another, and superior, type of causality operative in nature besides mechanism, the causality of final causes.

'Now this speculative question or problem might well be left without

any answer or solution; for if we content ourselves with speculation within the bounds of mere knowledge of nature, the above maxims are ample for its study as far as human powers extend, and for probing its deepest secrets. So it must be that reason wakens some suspicion, or that nature gives us a hint that by means of this concept of final causes we might go beyond nature and be able to unite it to the supreme point in the series of causes, if we were to abandon the investigation of nature, or at least lay it temporarily aside (though we may not have advanced so very far with it) and try first to discover where this stranger in natural science, namely the concept of natural purposes, would lead us.' (72 : 390)

It is when we attempt to use the principle of final causes to infer the existence of a supreme purposive cause that the unquestioned principle mentioned above gives rise to difficulties. That is, does the purposiveness which we apparently discern in nature actually *prove* the existence of a purposive cause; or might it be that such purposiveness, properly considered, is in fact identical with the mechanism of nature and rests on the same ground? Since Kant believes that this ground is not one we can ever discover, he repeats again that in estimating organisms, we must have recourse to a subjective principle of a causality according to ideas, and that we ascribe this type of causality to nature by analogy with human art. But this 'expedient' 'in no case justifies us in introducing into natural science a mode of operation different from causality according to the mere mechanical laws of nature'. (*ibid.*)[1]

Kant points out that there is a great difference between the assertion that organisms, and even the whole of nature, are only possible through the agency of a cause which acts according to design and the assertion that

> 'by the peculiar constitution of my cognitive faculties the only way I can judge of the possibility of those things and of their production, is by conceiving for this a cause working according to design, that is, a being whose productivity is analogous to the causality of an understanding'. (75 : 397–8)

The first assertion would claim to be objective, and we would be bound

[1] Here Kant devotes three sections to an examination of various systems which have attempted to deal with the purposiveness of nature, such as those of the Greek Atomists, Spinoza, and what he calls 'Hylozoism' and 'Theism'. Since the sections are a digression from the main point of this part of his discussion and do not contribute anything of importance to it, I have omitted consideration of them.

to prove the existence of a designing intelligence; but the second is only a subjective principle which reflective judgement can use to investigate nature. Kant also repeats that the concept of a thing whose form or existence we can only consider to be possible as a purpose is inseparably bound up with its contingency according to natural laws. It is this contingency which, as he has said many times before, makes it necessary for us to regard organisms as purposes. Moreover, it is this feature of organisms which makes them the main evidence of the contingency of the universe. Both for the common understanding and for the philosopher, organisms supply

> 'the only valid ground of proof [*geltende Beweisgrund*][1] for its dependence on, and origin from, a Being existing outside the world, and one which these purposive forms show to be intelligent. Teleology, then, will only find a complete answer to its inquiries in theology.' (75: 399)
>
> 'But, despite this, . . . what would be proved in the end by the most complete teleology? Would it prove that such an intelligent being really exists? No; it proves no more than this, that by the constitution of our cognitive faculties . . . we are absolutely incapable of forming any conception of the possiblity of such a world unless we imagine a highest cause operating according to design. We are unable, therefore, to prove objectively the proposition: There is an intelligent original being. We can only do so subjectively for the employment of our judgement in its reflection on the purposes in nature, which cannot be thought on any other principle than that of an intentional causality of a highest cause.' (75: 399)

If we attempted on teleological grounds, that is, from the purposiveness of organisms, to prove the proposition, 'There is an intelligent original being', we would become involved in insuperable difficulties, because we would first have to establish the prior proposition, 'Organisms are not possible except through the operation of an intelligent cause.' And this is something we cannot possibly establish, since, 'strictly speaking we do not observe the purpose in nature as designed, but only read this conception into the facts as a guide to judgement in its reflection upon the products of nature'. (*ibid.*) Consequently, we

[1] This does not mean that Kant himself thinks that organisms supply a valid ground of proof; he is only saying that the ordinary man and the philosopher have thought this.

cannot say 'There is a God' as an objective factual statement. All we can do is make the considerably weaker statement:

> 'We cannot conceive or render intelligible to ourselves the purposiveness which must be introduced as the basis of our knowledge of the inner possibility of many natural things except by representing it, and in general the world, as the product of an intelligent cause (a God).' (75: 400)

However, this conclusion does not commit us to saying that it is *impossible* that the source of organic life might be present in the mechanism of nature, and a source quite independent of any design. The latter would be what Kant calls 'a presumptuous judgement on our part', since we have no way at all of proving it to be true.

