

if a fact is the exemplification of a feature by an event, then that exemplification is as much a particular concrete datable occurrence as the event itself. As such, it too is a subject of referentially transparent description. Surely the feature or features themselves could not be causes or effects unless exemplified by some event.

What is the upshot of this comparison of events and facts for the issue of extensionality with which we began? We may agree with Mackie that "statements about producing causes will be extensional, since in them predicates are used only to identify concrete occurrences. . . . But this is not true of explanatory cause statements."³⁸ We can agree with Mackie only subject to the qualification that explanatory causation is not a relation *in the objects*—independent of, and by contrast with, producing causation. Explanatory causation reflects the purposes and interests we bring to causal inquiry. Subject to the same qualification, we may also accept Mackie's more general conclusion: "We need then, to recognize both kinds of cause, events and facts, and at the same time to distinguish them, in order to understand what we think and say about causal relations."³⁹ This distinction turns out, however, to be the distinction between causation *simpliciter* and causal explanation, a distinction between an ontological relation, and an epistemological one. Mackie's conclusion that an ontology of facts has "every advantage over" an ontology of events thus seems to confuse ontological and epistemological accounts of causation.⁴⁰ Once they are distinguished, the Humean ontology of causal relata remains intact.

38. *Ibid.*, p. 268.

39. *Ibid.*, p. 265.

40. Is it fair to conclude that there is nothing of metaphysical significance in Chapter 10 of Mackie's book (on grounds that Davidson's ontology is not directly challenged and that facts turn out to be features of events)? This metaphysically neutral outcome would be surprising, since the proclaimed topic of the chapter is the ontology of causal relata. We think nonetheless that it is the right conclusion. The reason the chapter fails to have metaphysical import is that it is really only tangentially about ontology. Primarily it is an elaboration of the epistemology of causation begun in his Chapters 2 and 3, where Mackie introduces "causal fields" and "progressive localization" as epistemological accounts of how we *know* causes (cf. pp. 35-63, 73). A careful examination of the roles "a minimally complete causal account" and "explanatory causes" play in his Chapter 10 would show them merely to be extensions of his earlier epistemological views.

8

Causal Judgment and Causal Explanation

PHILOSOPHERS HAVE long believed that problems of causation are closely connected to problems of causal explanation and causal judgment. This belief has no doubt derived much of its authority from the traditional assumption that effects are explainable or understandable in terms of their causes. Aristotle's influential theory of the "four causes," for example, is as much an analysis of basic principles of explanation as of types of causal relatedness. Since his time accounts of causal explanation and judgment have figured prominently in treatments of such fundamental philosophical problems as induction, free will, time, moral and legal responsibility, the nature of human action, and historical understanding.

Throughout our exposition and defense of Hume we have maintained that causation and explanation present substantially different problems. Chapters 5 and 7 defend this view in detail. Nevertheless, we do not deny that there are important connections between causation and explanation, if only because many requests for explanation are properly answered by the citation of causes. Indeed, almost every theory of causation has implications for the construction and evaluation of causal explanations. Hume's account is no exception. He offers and assesses explanations in a wide variety of contexts, always in the light of his own theory of causation. In this chapter we consider the question of how Hume's theory of causation bears on

issues of causal explanation and causal judgment. We also describe Hume's actual approach to these issues and the commentary on that approach offered by Mill and other defenders of the regularity theory.

Because Hume's account of causation is revisionary, we should not be surprised if its application to the analysis and assessment of causal judgment and explanation turns out to be revisionary as well. Yet a revisionary account of judgment and explanation would be more difficult to defend than such an account of causation. Unlike causation, explanation is not fundamentally a relation between spatiotemporal particulars, nor could it be supposed to obtain independently of its discovery or description by sentient creatures. If explanation is a relation at all, it involves more than two relata. To say that one event explains another seems to be an elliptical way of describing a three or more term relation between the two causally connected events and sentient creatures who cite one event to explain the other. By contrast to causation, causal judgments and explanations are human practices shaped by purposes and beliefs.

A revisionary reconstruction of judgment and explanation that made rationally warranted causal explanations and judgments unattainable would therefore be unacceptable. Indeed, we would do well to question any account that ruled out the bulk of common judgments and explanations. The structure of judgment and explanation as a human enterprise sets limits on the degree of revision that is permissible. No successful analysis of these notions can transcend the established limits. On the other hand, some attempts at causal judgment and explanation are clearly inadequate, and an acceptable theory cannot endorse them.

In this concluding chapter we first canvass leading analyses of singular causal judgments. Many of these analyses have been treated in earlier chapters, at least insofar as they constitute objections to Hume's theory of causation. Here we briefly expound the constructive side of these accounts of causal judgment, and then consider whether they identify errors of either omission or commission in the regularity theory. Our intent is to show that despite the contributions made by possible alternative analyses of causal judgments, their aims differ fundamentally from Hume's, and consequently these analyses con-

stitute no threat to his conception of causation. We argue that this conclusion applies as well to Hume's successor John Stuart Mill.

In later sections we shift from causal judgments to issues of explanation. The central topic that we address there is the relation between Hume's theory of causation and the contemporary covering-law account of explanation. We explore the possibility that Hume's theory entails an implicit commitment to this scheme of explanation. Finally, we consider whether defects in the covering-law model reveal faults that undermine Humean views.

I

Many philosophers have handled the concept of causation through an analysis of ordinary causal judgments. The most radical of these attempts assimilate all questions about causation to questions about causal judgment and explanation. Some even make the nature of causal judgment primary, and generate an account of causation from conclusions about causal judgment. Philosophers who defend singularist, manipulability, and contextualist theories of causation have generally challenged Hume's regularity analysis from this perspective. R. G. Collingwood, though a probing critic of Hume, is among the more moderate. He argues that there are three different senses of cause, and that Hume's account is inadequate because it neglects to take two of these senses into account. Gertrude Anscombe's reaction is at once more critical and more typical: "Contrary to the opinion of Hume, there are many different sorts of causality."¹ Based on such criticisms even some careful expositors of Hume's texts have accused him of philosophical error or at least of shortsightedness. For example, Antony Flew argues that Hume's theory errs significantly by overlooking the practical interests that inform causal judgments,² and Terence Penelhum complains that Hume does not account for our use of "cause" as a *sine qua non* or necessary condition—as in-

1. G. E. M. Anscombe, "Causality and Determination," in E. Sosa, ed., *Causation and Conditionals* (Oxford: Oxford University Press, 1975), p. 78.

2. Antony Flew, *Hume's Philosophy of Belief* (London: Routledge & Kegan Paul, 1961), p. 127.

stanced, for example, in historical judgments.³ Penelhum bluntly accuses Hume of failing to see that "it is not part of the notion of a cause as a necessary condition that it should also be a sufficient one."⁴

Let us begin our examination of causal judgment with an example of the (usually singular) causal assertions that prompt such philosophers to criticize Hume. Consider a circumstance that Collingwood considers typical of those calling for causal judgment and explanation:

A car skids while cornering at a certain point, strikes the kerb, and turns turtle. From the car-driver's point of view the cause of the accident was cornering too fast, and the lesson is that one must drive more carefully. From the county surveyor's point of view the cause was a defect in the surface or camber of the road, and the lesson is that greater care must be taken to make roads skid-proof. From the motor-manufacturer's point of view the cause was defective design in the car, and the lesson is that one must place the centre of gravity lower.⁵

Using such examples, Collingwood derives a "principle of the relativity of causes." He argues that persons who are differently situated will give different answers to the question "What is *the cause* of *y*?" Relativity of judgment occurs because the cause, for any given person, is that condition from the set of all relevant causal conditions that the person is capable of controlling or preventing, or at least the cause is that which is most naturally understood in terms of controllability. "The cause" judgments, on Collingwood's analysis, are thus relative to a specific context of investigation, determined by considerations of manipulability. Collingwood concludes that a person who is unable to control the conditions of an event's occurrence cannot use the term "cause" in one of its important meanings. There simply are no causes in this sense unless conditions are seen from the perspective of agent control.

Not everyone opposed to Hume believes in the contextual relativity of causes, or even that there are different senses of

3. Terence Penelhum, *Hume* (New York: St. Martin's Press, 1975), pp. 56f and p. 201, note 12.

4. *Ibid.*, p. 56.

5. R. G. Collingwood, *An Essay on Metaphysics* (Oxford: Clarendon Press, 1940), p. 304.

cause. Some are noncontextualists committed to a uniform analysis of singular causal statements. Ducasse's singularism is an example of a theory according to which the cause is the same for all, independent of context. Nevertheless, the subtle and significant differences between certain singularist theories, manipulability theories, and contextualist theories can be no part of our concern here. Our exclusive interest is their unified opposition to Hume and the grounds of that opposition. In considering the following positive proposals about the character of causal judgments, we shall therefore bracket the question of their many theoretical differences.

C. J. Ducasse

If it is the cause that we seek, we look for a *difference* in those circumstances between the moment when the phenomenon occurred, and the preceding moment. And the field among the entities of which the conditions lie is thereby also denied. It is that of circumstances which *remain constant* over the two moments.⁶

R. G. Collingwood

The term "cause," as actually used in modern English and other languages, is ambiguous. It has *three senses*; possibly more; but at any rate three.

Sense I. Here that which is "caused" is the *free and deliberate act* of a conscious and responsible agent, and "causing" him to do it means affording him a motive for doing it.

Sense II. Here that which is "caused" is an *event* in nature, and its "cause" is an event or state of things by producing or preventing which we can produce or prevent that whose cause it is said to be.

Sense III. Here that which is "caused" is an event or state of things, and its "cause" is another event or state of things standing to it in a one-one relation of causal priority: i.e. a relation of such a kind that (a) if the cause happens or exists the effect also must happen or exist, even if no further conditions are fulfilled, (b) the effect cannot happen or exist unless the cause happens or exists, (c) in some sense which remains to be defined, the cause is prior to the effect; for without such priority there would be no telling which is which.⁷

6. C. J. Ducasse, *Causation and the Types of Necessity* (Seattle: University of Washington Press, 1924; New York: Dover, 1969), p. 19.