> 'On the question, therefore, whether or not any being acting designedly stands behind what we properly term natural purposes, as a world-cause, and consequently as its author, we can pass no objective judgement, be it affirmative or negative; this much alone is certain, that if we are to judge according to what our own proper nature (the conditions and limitations of our reason) permits us to see, we can place at the basis of the possibility of these natural purposes nothing else than an intelligent being. This alone conforms with the maxim of our reflective judgement, and therefore with a ground which, though subjective, is inseparably attached to the human race.' (75: 400–1)

There is a strong parallel between Kant's final conclusion about the cause of purposiveness in nature and one of Hume's main conclusions in the *Dialogues*. Like Hume, Kant believes that 'to say that all this order in animals and vegetables proceeds ultimately from design is begging the question'. (*Dialogues*, p. 179) That is, to say that organisms must be the result of the operation of an intelligent cause would be to beg the question, since we would first have to prove that they are impossible in any other way; and the latter is something Kant believes we can never prove. It may even be the case that the cause of organic life is present, after all, in the mechanism of nature, although we have no way of proving this one way or the other. However, despite our utter inability to prove the existence of a designing intelligence on teleological grounds, Kant nonetheless echoes Hume's conclusion that '*the cause or causes of order in the universe probably bear some remote analogy to human intelligence*'. (*Dialogues*, p. 227)

III. KANT'S SOLUTION OF THE ANTINOMY

When Kant first mentioned the possibility of an antinomy between the mechanical and teleological maxims, he suggested that each of them might have 'its foundation in the nature of our cognitive faculties' (see above, p. 118). He indicated his belief that the mechanical maxim has its foundation there when he went on to say that it is 'suggested *a priori* by mere understanding'. But he has also said a number of times since that it is because of the nature of our cognitive faculties, because the human understanding is constituted the way it is, that we can only estimate the possibility of organisms if we refer them to an intelligent cause (see above, pp. 124, 125, 126). Hence he also believes that it is because of the way in which our minds are constituted that we must use the teleological maxim when dealing with organisms. Consequently, it is because of the nature of the human understanding that the antinomy itself arises, and this opens up for Kant the possibility that it need not arise for an understanding unlike the human. It is this notion of a different understanding which Kant uses in his resolution of the antinomy between the mechanical and teleological principles. He contrasts our understanding with a possible higher or supersensible understanding, which would not experience any conflict between the two principles. He asserts that it is not necessary to *prove* that such a higher understanding is possible[1] but only to show that we are led to the idea of it by contrast with our understanding, and that the idea is not self-contradictory. (77 : 408)

Although Kant's main point is a comparatively straightforward one, it tends to become obscured by his excessively detailed treatment of points which, though interesting enough, are not important for our purposes and are not essential for an understanding of what he is trying to do. In what follows, therefore, I propose to ignore the detail of his elaborate account of the peculiar nature of the human understanding, and of the possible higher understanding with which he contrasts it. The real importance of the idea of a higher understanding lies in the role which Kant assigns to it in his resolution of the antinomy, and that can be understood without a detailed examination of its nature.

[1] Presumably this means that we do not have to show that it fulfils the conditions set out in the first postulate of empirical thought; that is, we do not have to prove that it 'agrees with the formal conditions of experience, that is, with the conditions of intuition and of concepts'. (B265) In fact, since it is a supersensible object, which by definition cannot be met with in any experience, we could never prove this anyway.

Kant points out that, in the *Critique of Pure Reason*, in saying that our intuition is one of a special kind, that is, one for which objects only have the status of appearances, there must have been a contrast with another possible type of intuition. He believes that in the present case also we have an idea of a possible understanding different from our own. If we did not, then we would be unable to say, what Kant believes we must say, namely, that it is because of the particular constitution of our understanding that we have to consider organisms to be purposes produced by design. But in saying this, we are neither claiming that a designing cause exists nor denying

> 'that another (higher) understanding than the human might be able to discover the ground of the possibility of such products of nature in the mechanism of nature, that is, in a causal combination for which an understanding is not explicitly assumed as cause'. (77 : 406)

It is because the only objective principles which our understanding has at its disposal are mechanical principles that, whenever we are dealing with a system, whether a system of empirical laws or an organic system, we can only estimate its possibility by basing it on an idea in the mind of an intelligent being. To base it on mechanical principles would be, as Kant has repeated many times, to regard its organic structure as contingent or accidental; and we can only get rid of this contingency by considering the idea of the whole to be that which determines the position, relation, and structure of everything contained within it. But, as Kant emphasizes again, it does not follow from this fact about the way in which we must estimate organisms that they could not have been mechanically produced, because to say that would be to claim that it is self-contradictory for *any* understanding to consider an organic unity without basing that unity on an idea, and this is something we have no right to say. Certainly we should have to conclude that this would be self-contradictory 'were we entitled to look on material things as things-in-themselves'. (77 : 409) But since they are only appearances we are not required to do so.

> 'It is at least possible to regard the material world as mere appearance and to think as its substrate a thing-in-itself which is not appearance. Further, we may endow this substrate with a corresponding intellectual intuition (even though it is not ours). We should thus be provided with a supersensible, although unknowable, real ground of nature, to which we ourselves belong. So it would be possible to consider according to mechanical laws that which is necessary in nature

as an object of sense. At the same time we could consider according to teleological laws the agreement and unity of its particular laws and the forms resulting from them, which must be judged by us to be contingent as far as mechanical laws are concerned. . . . Thus we should judge nature according to two principles, without the mechanical mode of explanation [*Erklärungsart*] being excluded by the teleological as if the two principles contradicted one another.' (*ibid.*)

This is Kant's final resolution of the antinomy between the mechanical and the teleological principles. His argument, briefly restated, is that, because nature as we experience it is merely appearance, we are able to think of a possible thing-in-itself which is not appearance and which underlies appearances. The real ground of appearances is contained in the supersensible, and in a possible supersensible understanding quite unlike our own. Such an understanding could conceive the possibility of organisms without having, as we do, to base their possibility on an idea; it would see organisms as necessary and not contingent. This, of course, does not mean that it would have to see organisms as mechanically produced either; but rather it would see them as the result of a higher causality which unites both the mechanical and the teleological in one.

Thus, although we have no knowledge of a supersensible understanding, we can think of it without contradiction and can assume the possibility that it somehow reconciles the mechanical and teleological principles in one higher principle.[1] By referring both principles to the supersensible, and by recognizing that neither can give us any knowledge of it, Kant believes that we resolve the antinomy between them. If we were to attribute absolute validity to the mechanical and teleological principles, and thereby regard them as principles which apply to things-in-themselves, we would be unable to reconcile them with one another, since there would be an outright conflict between them. But because neither principle applies to things-in-themselves but only to our phenomenal experience, it is possible that they are ultimately united in

[1] In discussing the third antinomy, A.C.Ewing remarks that 'Kant had one advantage over others who have sought to solve the conflict between freedom and causality by a distinction between different kinds of causality, he was exonerated from attempting to give a clear account of the distinction, since it followed necessarily from the fundamental principles of his general philosophy that, if this noumenal causality was a fact, no clear account could be given of it, at least by human beings'. (*Commentary*, p. 229) We might say that, for the same reason, Kant is exonerated from attempting to give a clear account of how the mechanical and teleological principles are reconciled in the supersensible, and hence that we should not expect to find one. Nor do we find one.

the supersensible; and this, Kant believes, is all the justification we need for using a teleological vocabulary along with a mechanical one without contradiction.

It should be emphasized that Kant's resolution of the present antinomy differs in an important way from his resolution of the antinomy between freedom and natural necessity in the first *Critique*. He resolved the latter antinomy by arguing that the thesis might be true if we appeal to the supersensible and the antithesis true if we confine ourselves to the world of our experience. In the present case Kant does not attempt to argue that the mechanical principle may be true of appearances and the teleological true of the supersensible; rather he argues that both can be applied to appearances without contradiction, because it is possible (that is, not self-contradictory) that both are reconciled in the supersensible.