7. Collingwood, *op. cit.*, pp. 285f (emphasis added).

H. L. A. Hart and A. M. Honoré

There is not a single concept of causation but a group or family of concepts. These are united not by a set of common features but by points of resemblance, some of them tenuous. Of this group the correlates "cause and effect" mark off one member which is of fundamental importance in practical life and for that reason, if no other, has claim to be considered the central notion. . . . The notion, that a cause is essentially something which interferes with or intervenes in the course of events which would normally take place, is central to the common-sense concept of cause, and is at least as essential as the notions of invariable or constant sequence so much stressed by Mill and Hume.⁸

J. L. Mackie

I suggest that a statement which asserts a singular causal sequence, of such a form as "A caused P," often makes, implicitly, the following claims:

(i) A is at least an INUS condition of P—that is, there is a necessary and sufficient condition of P which has one of these forms: (AX or Y), (A or Y), AX, A.

(ii) A was present on the occasion in question.

(iii) The factors represented by the "X," if any, in the formula for the necessary and sufficient condition were present on the occasion in question.

(iv) Every disjunct in "Y" which does not contain "A" as a conjunct was absent on the occasion in question.⁹

This set of quotations presents the constructive side of several important non-Humean proposals. In previous chapters we evaluated aspects of Ducasse's singularism, Mackie's inus-condition analysis, and the manipulability theories of von Wright and Gasking. We found each wanting as alternatives to some aspect of Hume's theory of causation. The most instructive from among these theories of causal judgment for present purposes, however, is the eclectic and influential account offered by

8. H. L. A. Hart and A. M. Honoré, *Causation in the Law* (Oxford: Clarendon Press, 1959), pp. 26–27.

9. J. L. Mackie, "Causes and Conditions," *American Philosophical Quarterly* 2 (1965), pp. 245–64, as reprinted in Sosa, ed., *op. cit.*, pp. 15–38. On page 19, Mackie adds, "I do not suggest that this is the whole of what is meant by 'A caused P' on any occasion, or even that it is a part of what is meant on every occasion."

H. L. A. Hart and A. M. Honoré. They draw heavily on uses of the term "cause" in legal, historical, and practical contexts, and they exhibit a special interest in "the cause" judgments of ordinary thought as expressed in singular causal statements.¹⁰ They contend that careful attention to terms such as "cause," "effect," "result," and "consequence" reveals dimensions of meaning neglected in many philosophical treatments of causation, including those of Hume and the defenders of the regularity theory. Hart and Honoré find, for example, that the causal notions of "provision of reasons," "provision of opportunity," and "human intervention" are ignored in regularity theories. They hold that nonregularity principles govern the judgments of lawyers, historians, and the "plain man." The principles operative in these judgments, they claim, have more to do with the context of causal inquiry than with causal laws, which they regard as functioning primarily to justify causal judgments.

Hart and Honoré argue that a *cause* in practical life is a condition deviating from the normal or reasonably expected course of events, whereas a *mere condition* is a factor that is normal and inconspicuous. Criteria of normality, they maintain, are relative to one's context of inquiry, and this relativity indicates that use of the word "cause" is closely tied to the need to explain a puzzling or unusual occurrence. Their analysis follows the general lines of Collingwood's: they are contextualists who find the concept of causation to involve a cluster of related concepts and who also find the manipulability model essential. In their estimation, however, Collingwood misses the close connection between explanation and causation, and with it the crucial insight that causes are departures from the normal course of events.

Many contemporary philosophers interested in causation have taken Hart and Honoré's analysis as a point of departure. Samuel Gorovitz, for example, bases his account of causation on the Hart-Honoré thesis that causes are relative to context and selected because they are deviations from the circumstantially normal. Gorovitz finds Hart and Honoré's notion of "normality" both obscure and incomplete, and suggests a more technical

10. Hart and Honoré, *op. cit.*, pp. 17–48.

"differentiating-factor analysis."¹¹ But this contribution represents merely an improvement in the expression of a view whose essential features are shared with many others.

Let us now turn to the criticisms of the regularity theory that follow from these views. A common objection is that there are many cases in which we distinguish causes from their effects even though knowledge of regularities would not alone allow us to do so. Moreover, it is often observed that certain relations which are clearly not causal nevertheless satisfy the regularity theorists' criteria of causation. A traditional example of the second sort is the regularity of night following day, which is said on the regularity view to entail that the latter be the cause of the former. Examples of the first sort are often found in legal and practical contexts in which known regularities do not discriminate between causes and mere conditions. Thus the murderer's administration of poison and the victim's hunger must be distinguished as cause and mere condition of death, though both are equally implicated in regularities subsuming the effect in question. The nearly universal complaint is that the regularity theory is useless in these cases and that if one removes the manipulability, differentiating, or abnormality dimension, the causal relationship vanishes with it. Regularity theorists' analyses of causation are thus dismissed as one-sided accounts whose misplaced emphasis stems from an exclusive focus on scientific contexts.

These criticisms suggest two basic conclusions pertinent to the interpretation of Hume and the defense of a regularity theory of causation: (1) the regularity theory is too restricted to provide an adequate account of causation; and (2) theories of judgment and explanation are essential to an understanding of *the causal relation*. Insofar as the latter theories describe a crucial distinction in judgment between causes and conditions, they seem to highlight the inadequacies of a regularity theory blind to such differences.

11. Samuel Gorovitz, "Causal Judgments and Causal Explanations," *Journal of Philosophy* 62 (1965), pp. 695-711, as reprinted in Tom L. Beauchamp, ed., *Philosophical Problems of Causation* (Encino, Calif.: Dickenson Publishing Company, 1974), p. 240.

II

Hume and his successor John Stuart Mill together stand opposed to the views presented in the previous section. Hume provides no direct rejoinder to these claims, for reasons we shall elaborate, but he is forthright enough in stating his opposition to views that discriminate between causes and conditions. In a well-known passage of the *Treatise*, he writes, "we must reject the distinction betwixt *cause* and *occasion*, when suppos'd to signify any thing essentially different from each other" (T, 171; emphasis in original). Mill's answer is equally direct. He argues that "the real Cause is the whole of these antecedents; and we have, philosophically speaking, no right to give the name of cause to one of them exclusively of the others."¹² Hart and Honoré, Mackie, and many writers on causation have complained that this model is excessively idealized, even for physical causation.¹³ Mill, however, is uncompromising: "Nothing can better show the absence of any scientific ground for the distinction between the cause of a phenomenon and its conditions, than the capricious manner in which we select from among the conditions that which we choose to denominate the cause."¹⁴

The grounds for this summary rejection of distinctions which, as Hume says, "we sometimes make," are to be found in many of our arguments in favor of the regularity theory of causation. Together they constitute a strong case against the criticism that Hume's theory fails to draw obvious distinctions and sustain widely shared beliefs. In Chapter 1 we argued that Hume's is a revisionary theory of causation, not a logical or conceptual investigation of ordinary language or common sense. In Chapter 4 we expanded this thesis, noting that Hume's stated interest is in the "true meaning" of causal statements and not in the "frequent use of words." In Chapter 2 we found that Hume's revisionary analysis is a constructive attempt to analyze the true nature of causation, and not a sceptical attempt to question the existence of causes or the workings of causal reasoning. In

12. John Stuart Mill, *A System of Logic* (London: Longmans, 1961), Book III, Chapter 5, Section 3.

13. Hart and Honoré, *op. cit.*, pp. 21, 41-43; and J. L. Mackie, *The Cement of the Universe* (Oxford: Clarendon Press, 1974), p. 118.

14. Mill, *op. cit.*

Chapter 3 we argued that singular causal statements entail causal laws (whatever else such statements may also involve) and that Ducasse's singularism collapses into the regularity theory. In Chapters 5 and 6 we noted the counterintuitive character of many of Hume's statements about contiguity and directionality. We mentioned that his views seem to deviate from common convictions and to be inconsistent with apparently successful causal explanations. Finally, and most importantly, we argued in Chapter 7 that Hume's theory constitutes a metaphysical account of causation that renders sentences reporting this relation extensional, and thus that Hume's theory is not intended as an epistemological account of causal explanation and judgment.

These contentions all suggest a firm conclusion regarding the theories of causation and consequent criticisms of Hume outlined in Section I of this chapter. However prescient these accounts of causal judgment, they provide inadequate grounds for the criticism of Hume, because their philosophical purposes diverge too widely from his. The philosophers we have cited are motivated by philosophical interests in the epistemological principles governing judgments in a variety of contexts. Judgments of causal responsibility in law and morals, for example, are based on principles that make it possible to determine whether a particular human action is a cause. An action's *being* "the cause" is in turn influenced by the need to identify responsible agents. Likewise in ordinary and historical causal judgments, practical concerns fashion the truth conditions of "x caused y." Contrary to the opinions of Hart and Honoré, Anscombe, and innumerable others, no Humean will deny that there are various "senses" of cause, not all of which are controlled by empirical truth conditions. The principles involved may well be "man-made," as Hart and Honoré note in citing such statements as "The gardener's failure to water the flowers caused their dying."¹⁵ Indeed, these senses may in the end depend on moral, or at least normative, considerations. As William H. Dray points out:

A causal explanation is often . . . designed to show what went wrong; it focuses attention not just on what was or could have been done, but on what *should* or *should not* have been done by certain historical

15. Hart and Honoré, *op. cit.*, pp. 35f.

agents. Thus, selecting the causal condition sometimes cannot be divorced from assigning blame.¹⁶

The language of "selection" is common in these theories. Though constrained by governing principles, one selects from a range of causal conditions, any one of which may truly be "the cause." There is a deficiency in the regularity theory only if it pretends to analyze these *senses* of "causation" and offers an account of the principles by which causes are "selected." But the regularity theory is not of this order. Hume has multiple interests, but this aim is not among them. He is concerned with the metaphysical, epistemological, and psychological problems of causation and causal inference spawned by his overarching intent in the *Treatise* to produce a science of human nature. But he is not interested in the nature of ordinary causal judgments. At most he advances a theory on the basis of which the misleading directives of custom and imagination can be counteracted and corrected:

Tho' custom be the foundation of all our judgments, yet sometimes it has an effect on the imagination in opposition to the judgment. . . . We may correct this propensity by a reflection on the nature of these circumstances. . . .

We shall afterwards [Sec. 15] take notice of some general rules, by which we ought to regulate our judgment concerning causes and effects. (T, 147-49; emphasis added)

Hume here manifests a subsidiary interest in what he calls both "principles" and "general rules" that guide causal judgment in selecting true causes from accidentally conjoined conditions (cf. T, 97n, 170-75). But he does not intend to analyze practical, historical, and legal judgments about causation; and there is no indication in his work that he regards the regularity theory as directly relevant to this task. Of course, Hume and Mill may be chasing rainbows, for it may be the case that all causal judgments and explanations are context bound—scientific and metaphysical ones no less than the practical. Hanson's critique of the regularity theory seems to reach this conclusion. Should such a broad alternative account of causation turn out to be correct, Hume and Mill can be faulted for total failure; but let

16. W. Dray, *Laws and Explanation in History* (Oxford: Clarendon Press, 1957), p. 99.

us at least be clear about their enterprise. They ought not to be faulted for neglecting to provide analyses they never intended to provide and had no philosophical reason to undertake.

III

Three apparent problems are raised by the arguments thus far advanced. First, our suggestion that Hume has no theory of causal judgment may be deemed unacceptable because large sections of the *Treatise* are devoted to causal inference and thus to circumstances under which causal judgments are formulated. Second, the belief, apparently shared by Mill and Hume, that a cause is the whole set of the antecedents of an effect may seem incompatible either with the regularity theory altogether or with the very possibility of causal judgments. Either outcome would of course threaten the regularity view. Third, any claim that Hume and Mill are concerned with causation and not with the analysis of causal judgments seems to leave no room for them to handle the problems of causal explanation we promised to treat in this chapter. We shall consider the first two issues in the present section, reserving the third for the remainder of the chapter.

Hume plainly did develop a theory of causal inference that is intimately connected to the regularity theory. It is predominantly descriptive and psychological in character, but contains important logical and epistemological elements as well (some of which were discussed in detail in Chapter 2). For example, Hume distinguishes the psychological process of causal inference from causal inference that *successfully* locates the cause. He further distinguishes both forms of inference from the true cause itself. His theory of inference is based on a psychological account of observation and association, and of course it explains the movement of thought from cause to effect in terms of custom. In certain passages Hume exhibits a belief that causal judgment involves a selective picking out of causes. He treats this process, however, in the way psychologists explain selective attention and discrimination; he evidently does not think it has anything to do with the logical principles regulating proper selection of causes. Thus it is no surprise that his enterprise differs starkly from that of the philosophers such as Collingwood mentioned in Section I.

According to Hume's philosophy causal judgments are based on experiences of constant conjunction. Yet Hume nowhere denies that there may be special reasons for selecting some set of constantly conjoined conditions over another set of constantly conjoined conditions—given the variety of purposes (practical, legal, historical, etc.) that influence human decisions. His real philosophical interest, however, is in context-independent judgments of the true cause, as illustrated by his account of inductive rules. He simply is not concerned with conditions dictated by practical contexts. The correctness or incorrectness of a causal judgment, then, is determined by true causal relations—the only cement of the universe—and not in any other way.

Mill's views are similar. Concerning the ordinary distinction between what is denominated the cause and what is considered merely a condition, he writes: "However numerous the conditions may be, there is hardly any of them which may not, according to the purpose of our immediate discourse, obtain that nominal preeminence" of being denominated the cause.¹⁷ Following a series of examples of the distinction between the cause and its background conditions (with the variability and contextual determination discussed by Hart and Honoré), Mill concludes: "Thus we see that each and every condition of the phenomenon may be taken in its turn, and, with equal propriety in common parlance, . . . may be spoken of as if it were the entire cause."¹⁸ Mill holds that what may be unexceptional in common parlance, and what may be permissible according to immediate discourse, is subject to systematic explanation, without thereby affecting our understanding of causation in the objects. According to Mill, "the real Cause is the whole of these antecedents; and we have, philosophically, no right to give the name of cause to one of them exclusively of the others."¹⁹

The notion that the cause is the whole of the antecedents of the effect can be variously interpreted, and different objections will be offered against Hume and Mill depending on the interpretation accepted. Sometimes the notion that the cause is the whole of the antecedents is treated as a claim about all of the causally relevant conditions *contiguous* with the effect. Let us call this sense 1. So interpreted, the whole-of-the-antecedents

¹⁷ Mill, *op. cit.*

¹⁸ *Ibid.*

¹⁹ *Ibid.*

view may be considered incompatible with the very possibility of true causal judgments. Alternatively the whole-of-the-antecedents view can be treated as a claim not about the spatiotemporally contiguous causal conditions of an effect, but as a claim about the entire network of causal chains that stretches backward in time from the effect, the whole of its antecedents over time. Let us call this sense 2. So interpreted, the whole-of-the-antecedents claim seems incompatible with the *regularity* theory, for there could be in principle no regularities of this order.

Even if sense 2 were the correct interpretation, the allegation of incompatibility with the regularity theory could not be sustained. The errors on which this argument trades were exposed in Chapter 5 when contiguity and causal chains were treated. We can all agree that there is no law connecting effects and the whole prior history of the universe leading up to them. If the whole-of-the-antecedents view required such a law, the regularity theory would indeed be undercut. But of course it does not require such a law. Let us allow that each of the events figuring in the vast network of causal chains leading up to a given effect is minimally necessary in the circumstances for the effect, as it came about. It does not follow that one or more laws connect each causally necessary prior event with the effect that constitutes the terminus of the network of causal chains in question. Hume and Mill are committed only to the view that laws subsume each pair of contiguous links in these chains—links that perhaps criss-cross and overlap in the case of any given effect. Behind an effect stand many chains constituting the whole of its antecedents (in sense 2), a whole that is causal not in virtue of one law, but in virtue of many. There are as many laws as there are causally distinct types of conjunctions in the network of causally necessary links. This full set of events leading directly to an effect is how the sequence of prior events looks when all anthropocentric and normative principles of selection, such as those cited by Honoré and Hart, are stripped away, and nature is left bare of human interest and interpretation.

Understood in sense 2, then, the whole-of-the-antecedents thesis in no way conflicts with the regularity theory's insistence that causal connections are law-governed. The only respect in which this interpretation is incompatible with Hume's theory of causation is in its suggestion that among the antecedents con-

stituting the cause are events that are not spatiotemporally contiguous with the effect, events that occurred long before and far away from the effect. Because Hume is committed to the spatiotemporal contiguity of causes and effects, he cannot embrace the whole-of-the-antecedents thesis when interpreted as a claim that the entire network of chains is "the cause" of the effect. A Humean must therefore reject this understanding of Mill's claim that "the real cause . . . is the whole of these antecedents." "The cause" in Hume's regularity theory indicates the set of all causally necessary circumstances obtaining at the time and place the effect occurred, and this set alone (i.e., sense 1 above) must constitute the whole of the antecedents.

Yet when Mill's claim that the cause is the whole of the antecedents is interpreted in this way, it is often criticized on the ground that it makes accurate causal reports impossible. This charge is more serious than the contention that he failed to analyze ordinary causal claims, a task neither he nor Hume set themselves. J. L. Mackie, for instance, holds that analyses of the cause as reflecting the sum of the antecedent conditions is logically incompatible with the truth of correct causal reports. After advancing his own account of causes as *inus* conditions, Mackie notes the following advantage they have over causes treated as the sum of conditions sufficient for their effect:

[It is a] well-known difficulty that it is impossible, without including in the cause the whole environment, the whole prior state of the universe . . . to find a genuinely sufficient condition [for a particular house's catching fire] . . . because we should have to include, as one of the negative conjuncts, such an item as the earth's not being destroyed by a nuclear explosion just [prior to the effect]. . . . but it is easy and reasonable to say simply that such an explosion would . . . take us outside the field in which we are considering this effect. . . .²⁰

Thus, on Mackie's view, Mill's claim is seriously defective, because the sum of conditions would have to include a possibly infinite number of negative conditions. If this infinite set is part of the cause, causes could not be described in sentences of finite length. To avoid this difficulty Mackie introduces "the causal field," a notion that bears striking parallels to Colling-

20. Mackie, "Causes and Conditions," pp. 23-24.

wood's relativism as well as to Hart and Honoré's "causal contexts." Mackie notes that the question (1) "What caused this man's skin cancer?" may mean (1a) "Why did this man develop skin cancer now when he did not develop it before?" or it may mean, among other things, (1b) "Why did this man develop skin cancer, whereas other men who were also exposed to radiation did not?"²¹ In (1a) the "causal field" is the cancer of the man, and one acceptable answer to the question is that the man was exposed to a certain amount of radiation. In (1b) the causal field is the class of men exposed to radiation, and in this case being exposed to radiation cannot be the cause. Mackie's account has the objectionable characteristic of treating causation through explanatory contexts. It merely explains why and how we select certain features from among the antecedents of the effect, and not others, in ordinary causal judgments. Perhaps it is for this reason that Mackie recognizes an interpretation of Mill whose conclusions he finds philosophically acceptable:

Since even the choice of a field is relative to a purpose or a point of view [and may be] . . . closely related to our interests, there is much to be said for Mill's refusal to distinguish "philosophically speaking" between causes and conditions. As an analysis of ordinary language, this would be wrong; but from a theoretical point of view, as an account of causal processes themselves, it would be right.²²

Despite this endorsement, it is important to note that the alleged difficulty leading Mackie to prefer his broad account to Mill's is not a difficulty for the regularity theory. Mill's account of the cause is actually *compatible* with ordinary distinctions between causes and conditions, and need not involve the "refusal" Mackie mentions. Mackie supposes that we cannot specify the whole cause if we cannot wholly specify it. He assumes that because a full description of the cause must be of infinite length on Mill's view, any lesser description is not a description of the cause; and consequently causes could never be cited. But merely because a particular description of the causal event is couched sometimes in terms of one aspect and sometimes in terms of another (depending on the context of inquiry, occurrence, or

21. *Ibid.*, p. 22.