However, although the appeal to the supersensible 'shows us that . . . the principle of the mechanical derivation of purposive natural products is consistent with the teleological, it in no way enables us to dispense with it'. (77 : 409) Kant believes that in estimating organisms, we may use all the mechanical laws we know at present, and even those which may be discovered in the future, and that we may even make satisfactory progress in this way; but nonetheless, in the long run, we will never escape having to introduce the idea of a purposive cause as the source of their possibility.

> 'It is utterly impossible for human reason (even for any finite reason which might resemble ours in quality, however much it might surpass it in degree) to hope to understand the production even of a small blade of grass from merely mechanical causes. For the possibility of such an object the teleological connection of causes and effects is quite indispensable for judgement, even if only to study it under the guidance of experience. For external objects as appearances, no sufficient ground related to purposes can be encountered; on the contrary, this, although it lies in nature, must only be looked for in the supersensible substrate of nature, into which we cannot possibly have any insight. Consequently, it is absolutely impossible for us to derive from nature itself grounds of explanation for purposive connections, and because of the constitution of the human cognitive faculties, it is necessary to look for their supreme ground in an original understanding as cause of the world.' (77 : 409–10)[1]

[1] Earlier Kant expressed part of this point more eloquently when he said: 'It is

IV. THE RELATIONSHIP BETWEEN THE MECHANICAL AND TELEOLOGICAL PRINCIPLES

In the final section of the Dialectic, which is entitled, 'The union of the principle of the universal mechanism of matter with the teleological principle in the technique of nature', Kant comments further on his resolution of the antinomy and discusses the extent and limitations of the mechanical and teleological vocabularies. The appeal to the supersensible has, he believes, given us a justification for supposing that we can use both vocabularies without contradiction; but despite this, we still need to see clearly the relation between them, and their areas of application. We must see what we are able to say with each of them and what we are unable to say.

Kant asserts at the outset that, in explaining natural objects, it is of the utmost importance to consider the mechanical principles which were operative in their production, since, apart from mechanism, we can get no insight into the nature of things. Our knowledge of nature is not increased in the slightest by assuming *a priori* that an intelligent cause has directly created the things in nature as they have been from the beginning or has predetermined things such as organisms which regularly conform to the same pattern. Kant stands by his position that any explanation which is to lay claim to objectivity must be a mechanical one. We cannot use the idea of an intelligent cause in any *explanation* of natural objects, because we are totally ignorant both of the manner in which such a cause might have operated and of the ideas it might have used. Moreover, it would be 'simply tautological' to attempt to infer the existence of an intelligent cause from the purposive things in nature and then to proceed to use that cause as the basis for an explanation of them. For, as Kant has already indicated, that would be begging the question; we should be assuming what we want to prove, namely, that certain things in nature are in fact purposes which owe their exis-

quite certain that we can never get a sufficient knowledge of organized beings and their inner possibility, much less explain them, according to mere mechanical principles of nature. So certain is it, that we may confidently assert that it is absurd for men to make any such attempt, or to hope that maybe another Newton will some day arise to make intelligible to us even the production of a blade of grass according to natural laws which no design has ordered. Such insight we must absolutely deny to mankind.' (75: 400) And he emphasizes, here too, that it would be 'presumptuous' for us to go on and say that 'there *cannot* lie hidden (in [nature's] mere mechanism) a sufficient ground of the possibility of organized beings, without supposing any design in their production' (*ibid.*: my emphasis). For we have no way of proving the latter claim.

tence to an intelligent cause. But since we cannot prove this either *a priori* or *a posteriori*, we have no justification for believing that we can explain any natural object in this way.