22. Mackie, *The Cement of the Universe*, p. 120.

causal field), and thus is incomplete, it does not follow that the whole panoply of antecedents which characterize the cause event has not been referred to.

Davidson has expressed this point in an account we cited in Chapter 3: "Mill's critics are no doubt justified in contending that we may correctly give the cause without saying enough about it to demonstrate that it was sufficient; but they share Mill's confusion if they think every deletion from the description of an event represents something deleted from the event described."²³ Davidson's point actually can be used in defense of Mill, despite the apparent criticism. Certainly it misses the mark when it invokes "Mill's confusion." Mill explicitly allowed that in ordinary discourse we may cite the cause without saying enough about it to demonstrate sufficiency. It is also not clear that Mill asserted or even supposed that every deletion from the description of an event represents something deleted from the event described. There are several passages that at least strongly suggest a contrary position. Thus Mill writes: "If we do not, when aiming at accuracy, enumerate all the conditions, it is only because some of them will in most cases be understood without being expressed, or because for the purpose in view they may without detriment be overlooked."²⁴

Davidson's point effectively answers Mill's critics, but not Mill himself. One of Davidson's own arguments will suffice to illustrate why:

"The cause of this match's lighting is that it was struck—yes, but that was only *part* of the cause; it had to be a dry match, there had to be adequate oxygen in the atmosphere, it had to be struck hard enough, etc." . . . [This] "yes, but" comment does not have the force we thought. It cannot be that the striking of this match was only part of the cause, for this match was in fact dry, in adequate oxygen, and the striking surface was hard enough. What is partial in the sentence "the cause of this match's lighting is that it was struck" is the *description* of the cause; as we add to the description of the cause, we may approach the point where we can deduce, from this description and laws, that an effect of the kind described would follow.²⁵

23. D. Davidson, "Causal Relations," *The Journal of Philosophy* 64 (1967), as reprinted in Beauchamp, ed., *op. cit.*, p. 195.

24. Mill, *op. cit.*

25. Davidson, *op. cit.*, p. 195.

The positions defended by Mill and Hume on these matters are again not incompatible with the views of many contemporary philosophers who have attacked them. These critics have mistakenly thought that their special interests in the ordinary conception of causation offer grounds for criticizing Hume's and Mill's treatment of the causal relation itself. With Hume's actual intentions now firmly in mind, we may turn to the implications of the regularity theory for problems of causal explanation.

IV

We have argued that neither Mill nor Hume intends to analyze the principles regulating singular causal judgments. In light of this conclusion, how should the regularity theory treat problems of causal explanation, especially in light of the fact that Hume seems to have no greater interest in causal explanation than in causal judgment? His apparent indifference is compatible with a revisionary account or rational reconstruction of explanation. As we have repeatedly argued, Hume's account of causation is revisionary. The Humean may offer a parallel rational reconstruction of explanation, so long as the account does not render explanation an impossible or rare achievement. But what form could such a revisionary thesis assume?

A revisionary account of explanation that many Humeans have found attractive is the deductive-nomological or covering-law model of explanation, and we have left little doubt in earlier chapters of this book that Hume is in some measure committed to covering laws. In the remaining sections of this chapter we examine more precisely Hume's commitment to this model, and the difficulties, if any, which such a commitment generates for his regularity theory of causation. In this section we expound the broad outlines of the model and of Hume's investment in it. In the next two sections we consider objections to the model when construed as a sufficient condition for explanation, the degree to which these objections reflect on the regularity theory, and possible strategies for undercutting these objections. In the final two sections we assess the claim that the deductive-nomological account provides necessary conditions of adequate explanation, attending particularly to purposive or goal-directed

behavior, which is often claimed to be non-Humean in its underlying causal mechanisms. We consider whether the explanations offered for human action by historians and social scientists, and indeed by Hume himself, are consistent with his theory of causation.

Hume offers no explicit characterization of causal explanation, but leading proponents of the covering-law analysis have traditionally appealed to certain key features of his theory of causation. Indeed, according to one version of this model, all explanations of contingent phenomena proceed by the subsumption of the item to be explained under a law that connects it to conditions *causally relevant* to its occurrence. The earliest explicit statement is found in Mill's *System of Logic*:

An individual fact is said to be explained by pointing out its cause, that is, by stating the law or laws of causation of which its production is an instance. Thus a conflagration is explained when it is proved to have arisen from a spark falling into the midst of a heap of combustibles; and in a similar manner, a law or uniformity in nature is said to be explained when another law or laws are pointed out, of which the law itself is but a case, and from which it could be deduced.²⁶

Mill goes on, as have other followers of Hume, to argue that this account, suitably amended, holds for the explanation of all contingent occurrences in the natural and social sciences.

That Hume concurs in these claims seems evident from several diverse sources. For example, he holds that explanation of natural phenomena proceeds by subsumption under laws of successively greater generality:

It is confessed, that the utmost effort of human reason is to reduce the principles, productive of natural phenomena, to a greater simplicity, and to resolve the many particular effects into a few general causes, by means of reasonings from analogy, experience, and observation. But as to the causes of these general causes, we should in vain attempt their discovery; nor shall we ever be able to satisfy ourselves, by any particular explication of them. These ultimate springs and principles are totally shut up from human curiosity and enquiry. Elasticity, gravity, cohesion of parts, communication of motion by impulse; these are probably the ultimate causes and principles which we shall ever dis-

²⁶ Mill, *op. cit.*, Book III, Chapter 12, Section 1.

cover in nature; and we may esteem ourselves sufficiently happy, if, by accurate enquiry and reasoning, we can trace up the particular phenomena to, or near to, these general principles. The most perfect philosophy of the natural kind only staves off our ignorance a little longer. (EHU, Sec. 26)

As we argued in Chapter 3, Hume suggests that explanation requires laws, and that the ultimate explanations of both particular occurrences and the generalizations that subsume them are the laws of physics. More importantly, he claims that we can expect no more from explanations than that they reveal the items explained as instances of the consequents of causal laws (of perhaps successively more general sorts). This restriction on what we can hope to discover from explanations is significant, for Humean theories of explanation are sometimes condemned on the ground that the mere subsumption of an event under a regularity is no explanation at all. As one contemporary opponent of covering-law explanations writes, "once the demand for explanation arises, an answer which does no more than represent what is to be explained as what we always find happening in such circumstances fails to explain it at all. . . . [S]ome sort of analysis besides mere certification as a recurring phenomenon, would seem to be essential."²⁷ The view that explanations must "go beyond certifying" something as "what always happens" is one that Hume and his followers ultimately reject, another reason for saying they defend a revisionary account of explanation. Most alternative theories connect explanation with subjective *understanding*. They stipulate, as at least a necessary condition of successful explanation, that it reduce puzzlement, make the explanandum comprehensible, and meet certain contextually determined criteria of appropriateness.²⁸

On Hume's contrasting view, the most we can hope for by way of explanatory completeness, accuracy, and understanding is the demonstration that the occurrence to be explained reflects regularities of a perhaps fundamental but nevertheless

27. Dray, *op. cit.*, pp. 72f.

28. See for example Michael Scriven, "Explanation, Prediction and Laws," *Minnesota Studies in Philosophy of Science*, Vol. 3 (Minneapolis: University of Minnesota Press, 1962), pp. 170-229, and Peter Achinstein, "Explanation," *Studies in the Philosophy of Science, American Philosophical Quarterly*, Monograph Series, No. 3 (Oxford: Basil Blackwell, 1969).

wholly contingent type. This position strongly suggests that Hume would sympathize with those philosophers whose aim is to provide a revisionary analysis or rational reconstruction of explanation by appeal to covering laws. Notable among these philosophers has been Carl Hempel, who has defended the deductive-nomological pattern first elaborated by Mill. Hempel seeks to make the assessment of explanations as much a matter of formal considerations as possible. He deems inadequate the requirement that explanations provide understanding, construed as the subjective reduction of puzzlement. In its place, he proposes that explanations establish a formally determinable, deductive relation between sentences describing the event to be explained, the initial conditions (the cause), and a law or laws permitting the deduction of the former from the latter. In this way the notion of explanation is assimilated to that of proof, a procedure whose satisfaction is mechanically determinable for many problems.

Although Hempel and other empiricists have clearly endorsed some version of the regularity theory of causation,²⁹ none has ever offered the following simple argument as a rationale for their accounts of explanation: (a) to provide a causal explanation of an event is to cite its cause under an appropriate description; (b) causal connections obtain in virtue of laws that subsume events; and therefore (c) to provide a causal explanation (and not merely a true singular causal statement) involves the citation or presumption of a law or laws underwriting the connection between the event to be explained and the events described as its cause. These three simple parts of a Humean argument provide a more direct reason for accepting the deductive-nomological model of explanation than does the attempt to assimilate explanation to proof. They also seem superior to Hempel's so-called general adequacy requirement for explanations, according to which explanations take this form because only thus do they give good grounds for supposing that the explanandum event actually obtained.³⁰

The deductive-nomological account of explanation has en-

29. C. G. Hempel, *Aspects of Scientific Explanation* (New York: Free Press, 1965), pp. 349ff.

30. Hume himself embraced this latter criterion of adequacy for explanations. Cf. his insistence that we can know of the occurrence of an event only through causal considerations (T, 108; EHU, Sec. 87).

countered many substantial objections, and it is understandable that a proponent would not want to carry an additional obligation to defend a particular theory of causality. Thus even *Humeans* interested in this account of explanation could not be expected to treat Hume's theory of causation in detail or to make it an essential part of their account of explanation. Furthermore, proponents of the covering-law account have held that its application, especially in the natural sciences, extends well beyond the bounds of explicitly causal contexts. Ernest Nagel, for example, treats explanations that appeal to the equation of state for an ideal gas, $PV = rT$, as covering-law explanations, but not causal ones, on the grounds that the equation's variables vary functionally and symmetrically in a way that causal sequences do not.³¹

The issues complicating the preceding seven chapters of this work perhaps testify to the wisdom of dissociating the covering-law account of explanation from the unnecessary demands of a full scale defense of Hume's theory of causation. On the other hand, if these chapters strengthen the grip of Hume's account of causation, they must improve the position of the covering-law account of explanation. More importantly, they lend credence to the rational reconstructionist aims of a covering-law theorist by providing independent reasons to suppose that we can expect no more of explanations than what the covering-law model offers. If Hume is right about the limits to explanatory pretensions, then we can only ask of an account of explanation that it conform to the standards for perspicuity and clarity already exemplified in the mathematical notion of proof.