On the other hand, despite the fact that the idea of an intelligent cause has no explanatory value,

> 'it is an equally necessary maxim of reason not to ignore the principle of purposes in the products of nature. For although this principle does not make the manner of their production any more comprehensible to us, yet it is a heuristic principle for investigating the particular laws of nature, even supposing that we do not wish to make use of it for explaining nature itself.' (78 : 411)

Whenever we encounter a form or organization which we cannot conceive to be the result of mechanical causes alone, we must estimate it in the light of a possible intelligent cause. If we did not do this, we should be without any notion of even a possible reason for it. Just as Kant is convinced that any objective explanation must be a mechanical one, so he is equally convinced that we can never explain organisms mechanically. Consequently, if we are not to be without some reason for their organic character, we must estimate them as due to the operation of an intelligent cause. Kant warns us that we must not try to explain teleologically every product of nature 'which displays in itself (as in regular bodies) purposiveness of figure to our mere apprehension'. (*ibid.*) We must always regard such quasi-purposive things as the result of mechanical causes, and investigate them on that assumption. But we must not for that reason go on 'to exclude entirely the teleological principle, and follow mere mechanism only, in cases where . . . we find a purposiveness which is quite undeniably related to another kind of causality'. (*ibid.*)[1]

Kant goes on to say that we cannot apply the mechanical and teleological principles in conjunction, for the explanation of one and the same natural object. To use the example he gives:

> 'if I suppose, for instance, that a maggot is to be regarded as the product of the mere mechanism of matter (of the new formation which

[1] By 'a purposiveness which is quite undeniably related to another kind of causality', Kant can mean only a natural organism which we cannot conceive to be the result of mechanical laws. He obviously does not mean to say that we know *objectively* that any organism *is* undeniably related to another kind of causality, since this would involve our knowing that it is in fact impossible by mechanical means – and the latter is something he has specifically said that we never can know.

it produces by itself when its elements are released through decomposition)[1] I cannot derive the same product from the very same matter, as from a causality that acts according to purposes'. (*ibid.*)

Conversely, if we suppose that the maggot is a natural purpose, we cannot at the same time consider it to have been mechanically produced. For that would be to unite the mechanical and teleological principles, and, as Kant says, each mode of explanation (*Erklärungsart*) excludes the other. The human mind is absolutely incapable of uniting the two.

'The principle which is to make possible the compatibility of both for estimating nature must be placed in what lies beyond both (and consequently beyond the possible empirical representation of nature), but in what nevertheless contains its [nature's] ground, that is, in the supersensible; and to this each of the two modes of explanation must be referred.' (78: 412)

However, we are unable to reach any knowledge of the supersensible principle or to use it as a basis for *explaining* the union of the two principles; we can use it only as a ground of the *possibility* of their union:

'The principle common to the mechanical derivation on the one hand, and the teleological on the other, is the supersensible, which we must take to be the basis of nature as phenomenon. Of this, however, we cannot from the theoretical point of view form the slightest positive determinate conception. How, therefore, in the light of the supersensible as principle, nature in its particular laws constitutes a system for us, and one capable of being recognized as possible both on the principle of production from physical causes and on that of final causes, is a matter which does not admit of any explanation. If it happens that objects of nature occur whose possibility is incapable of being conceived by us on the principle of mechanism . . . without relying on teleological principles, we can only advance a hypothesis, namely, we suppose that we may confidently study natural laws according to both principles . . . without being disturbed by the apparent conflict which arises between the principles on which they are estimated. For we are at least assured of the possibility of both being reconciled, even objectively, in a single principle, since they concern appearances which presuppose a supersensible ground.' (78: 412–13)

This is a repetition, in clearer terms, of Kant's final resolution of the antinomy between the mechanical and teleological principles. I have suggested that this is really his way of establishing our right to use a

[1] See above, p. 39, n. 1.

teleological vocabulary; it is because both principles may possibly be united in the intelligible world that we can use teleological language when dealing with organisms. What unites the mechanical and teleological vocabularies is a possible higher-level vocabulary possessed by a supersensible mind, within which there would be no contradiction between them. This higher-level vocabulary is not one which we can ever use; but we can use each of the lower-level vocabularies without contradiction, since it is possible that they are ultimately reconciled. The fact of organic life, which Kant has squarely faced in the *Critique of Teleological Judgement*, makes it necessary, he believes, to use teleological language in dealing with organisms; but because he cannot give that language a justification, as he did for the language of the physicist in the first *Critique*, he must be content with showing that it is not impossible for it to have some objective basis in the nature of things, although a basis which we can never know.[1]

[1] Körner puts the latter point in a different way when he says: 'While the first *Critique* justifies the mechanistic method on the basis of a mechanistic metaphysic, the third *Critique* justifies the teleological method in spite of the impossibility of a teleological metaphysic. This impossibility is insisted upon time and again. Kant admits only a metaphysic of nature and a metaphysic of morals. There is no metaphysic of purpose, but only a *Critique of Teleological Judgement*. He shows that there is no conflict between the maxims of mechanistic and teleological *method*. There can be no conflict between mechanistic and teleological *metaphysics* because, according to the critical philosophy, there can be no teleological metaphysics.' (*Kant*, p. 209: my emphasis)

8

CONCLUDING COMMENTS

Kant's attempt to show that it is possible to use a teleological vocabulary along with a mechanical one without contradiction reflects his growing awareness that mechanical concepts are not exhaustive of our experience of the world. He realizes that all thinking is not the thinking of the physicist and that to make sense of some aspects of our experience we must use concepts different from the mechanical, even if these cannot be objectively justified. Such concepts do not enable us directly to extend our theoretical knowledge of nature, but he believes that they do enable us to make some products of nature intelligible to ourselves which would remain entirely unintelligible in terms of mechanical concepts alone. In the first *Critique* Kant realized that there is a similar problem with regard to moral-language concepts when he tried to show that it is possible to talk sensibly about moral actions despite the fact that the only objective vocabulary we can use is the vocabulary of the physicist. There too he appealed to the supersensible world in order to show that it is not self-contradictory to use a moral-language vocabulary to talk about an aspect of experience for which the mechanical vocabulary is inadequate.

In attempting to establish that it is legitimate to use a teleological vocabulary, Kant is trying to deal with the problem posed by the fact that the conceptual system which he believes we *must* use if we are to talk objectively about our experience does not exhaust the possibilities of experience. This comes out strongly in his appeal to a higher intelligence which might be able to unite the mechanical and teleological vocabularies in one all-inclusive vocabulary. In other words he is advancing the possibility that the mechanical vocabulary, which is constitutive for our knowledge of nature, and the teleological one, which is

only regulative, may be united in a higher-level vocabulary which is constitutive for *some* understanding. But he is prevented from proposing such a higher-level vocabulary as a possibility for human knowledge by his conviction that only one of the two lower-level vocabularies can ever have any objective validity for human experience. Consequently, although Kant gives the impression that he is looking for a conceptual framework which would take in more than he believes we can ever claim to know, he can only suggest that it is a possibility for a supersensible understanding, but never for human knowledge. His way of dealing with the problem which is posed for him by the need to talk about organic life shows clearly that as far as theoretical knowledge is concerned, he is still firmly committed to the mechanical vocabulary which he justified in the first *Critique*.

Nevertheless, as we have seen, Kant believes that teleological concepts such as 'purpose', 'design', and 'end' play an essential role both in our attempts to discover and systematize empirical laws and in our investigations of organic life. What unites these two areas for him is his view that mechanical concepts will never enable us to comprehend how systems are possible. Anything which is an organized system, and not an aggregate of parts which might have been thrown together at random, is entirely contingent as far as the operation of mechanical laws is concerned. If we are to understand its possibility, Kant believes that we must treat it as if it were the result of the operation of an intelligent cause. Plants and animals appear to him to be obvious examples of systems which cannot be understood mechanically. But equally he believes that if we are to bring the empirical detail of nature to systematic unity, then this unity must exist in nature for us to discover; and since we have no objective reasons for believing that this is the case, we can only presuppose that an intelligence has designed nature with our scientific needs in view, that nature is purposive for our knowledge of it. If we did not presuppose this, or at least not deny it, Kant believes that there would be no empirical natural science.

Kant's claim that we must presuppose that nature is purposive for our scientific knowledge of it indicates that he saw that the categorial principles are not by themselves sufficient to guarantee the possibility of empirical natural science. Both in the Dialectic of the first *Critique* and in the Introduction to the *Critique of Judgement*, he was aware that the problem of induction, as he saw it, had not been resolved by the categorial principles. He also seems to have been aware that there was

in fact no way in which he could resolve it. He could only point out that unless we presuppose that the detail of nature is purposive for our knowledge of it, there can be no natural science, and hence that it is subjectively necessary to do so. He does not change his view of the role of the categorial principles for theoretical knowledge which he outlined in the Analytic of the first *Critique*; but he does realize that those principles do not by themselves guarantee that natural science is possible.