In his account of scientific explanation, Hempel notes that "the terms 'empirical science' and 'scientific explanation' will . . . be understood to refer to the entire field of empirical inquiry, including the natural and the social sciences as well as historical research."³² Hume is notoriously committed in the *Treatise* to an account of explanation that is uniform across all the nonmathematical disciplines in which explanations are advanced and assessed. His "science of human nature" was conceived both at the time he wrote it and subsequently as a novel

31. E. Nagel, *The Structure of Science* (New York: Harcourt, Brace & World, 1961), Chapter 3.

32. Hempel, *op. cit.*, p. 333.

and revisionary approach to scientific explanation. The following statement is indicative of his approach: "There is a general course of nature in human actions, as well as in the operations of the sun and the climate. . . . In judging of the actions of men we must proceed upon the same maxims, as when we reason concerning external objects" (T, 402-3). This position gives yet another reason for holding that Hume would concur in the broad outlines of the deductive-nomological treatment of explanation (at least as Hempel develops it).

We conclude, then, that though Hume did not offer such an account with the precision we might wish, he apparently holds that events are explained by subsumption under laws, that laws themselves are explained by subsumption, that both the natural and social disciplines can uniformly be treated, and that these claims have prescriptive or revisionary force for those regions of inquiry in which they are ignored in actual practice.

V

The natural affinity between the regularity theory and the deductive-nomological model has led each to be assessed by reference to the merit of the other. This association is problematic for the defender of Hume's theory of causation, for the deductive-nomological model has been subjected to extensive criticism on grounds remote from problems of causation. On this theory, explanations are usually given for events, but in fact particulars of other sorts are also involved, including states, conditions, facts, etc. The sentences that provide the explanation, the "explanans," must meet several substantial conditions: they must describe one or more general laws and must include an account of the initial or boundary conditions within which the explained or "explanandum" phenomenon occurred, arose, or obtained. These two components of the explanans must jointly imply the truth of the explanandum statement. When initially advanced by Hempel and Oppenheim,³³ the theory also required that the explanans have "empirical content" and that the explanans be true.

These last two conditions of an adequate explanation have

33. C. G. Hempel and Paul Oppenheim, "Studies in the Logic of Explanation," *Philosophy of Science* 15 (1948), pp. 135-75.

long bedeviled the covering-law theory. The aim of the empirical-content stipulation is to exclude metaphysical, theological, and other scientifically "disreputable" accounts of phenomena which may pass muster on a commonsense account of explanation. The problem with this condition is a variant of one that has haunted empiricism from Hume's day to our own: it has proved impossible to expound an effective criterion of empirical content which is neither so broad as to legitimate much of what Hume calls "school metaphysics," nor so narrow as to exclude much of what he calls "reasoning concerning matter of fact and existence" (EHU, Sec. 132).

The second requirement, that the explanans be true, raises a different problem of epistemic indeterminism for the revisionary covering-law model. Given that the explanans must contain laws, and assuming that the evidence for any nomological statement is always incomplete, it follows that whether any set of statements constitutes an explanation is never beyond inductive doubt. The positive claim that a set of statements is an *explanation* will be as much open to revision as the lawlike statement it relies upon. This consequence is problematic for the deductive-nomological model, because many sentences seem to constitute an explanation whether or not they prove ultimately to be true. For example, no one is inclined to deny explanatory power to Newtonian accounts of the height of the tide at a particular date and place just because the laws they cite have turned out to be false.

On the other hand, to forgo entirely the requirement of truth, or some similar epistemic stipulation, would result in even graver counterintuitive consequences. Without such a requirement trivial explanations for events can be produced. Given any explanandum statement, it requires only minimal logical ingenuity to construct a set of sentences that includes a false universal conditional and that implies the explanandum sentence, thereby satisfying the covering-law model. To abandon epistemic requirements of the explanans is thus to deprive explanations of their explanatory power.

One alternative in the face of this difficulty is to substitute for the requirement of truth the requirement that the explanans be "well supported by available evidence." This strategy may enable us to retain the covering-law model as an account of ex-

planation while remaining faithful to most of our ordinary views on the subject. The trouble with this alternative is that the notion of "evidential support" is no clearer than the concept of empirical content, as required by the condition discussed above; and, even weakened in this way, the covering-law model will diverge from ordinary beliefs about explanation. For according to ordinary notions, the distinguishing constituent of explanation is not a set of logical, semantical, and epistemological features, but rather a body of informal, context-dependent features such as reduction to the familiar and the allaying of puzzlement. Accounts that by common agreement satisfy these conditions and that satisfy ordinary demands for explanatory completeness may yet lack "evidential support." This divergence from ordinary conceptions reflects one respect in which the covering-law model offers a rational reconstruction of ordinary notions.

A still more controversial divergence from ordinary standards of explanation can be found in the model's requirement that explanation and prediction be symmetrical. Because an explanation involves the deduction of a statement describing the occurrence of a particular phenomenon from a lawlike generalization and a description of initial conditions, it follows that the lawlike generalization and the initial condition statement together justify belief that the explanandum phenomenon has occurred or will occur, and thus that the occurrence could have been either predicted or retrodicted. Accordingly, it will be a necessary condition of every adequate scientific explanation that it serve equally well as a prediction or a retrodiction. This requirement, which seems a fairly obvious inference from deductive-nomological strictures, flies in the face of common evaluations of explanations, for we customarily do not hold them to so rigorous a standard. Here again the covering-law analysis diverges from conventional views in offering a rational reconstruction.

These problems continue to plague the covering-law theory of explanation, but is there any reason to suppose that they also create problems for Hume's theory of causation? We do not see that there need be any significant spillover from problems of explanation to causation. For example, the complexity of defining "empirical content" and "evidential support" bears di-

rectly on Hume's epistemology and on the general philosophical program of his empiricist followers. But it does not present difficulties for the *regularity* theory. One might argue further that none of the counterintuitive implications of the covering-law model are relevant to Hume's theory of causation, because, despite appearances, the two subjects are utterly distinct. Such an argument rests on the premise that the deductive-nomological theory is not an analysis of *causal* explanation, so that problems for the former are not problems for the latter. In support of this claim, it is noteworthy that nothing in the covering-law theory's demands for initial conditions requires that explanans statements describe the spatiotemporally contiguous and temporally prior conditions of the explanandum phenomenon, i.e., its cause.³⁴ Indeed, covering-law theorists are prepared to accept as initial conditions certain events, states, and circumstances that are apparently not causes of the effect to be explained. Thus the dispositional states and macroscopic properties of an object can be explained by the object's simultaneous microstructure together with laws relating the macroproperties and the microstructure. It is also sometimes claimed that we may provide a covering-law explanation of a phenomenon by citing its effect and a teleological law relating them. (Even apparently nonteleological laws, such as Fermat's least-action principle in optics, occasionally permit such apparently noncausal explanation.)

Although these considerations suggest that covering-law explanations are not restricted to the class of causal explanations, they certainly cannot entirely obviate a Humean defense of deductive-nomological explanation and rational reconstruction in this domain. It was the intention of Mill and other followers of Hume, as we have seen, to extend Hume's account of causation to all explanatory contexts, so that all explanations would in the end be causal explanations. The Humean is committed to the view that even where the term "cause" does not figure in an explanation, and even where the initial conditions do not seem overtly to constitute the cause of the explanandum phe-

34. Hempel makes this claim in the course of attempting to distinguish causal explanation and deductive-nomological explanation in "Explanation in Science and History" in R. Colodny, ed., *Frontiers of Science and Philosophy* (Pittsburgh: University of Pittsburgh Press, 1962), pp. 9-33.

nomenon, *the power of the explanation must ultimately rest on processes that are causal in Hume's original sense*. Teleological explanations, for example, are not admitted by the Humean unless they rest on a Humean causal process. Least-action explanations such as those involving Fermat's principles are clearly causal in that reference to future events (in the explanation of past ones) neither entails retrocausation nor is ineliminable. And physical microanalytic explanations, though admittedly synchronic, are of the sort Hume would have sanctioned as causal, because they trade on the causal laws cited in their elaboration.

Thus, problems for the deductive-nomological model that stem from its status as a revisionary reconstruction of ordinary conceptions cannot simply be swept aside by defenders of Hume, for his theory of causation does have all the *implications* for explanation discussed in the previous section, and perhaps other implications as well. On the other hand, as we shall argue, greater explicit reliance on Hume's own insights into causal reasoning will assist defenders of the covering-law model in their attempt to circumvent the aforementioned objections. This strategy may require a revision in the outlines of the covering-law model, as many of its proponents have conceived that model. But this revision presents no problems for the philosopher bent on defending Hume's theory of causation.

VI

The covering-law model is challenged by technical objections and informal counterexamples. Both the objections and the counterexamples are contrived to show that a set of sentences can satisfy every demand of the model, and yet fail to explain the explanandum.

Consider first the technical problems. Hempel and other contemporary exponents of the covering-law model seek to provide an account of explanations that employs a formal language no stronger than that of first-order truth-functional logic. One reason for this commitment is their desire to treat explanation as objective, as a mathematical procedure modelled on proof. Another reason is their belief that a language no stronger than first-order logic suffices in all scientific contexts, in part because

it seems sufficient for the mathematical formulae through which much scientific knowledge is expressed. Finally, first-order logic is a system that we thoroughly understand, and so promises to bring an especially high order of perspicuity to the analysis of explanation. In Hempel and Oppenheim's classic presentation of the deductive-nomological model,³⁵ an explanation is defined formally as follows: an ordered pair of sentences (T, C) constitutes an explanation for a singular sentence E if and only if

- (a) C is a singular sentence, and T is a set of universally quantified sentences employing purely qualitative predicates;
- (b) T and C are true;
- (c) E is logically derivable from T and C jointly, but not from either alone; and
- (d) T is compatible with at least one class of singular sentences which has C but not E as a consequence.