Similarly, Kant recognizes that mechanical concepts, which are based on the categorial principles, will never enable us to explain or even to talk sensibly about organic life. But it should be noted that he does not claim that we will never be able to explain organisms mechanically because they are too complicated for us to do so. This would have made it only an empirical difficulty, whereas Kant believes that it is impossible in principle. For Kant, as for many of his contemporaries, the distinctive characterististic of organisms is simply their non-mechanical nature. And this makes it analytically true that a conceptual system which enables us to talk about the world only in mechanical terms will never enable us to explain organic life and development, because in trying to explain organic life in mechanical terms, we would be attempting to account for facts which belong to one category by means of concepts which are appropriate to another. We would, so to speak, be committing an explanatory category-mistake. On the other hand, Kant is equally emphatic that, although we can use teleological concepts regulatively in our investigation of organic life, we will never be able to explain organisms teleologically either. And it follows that, since any objective explanation must be a mechanical one, and since organisms cannot be explained mechanically, they can never be given an objective explanation.

Kant's concern with the mechanical-teleological distinction is related to the attempt by some twentieth-century philosophers of science to show that explanations which refer to purposes can be reduced to explanations containing no teleological terms. It is argued that while purposes and goals certainly play an important part in understanding human activities, there is no reason whatever for assuming that they are present in most biological phenomena, and that teleological descriptions of the seemingly purposive activities of organisms and their parts can be reduced to statements containing no teleological terms without diminishing the content of what is being asserted. Kant, too, is willing to admit that it might be possible for *some* understanding to

describe organisms in a teleologically neutral way, but he denies that it will ever be possible for us to do so. And this again relates to his conviction that the only objective vocabulary we have is a mechanical one. The modern philosopher who tries to reduce teleological statements to statements containing no teleological terms is also committed to a vocabulary which he believes to be objective, the vocabulary of physico-chemical explanations. He is concerned to show that this vocabulary will do the job which is done by a teleological one. Kant, on the other hand, believes that a non-teleological vocabulary never can do that job, because the only non-teleological vocabulary available to us is a mechanical one and organisms are by definition fundamentally different from mechanical aggregates.

When Kant says that we must investigate organisms as if no part were without a purpose, he is saying that we must presuppose that every part fulfils some essential function in relation to other parts and to the whole organism. But it is clear that if we use 'function' in a teleologically neutral way to mean something done which is essential for the life of the organism, then to presuppose that a part of an organism fulfils a function is not necessarily to presuppose that this is its purpose in the sense that this is what it was designed to do. For example, the fact that the heart pumps blood, and that blood-circulation is essential to the life of an organism, is no basis from which to conclude that the purpose of the heart is to pump blood. On the other hand, with machines such as watches or clocks, and other man-made teleological systems, the fulfilling of a function can in general be regarded as the purpose of both parts and whole, since they were designed to fulfil it. In one important sense, of course, we cannot say that a machine acts purposively in order to fulfil a function, since machines do not have purposes of their own. But we can say that it fulfils the function it was designed to fulfil. It is Kant's apparent inability to distinguish clearly between a function fulfilled and an actual purpose in mind which accounts for his belief that we must appeal to a possible designing intelligence, even if only heuristically, if we are to get some understanding of organic life. And his inability to make this distinction may have been due in some part to the fact that many of his contemporaries considered organisms on the analogue of a watch or clock. Watches and clocks are designed to fulfil certain functions; that is to say, they are designed with specific purposes in mind. Function and purpose are here generally identical. But they are not the purposes of the machine; they are the

purposes of its maker, who has seen to it that the machine functions accordingly. It is evident that Kant saw clearly that natural organisms are quite different from machines in so far as they produce themselves, repair their own deficiencies, and so forth. But, at the same time, he was unable to free himself from the watchmaker-watch analogy completely enough to be able to ask whether organisms can be understood in any other way than as if they had been designed. Consequently, he tried to apply an inappropriate model in investigating them, the model of the man-made artifact. We must treat both the parts of an organism and the whole as if they had been designed, without, of course, prejudging whether they were in fact designed. And here again, part at least of his reason for saying this is his belief that it is impossible to understand how the parts of an organism can co-operate as intimately as they do by means of mechanical laws alone.

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