This apparently innocuous formalization of criteria already expounded informally has the unfortunate property of enabling us to construct an infinite variety of counterexamples that impugn the covering-law account. A simple example will suffice to illustrate this problem. Suppose T is the law that objects expand when heated, and E, the explanandum sentence, asserts that the moon is devoid of life. Suppose further that we add to T a statement such as "The moon is devoid of life or is heated but does not expand." This statement functions as C is required to by the formalization; E then follows from T and C, and all three sentences satisfy conditions (a) through (d). Yet the moon's being devoid of life has not been explained. Accordingly the multiple criteria in the covering-law model do not constitute a sufficient condition of explanation. They seem so trivially satisfiable as to shed no light on explanation whatever. It is not difficult to invent restrictions which when added to conditions (a) through (d) will circumvent this particular counterexample, but such restrictions require an independent rationale, and further counterexamples to the newly restricted account can easily be devised. Attempts to shore up the formal version of the analysis, and generally to thwart the criticism that the covering-law model provides only trivially satisfiable necessary con-

35. Hempel and Oppenheim, *op. cit.*

ditions of explanation, have thus far not succeeded. Indeed the project has by and large been abandoned.³⁶

This criticism of the covering-law model is serious for several reasons. First, it shows that the covering-law model provides at best necessary conditions of explanation. Moreover, the objection suggests that the necessary conditions described are uninteresting and fail to restrict the class of admissible explanations. Any explanation sanctioned by ordinary convictions, and even some putative explanations rejected in ordinary contexts, can be phrased so as to pass the test of conditions (a) through (d), and whatever additional restrictions are added to them. In short, the covering-law theory so substantially revises ordinary explanatory commitments that it turns out to have no special relevance for explanation.

Let us now return to our central concern. Not only does this objection leave Hume's account of causation untouched, but that account can be called upon to explain what has gone wrong in the reconstruction offered. The objection does not impair Hume's theory because the regularity account is in no respect committed to the adequacy of first-order truth-functional logic. Indeed, nothing is more obvious than the non-truth-functionality of singular causal statements, both on Hume's account of them, and on commonsensical accounts as well. For instance, "the fact that the Titanic struck the iceberg caused it to be the case that the Titanic sank" is true (although it requires special analysis in terms of events on the regularity theory we have supported), while the same causal statement with the contained sentences reversed will be false even though their truth values remain unaltered. Accordingly, causal statements are not truth-functional. Because it is thus free from any commitment to the adequacy of first-order logic for expressing the causal relation, the regularity theory is not open to the same trivializing counterexamples as the covering-law model of explanation.

Moreover, the non-truth-functionality of causal statements

36. Crucial papers on this subject include Rolf Eberle, David Kaplan, and Richard Montague, "Hempel and Oppenheim on Explanation," *Philosophy of Science* 28 (1961), pp. 418-28; David Kaplan, "Explanation Revisited," *Philosophy of Science* 28 (1961), pp. 429-36; and Jaegwon Kim, "Discussion: On the Logical Conditions of Deductive Explanation," *Philosophy of Science* 30 (1963), pp. 286-91.

helps reveal what has gone wrong in the attempt to formalize the deductive-nomological model at the level of first-order logic. If, as suggested above, an adequate explanation must ultimately appeal to processes that are causal in Hume's original sense, then it will be no surprise if a concept of explanation cut adrift from this non-truth-functional relation falters because of counterexamples hinging on the conception's commitment to truth-functionality. In abandoning the causal rationale for covering-law explanations, covering-law theorists successfully avoided celebrated controversies in the philosophy of causation. But they thereby strayed too far from the actualities of explanation in ordinary contexts. As it turns out, explanation is not an objective, truth-functional relation among sentences, and it is not akin to proof in mathematics. It retains an essentially pragmatic connection to the purposes of sentient creatures, and must meet informal requirements determined by these purposes. The Humean can and should claim, on the basis of his theory of causation and in behalf of his commitment to a nontrivial covering-law model, that such informal requirements are best represented by a model that posits a causal connection between the explanandum and the explanans. The hopes for first-order formalization would consequently have to be surrendered, but the nontrivial character of deductive-nomological strictures on explanation could be preserved.

This suggestion can be illustrated by considering informal counterexamples intended to show the irrelevance of covering-law requirements. Suppose we wish to explain why the Empire State Building is 1200 feet high. We may give an account of the matter that meets covering-law requirements by deducing its height from the law of the rectilinear propagation of light, the necessary truths of trigonometry, the angle of incidence of the sun's rays, and the measured length of the shadow cast by the building. This account clearly fails to explain the height of the edifice in question. It would be fatuous to reply that, although the argument does not satisfy conventional strictures on explanation, it is nevertheless scientifically adequate. For there are reasonable limits on the degree to which a rational reconstruction of explanation can transcend common intuitions, limits that the deductive-nomological model has simply ignored.

This explanatory deficiency can be amended by introducing

Humean causal considerations. The Empire State Building counterexample does not constitute an explanation because the items cited in the statement of the initial conditions do not, in any sense relevant to human purposes and capacities,³⁷ causally determine the state of affairs to be explained. One of the initial conditions is a causal consequence of the explanandum phenomenon and the other is causally independent of it. The problem identified is thus solved by adding a requirement that explanans and explanandum stand to each other in some particular causal relation that cannot be expressed through first-order logic, or for that matter through any simple and straightforward terms. It would, for example, be excessively stringent to require that the initial conditions cite the cause of the explanandum phenomenon. As noted previously, some patently acceptable covering-law explanations do not mention among their initial conditions phenomena that constitute the cause of their explananda phenomena. Some explanations cite states simultaneous with the explanandum phenomenon: for example, explanations of the properties of diamonds in terms of their crystal-lattice structure, and explanations that employ the gas laws. Others cite events that occur after the event to be explained, such as explanations employing Fermat's least-action principle to account for the path of a light-ray in terms of the last point on the path.

In each of these cases there is at least an indirect Humean causal link. The analysis of causal connections between simultaneous states provided in Chapter 6 shows how an explanation employing the gas laws and simultaneous causal conditions can reflect a Humean causal connection. And the citation of events occurring after the explanandum event in accounts trading on Fermat's principle are legitimate causal explanations because the explanandum event and the later event cited in its initial conditions are causal consequents of prior events which fix them both. These considerations suggest that a suitable restriction might be formulated and added to the other requirements of the covering-law model. So revised, the model would circumvent

37. Relativization to human purposes and capacities reflects the fact that in a wholly deterministic universe later events may strictly determine earlier ones, but not in a way that would allow humans to bring about events in the past. Cf. Chapter 6 for further discussion.

both vexing formal puzzles and informal counterexamples to the conventional deductive-nomological account of explanation. The revision would also reveal the extent to which Hume's treatment of causation is independent of defects in the covering-law model, as traditionally conceived. It is of course unclear whether exponents of this model would accept an addition which binds it so closely to an account of causation, and which precludes its formalization. Furthermore, whether such a causal requirement will represent the final among a set of sufficient conditions of explanation—that is, whether it will enable the covering-law model to avoid all technical objections and counterexamples—is beyond our immediate task. What does seem clear is that such an explicit causal condition of explanations would strengthen the Humean conviction that all factual knowledge is founded on relations of cause and effect.

We shall not here attempt to formulate a specific additional requirement of causal relevance between explanans and explanandum. Not only would the task be arduous, but a Humean need not be committed to any particular version of the requirement. He must, however, be committed to the general view that a restriction of this kind represents the correct strategy in analyzing explanation. This general view places the Humean under a heavier obligation than that of articulating the details of an account of explanation. It demands that he defend the whole strategy of covering-law explanation against a set of objections entirely different from those expounded in this section. These objections are found in non-Humean theories that oppose the covering-law model on grounds that it fails to provide even a set of *necessary* conditions of explanation, let alone a set of sufficient conditions.

VII

Many philosophers accept the deductive-nomological model as an adequate account of explanation in the physical sciences, yet consider it inapplicable to the life sciences and the human sciences. They argue that explanation in those disciplines does not conform to the covering-law model because the phenomena to be explained do not reflect the operation of causation—at least not as Hume conceived it. This conclusion about explana-

tion resembles the conclusions reached by Hart and Honoré, Collingwood, and others about the different senses of cause and the importance of a causal context. However, new problems beyond those discussed by these philosophers emerge in connection with explanation, and they are especially important for Hume's theory of causation.

The life sciences and the social sciences both treat their subjects as teleological or goal-directed systems. The behavioral patterns of living systems are described and explained by appeal to the ends or goals towards which they are directed. Because ends or goals cannot be causes (obtaining, if at all, only after the behavior they determine), it is often maintained that the behavior in question is not the product of Humean causal mechanisms, and cannot be accounted for in terms that satisfy the covering-law model. In this section we take up these arguments with reference to teleological phenomena generally, and in the last section with reference to a special subclass of such phenomena: human actions. In both cases, we argue, the range and applicability of Hume's account of causation and its associated commitments to a theory of explanation can be defended without alteration.

Hume certainly would not accept the view that purposive explanations fail to conform to his theory of causation. In both his theoretical account and his practical employment of purposive explanations, he treats the relation between explanans and explanandum as wholly causal. He notoriously argues that acts of free will aimed at human goals can be explained causally, while retaining their status as free acts for which we rightly hold persons responsible. He also argues the connected thesis that the inference from the presence of apparent design in nature to the existence of a designer is an inference from effect to cause, and he applies his analysis of the grounds of our causal knowledge to this inference. In the first *Enquiry*, for example, he writes:

You . . . have acknowledged, that the chief or sole argument for a divine existence . . . is derived from the order of nature; where there appear such marks of intelligence and design, that you think it extravagant to assign for its cause, either chance, or the blind and unguided force of matter. You allow, that this is an argument drawn from effects to causes. From the order of the work, you infer, that

there must have been project and forethought in the workman. (EHU, Sec. 105)

Hume refers here to the possibility that the blind and unguided force of matter might be the cause of phenomena that seem to show the mark of intelligence, purpose, aptness, goal-directedness, adaptiveness, functionality, or design. Although the quoted passage alone is a tenuous basis for the interpretation, Hume is widely supposed to believe that a correct explanation of apparently teleological phenomena must appeal to this "unguided force of matter." While Hume never explicitly commits himself to the claim that teleological phenomena are explainable by causal laws of the type known in physics, reductive analyses of teleological explanations have always enjoyed the sympathy of Humeans, and we believe would have enjoyed Hume's sympathy as well.

But what are these teleological phenomena, and how might their explanation be achieved in Humean causal terms? Teleological characterizations fit the following general pattern.

A system S engages in behavior B for the sake of goal G, if and only if:

- (i) B tends to bring about G; and
- (ii) B occurs because it tends to bring about G.³⁸

Such characterizations are employed in explaining the behavior of an organ such as the heart, the circulation of the blood being the end-state for the sake of which it beats (the function that it serves). Similarly, functional explanations are offered for human actions with conscious goals or purposes. The notion of "tending to bring about a state," as in (i), may be explicated causally (as reflecting the necessity in the circumstances through which B causes the occurrence of G); but the claim that "B occurs *because it tends to bring about G*," as in (ii), is not obviously causal. There are two reasons. Because G is attained only after (or at best simultaneously with) the occurrence of B, G cannot be the cause in Hume's sense. Additionally, behavior frequently fails to attain its goals, and since unattained goals are not actual

38. This version is adapted from Charles Taylor, *The Explanation of Behavior* (London: Routledge & Kegan Paul, 1964).

occurrences, they cannot be Humean causes. The formulation above permits both temporal posteriority and failure to attain goals by use of the expression "tends to." But the "because" expression in clause (ii) cannot be given a Humean causal reading. If characterizations of this sort are countenanced as having explanatory power in the life sciences and the social sciences, then these subjects must appeal to processes that are not causal in Hume's sense.

The Humean has two compatible alternatives. First, the independent cognitive standing of such explanations can be denied. The Humean may argue that there are nonteleological treatments of systems that engage in behavior "for the sake of ends," that these treatments are wholly causal, and that the evidence for them is preferable to that supporting teleological explanations. The Humean's second alternative is to provide an analysis of teleological accounts that shows them to be merely a species of causal explanations, despite appearances to the contrary. Such an analysis would characterize teleological accounts as innocuous conveniences without metaphysical or methodological implications that could cast doubt on their wholly causal character.

Humeans have profitably pursued both of these strategies. The plausibility of the first is illustrated by the history of biology since Darwin. Darwin's influential theory of natural selection provides purely causal, nonteleological descriptions of and explanations for phenomena previously supposed to be the products of design and purpose. His explanation of the fittedness of organs to their function, plants and animals to their niches, populations and species to their environment, in terms of small hereditary variations and their consequences for rates of reproduction, is a paradigm of the elimination of teleology endorsed by Humeans. The cause of design is, in effect, the "blind and unguided force of matter" cryptically mentioned by Hume. Since Darwin's time causal accounts of apparently goal-directed activities have been improved in detail and range. Few biological areas remain in which at least the outlines of a nonteleological replacement for obsolete teleological explanations have not been sketched. The causal laws of Darwinian evolution governing heredity, variation, and environmental interactions, can themselves be explained by appeal to causal laws

at the level of genetics and physiology; and these in turn are explained by chemical and physical laws that reflect "the blind and unguided force of matter" at a still deeper level. The degree to which this strategy of supplanting teleological characterizations by causal ones can succeed is of course an empirical question, one that can only be settled on the strength of the experimental and observational evidence for the competing characterizations. But it seems clear that the evidence is mounting in favor of nonteleological hypotheses, and at an accelerating rate. As this process proceeds, the claim that there are important classes of phenomena not regulated by causal mechanisms grows increasingly less tenable.

The Humean's second strategy is not only compatible with the first, but acquires much of its plausibility from the success of the first. The second strategy views teleological characterizations as exhaustively translatable, at least for explanatory purposes, into causal characterizations. This reduction to Humean mechanisms also opens the door to covering-law explanations of ostensibly teleological phenomena. Central to this strategy is an analysis of condition (ii)—"B occurs because it tends to bring about G"—in the general pattern offered above. In one popular proposal that builds on Darwin's account, condition (ii) is treated as an elliptical expression. It stands for the claim that systems such as S exhibit B-type behavior because the disposition to do so is hereditary, because such behavior has historically tended to bring about the occurrence of G in these systems, and because that occurrence has been causally conducive to the survival of systems of type S.³⁹ However, a number of objections must be overcome in defending this proposal. It links its characterization of teleological statements to the truth of an empirical theory, a theory in the absence of which it cannot account for the meaning or employment of these statements. Indeed, the analysis ties teleology so closely to biological contexts that it seems inadequate to explain the large number of cases which apparently transcend such contexts. Thus, the proposal appears inapplicable to teleological behavior that is not determined by hereditary dispositions (e.g., goal-directed animal behavior and

39. For a good example of such accounts, cf. M. Ruse, *Philosophy of Biology* (London: Hutchinson & Co., 1973), Chapter 8.

the apparent purposiveness of such human artifacts as guided missiles or thermostats).

Larry Wright has noticed the possibility of generalizing Darwinian analyses of teleological descriptions beyond narrow biological contexts. On Wright's analysis the key to Darwinian explanations is the requirement that among the causally prior conditions of goal-directed behavior of a system are certain states of its ancestor systems. What makes phenomena goal-directed is the fact that these prior states are susceptible of description integrally referring to the subsequent goal states, i.e., those causally requiring the teleological behavior in question.⁴⁰

This insight is important for the Humean. The fact that causal conditions of teleological phenomena may be described in terms referring to their effects entails neither that the effects bring about the phenomena nor that the phenomena are closed to causal explanation. Indeed, quite the reverse is true. If a particular behavior pattern is teleological, it must be open to causal explanation because its source is a set of causal processes. So formulated, this analysis accommodates cases of natural selection involving merely apparent purposive biological phenomena, goal-directed human or animal behavior, and human artifacts, as well as pre-Darwinian claims about the purposes of the deity. For instance, the teleological character of human behavior is explained by noting that the prior states of an agent exhibiting the behavior include a desire to attain G, the desire itself being specifiable in terms that also describe G. Equally, the goal-directed behavior of animals produced through conditioning will be the causal product of prior exposure to objects resembling G.

This analysis of teleological characterizations is tied to the first of the Humean strategies in that it helps explain the progressive elimination of teleological characterizations in biology. These characterizations have become superfluous in many areas as alternative descriptions of goal-directed behavior have been provided. Thus, the intricate dance of bees was once explained by reference to its function in the acquisition of food. Wright's analysis substantiates the legitimacy of this attribution by noting

40. Larry Wright, *Teleological Explanation* (Berkeley: University of California Press, 1976).

the hereditary character of the behavior and the fact that it resulted in the acquisition of food in past generations. With the advent of physicochemical descriptions of more immediate and causally prior conditions, this explanation was largely supplanted by one citing chemical interactions. At this stage it was no longer necessary to characterize the antecedent conditions of the phenomenon in terms that mentioned its causal consequences, and an adequate explanation lost even the appearance of being teleological. By the same token, of course, teleological characterizations may on occasion become entrenched rather than replaced by the discovery of underlying causal mechanisms. When the description of these mechanisms is richly complex, practical considerations of simple reference may dictate the continued characterization of these mechanisms in terms of their consequences. In such cases the teleological appearance of the account is enhanced, but this result does not signify that the explanation is noncausal.

Because it is consistent with Humean causation, the foregoing analysis can easily accommodate teleological phenomena to the minimal version of the covering-law model we have endorsed. If teleological processes are causal, their explanation ideally involves subsumption under universals of law. Most teleological explanations countenanced in ordinary contexts cannot formally pass this requirement, of course, because the full range of causal conditions is unknown. The Humean is nonetheless committed to the existence of such conditions and to the possibility of an account that will reveal them to be initial conditions in a covering-law explanation.

This solution to the problem of teleological explanation seems to leave two questions unanswered. First, what are we to say when there is no promising causal explanation for a process that is characterized teleologically? Second, what are we to say if the characterization of the prior conditions of a teleological process *must* refer to goals or ends, so that no wholly nonteleological, purely causal explanation is conceptually possible? Inadequate Humean answers to these questions will undercut the entire Humean project for establishing the ubiquity of causal processes and the universal appropriateness of covering-law explanations. Yet the answers can at present be no better than programmatic. To the first question we would respond that if

no causal explanation can be found, either the search has not been thorough enough or the phenomenon is uncaused. The latter alternative reflects the contingent character of the Humean's claim to be able to provide a detailed causal explanation for every teleological process. If this goal *cannot* be achieved for some processes, the Humean must candidly admit the failure of his broad program and consequently concede that there are limits on the range of causation. The former alternative rests both on the increasingly well confirmed belief that the program will not fail, and on the conception of empirical science that Hume's theory of causation provides.

The second question is in a sense more pressing than the first, for it reflects a belief that one special subclass of teleological behavior is essentially and ineliminably noncausal, both in mechanism and in explanation. This subclass is almost certainly limited to human action, a form of behavior that deserves separate and detailed consideration.

VIII

Hume writes that "the philosopher, if he be consistent, must apply the same [causal] reasoning to the actions and volitions of intelligent agents" as he does in explaining the human body and all external objects (EHU, Secs. 67-68; T, 403f). Hume is thus committed to a causal account of human action, to the explanation of such action in terms of covering laws, and to the compatibility of determinism and commonsense attributions of free will to human agents. Human nature, he holds,

remains still the same, in its principles and operations. The same motives always produce the same actions: The same events follow from the same causes. Ambition, avarice, self-love, vanity, friendship, generosity, public spirit: these passions, mixed in various degrees, and distributed through society, have been, from the beginning of the world, and still are, the source of all the actions and enterprises, which have ever been observed among mankind. . . . Mankind are so much the same, in all times and places, that history informs us of nothing new or strange in this particular. Its chief use is only to discover the constant and universal principles of human nature . . . and furnishing us with materials from which we may form our observations and become acquainted with the regular springs of human action and behavior. (EHU, Sec. 65)

Hume here suggests that the factors commonly cited as determinants of human behavior operate with causal force. Motives explain actions, and there are regularities in the relation of motives to actions that transcend historical epochs and cultural differences. Human action does not generate the same problems as the wider genus of teleological phenomena of which, in its intentional varieties, it is a species. The problem posed by teleological phenomena is the difficulty of identifying a causal relation between behavior and the end that is said to explain it. In human behavior, by contrast, prior motives to attain the ends or goals can readily be appealed to as Humean causes. Such explanations are teleological because the motives are described in terms that mention the ends towards which the action is directed. As the earlier formula dictates: the action of raising one's arm in order to signal a turn is caused by the intention to signal a turn.

This analysis, however, is too simple. The most influential argument against it holds that the universal and general principles which, according to Hume, "history discovers" are as much a mystery today as they were in Hume's time. Yet a causal relation between motives and actions requires such principles; and a science of human action demands that we know them. It is easy to construct general statements that connect particular actions and motives, but the trouble with these candidates—as Hume notes (EHU, Secs. 67–68)—is that they are invariably false, because laden with exceptions. If phrased so as to exclude all exceptions, they seem repeatedly open to the charge of vacuity and tautology. For example, consider an explanation of a person's climbing a ladder: the action is explained by the person's *belief* that his hat is on the roof to which the ladder leads and by his *desire* to retrieve his hat from that roof. It is easy to generalize this singular statement into a lawlike statement to the effect that whenever persons wish to retrieve their hats from roofs, and believe that climbing a ladder will enable them to do so, they climb a ladder. This general statement is plainly not a causal law.

Hume's unrefined principle that the same motives always produce the same actions may only manifestly be true when motives are *defined* in terms of actions, in which case the causes and effects of human action would therefore not be

logically distinct entities. Yet, as one standard objection to Hume has it, the nondistinct character of these causes and effects means that the statements explaining human action are analytically true, and it follows that "no explanation in Humean causal terms of action is possible."⁴¹ This argument is most conveniently expressed by means of the account of teleological processes given earlier. According to the Humean, action is goal-directed because its causes, human motives, are typically characterized in terms that mention the ends or goals of actions. Yet on the anti-Humean objection we have sketched, this assimilation is fatal, for motives can only be expressed by reference to the goals toward which their associated actions tend, and the actions they explain can likewise only be characterized in terms of these ends. All exceptionless general statements connecting motives and actions thus seem analytic. The logical inevitability of such characterizations is revealed by the intensionality of the descriptions of motives and actions. If a coextensive description of a goal is substituted in the description of an action or intention, the goal's identity may change. Thus, in our previous example, suppose the agent's act of retrieving his hat is also truly described as "the act which caused his fatal accident." Substituting this true description of his goal-state into a statement about his action or its intention makes the statement false. Surely his motive was not to bring about an event identical to the cause of his fatal accident. The same must be said about the action of attempting to retrieve the hat by climbing the ladder: it was not the attempt to attain that state which caused his fatal accident. The upshot is that if a particular motive explains a particular action and the connection between motive and action is a logical one, then this explanation cannot be causal; the motive consequently cannot be the cause of the action.

This argument constitutes a serious challenge to Hume's claims. It rests on considerations about the intensional nature of our characterizations and explanations of action. Though Hume was entirely ignorant of these issues, he was committed to the appropriateness of causal explanations of human actions,

41. A. I. Melden, *Free Action* (London: Routledge & Kegan Paul, 1964), p. 85.

and so presumably to the view that they are ultimately reducible to nonintensional characterizations and explanations. Yet the many contemporary efforts to analyze the apparent intensionality reductively have not succeeded. In addressing this problem, the most we can hope for here is to sketch lines along which the defender of Hume must argue if he is to circumvent the objection to his theory while continuing to do justice to our ordinary explanations of human action.

This last proviso deserves brief explanation. Following contemporary philosophers such as Quine,⁴² a defender of the regularity theory and its applicability to human behavior might argue that the intensionality of terms which precludes a causal account simply reflects their unsuitability to the scientifically acceptable description of behavior. The latter descriptions must be extensional. Accordingly, intensional characterizations of human behavior and its determinants should be replaced by the nonintensional explanations of neurophysiology or behavioral psychology. Such a program would proceed on analogy with the elimination of teleology from explanations of natural phenomena. Without assessing the plausibility of this general strategy, it cannot be attributed to Hume himself (though it is certainly open to the contemporary Humean). Both the passage quoted at the outset of this section and Hume's vast outpouring of historical explanations in terms of motives and actions are evidence that he did not envision this strategy of elimination.

A Humean response to the objection we have paraphrased should focus instead on the problem of explanation. If a *logical* connection obtains between intentions and actions, how can the citation of an intention adequately *explain* the occurrence of a particular event described as an action? An explanation of ladder climbing in terms of the intention to reach a roof leaves unresolved the question of whether an agent's movement is an action. Any physical movement of a body can be given a topographic description that is neutral as between the movement's constituting an action of the agent or an instance of mere reflex behavior produced, say, by artificial stimulation of appropriate neurophysiological centers. In practice we seldom

42. W. V. O. Quine, *Word and Object* (Cambridge, Mass.: M. I. T. Press, 1961).

have any difficulty distinguishing mere movements of the body from actions. But a view that envisages a logical connection between action and motive cannot explain how such distinctions are made. We cannot explicate the distinction between movements and actions by claiming that an action has an appropriate intention. Like motives, intentions are logically connected to actions, with the result that the evidence for something's being the relevant motive is identical to the evidence on the basis of which a particular movement is classified as an action. The logical connection thesis thus shifts our context of inquiry from questions about why actions are performed to questions about whether particular events in which agents figure are actions.

In the absence of independent grounds to believe that an action has taken place, the mention of motives will not explain an instance of human behavior any more than noting that Hume was unmarried explains his being a bachelor. The only way to give such an independent description of the action would be to show that it exhibits some property which can be identified without reference to its motive and goal and which distinguishes it from mere movement. But if motives and actions are logically linked, no independent grounds of this sort can be provided. To provide such independent grounds for believing that a particular movement is an action would require a nonteleological description of the action, which is impossible on the thesis in question. Thus, on the one hand the logical connection thesis leaves open the question of whether there are actions distinct from mere movements, and on the other it precludes the existence of evidence that could answer this question by establishing the existence of actions. If, then, there are actions, it is impossible to say how, on the logical connection thesis, motives could possibly explain them. Since of course there are actions, and motives do explain them, it follows that this thesis must be false.

The false claim that particular motives logically determine their correlative actions must be distinguished from the deceptively similar logical truth that every action entails some intention. This necessary truth no more requires a logical connection between particular motives and actions than the necessary truth that every effect has a cause requires that particular causes

logically necessitate their effects. The mistake is particularly easy to make if the terms we employ to state the reason and describe the action are the same, as they are in a teleological characterization. Indeed, to recognize this tendency helps explain why we accept, for instance, Hume's *Histories* as containing truths about particular historical events and their causes, even when we do not know the generalizations that on the covering-law model must connect them. Nonetheless, the Humean needs to explain why, unlike biology, social science and history have yet to discover applicable causal laws, and why in the absence of such laws we should credit singular causal statements about human action with explanatory force.

Hume's answer to these two questions rests on a disarmingly simple comparison between human action and biological phenomena. He describes the action of agents by analogy with the behavior of the body:

In the human body . . . when irregular events follow from any particular cause; the philosopher and physician are not surprised at the matter, nor are ever tempted to deny, in general, the necessity and uniformity of those principles by which the animal economy is conducted. They know that the human body is a mighty complicated machine: That many secret powers lurk in it, which are altogether beyond our comprehension: That to us it must often appear very uncertain in its operations: And that therefore the irregular events, which outwardly discover themselves, can be no proof that the laws of nature are not observed with the greatest regularity in its internal operations and government. . . .

[Similarly] internal principles and motives may operate in a uniform manner, notwithstanding these seeming irregularities; in the same manner as the winds, rain, clouds, and other variations of the weather are supposed to be governed by steady principles; though not easily discoverable by human sagacity and enquiry. (EHU, Secs. 67 and 68)

With this line of thought, Hume circumvents the difficulty of at once claiming truth for singular causal statements about human action and admitting ignorance of laws. We can treat general conclusions about the relations between motives and actions as rough-and-ready approximations to the strict generalizations that underlie them. In so doing, argues Hume, we reason no differently from our explanations of "the operations of body, nor can we conclude any thing from the one irregu-

larity, which will not follow equally from the other" (T, 404). Our knowledge, in Hume's words, is "imperfect"; but ignorance alone does not exempt us from the same methodological commitments in the explanation of human action that we accept in the explanation of natural phenomena.

Given Hume's epistemological commitments and theory of causation, the Humean can only await the development of laws of human action that are now unavailable. If the many attempts to provide such laws continue to meet with failure, even as the conditions of scientific inquiry approach the optimum, the Humean will have no recourse but to allow that there apparently are no laws relating reasons, motives, beliefs, and desires to actions. However, there are many levels on which to search for laws, and it would be vastly premature to give up altogether the Humean position on the causal explanation of human actions merely because no motive-action connections seem possible. One Humean alternative that parallels Quine's aforementioned reductive strategy would be that the laws governing human behavior do not describe causes and their effects in terms of *reasons* and *actions* but rather, for instance, in terms of brain-state and movement or operant and reinforcer. There are many such strategies consistent with Hume's theory of causation. However, the central conviction that can never be surrendered, while remaining faithful to Hume's broader philosophical program, is that "in judging of the actions of men we must proceed upon the same maxims, as when we reason concerning external objects" (T, 403).