

This view accounts for temporal asymmetry by appeal to a nonasymmetrical relation; and it thereby provides those who believe that temporal relations are founded on causal relations further motivation to deny that causation is asymmetrical. For it is only on this latter assumption that a non-question-begging analysis of time order can proceed.

Our conclusion is ironic, in a way that Hume might have appreciated. We began by suggesting that no one has yet refuted Hume's claims about causal priority, despite a long tradition that assumes him to be mistaken. We then examined a range of alternatives, whose failures naturally strengthen the case for Hume's own claims. Eventually we questioned whether Hume can consistently hold that causation is an asymmetrical relation at all. If this ascription to Hume of a certain form of sceptical doubt seems plausible, it may shed new light on his own general comment about this issue. In the *Treatise* (76), while concluding his discussion of causal priority, Hume writes: "If this argument appear satisfactory, 'tis well. If not, I beg the reader allow me the . . . liberty . . . of supposing it such. For he shall find, that the affair is of no great importance."

7

Events, Facts, and the Extensionality of Causal Contexts

CAUSATION IS a relation, and every account of causation presupposes an implicit characterization of the objects of this relation, for these relata must have properties consistent with their relational character. Unlike contemporary students of causation, Hume does not attend explicitly to questions about the nature of causal relata. Nevertheless certain suppositions about causal relata are implicit in his theory of causation, and these suppositions deserve consideration together with more probing contemporary analyses of the problem.

Hume loosely refers to the relata of a singular causal relation both as "objects" and as "events," where events, like objects, are presumably locatable, datable, concrete particulars. Philosophers subsequently have come to prefer the language of events and conditions, but until recently no analyses of such notions had been provided that would clarify and distinguish them. Of late one question about causation to which considerable attention has been paid is whether causes and effects are *events*, or whether causes and effects are better construed as *facts*. Donald Davidson, Jaegwon Kim, J. L. Mackie, and Zeno Vendler have all considered this issue to be one of the more pressing ontological problems about causation. As Mackie puts it, the issue emerges from "anxieties about the exact ontology of causation."¹

¹ J. L. Mackie, *The Cement of the Universe* (Oxford: Clarendon Press, 1974), p. 31.

Most of these discussions begin with an examination of the view we treated in Chapter 3, and advanced most notably by Davidson, that causes and effects are events in the sense of concrete occurrences exemplifying features over and above the ones we hit upon for describing them. On this view causation is a two-place relation between particular events, whose (definite) descriptions are freely substitutable in causal sentences without changing their truth value, so long as reference is preserved. Hence causal statements are extensional.

We begin our discussion of these matters with a general analysis of Hume's account, devoting the remainder of the chapter to the above currents in contemporary philosophy—especially to controversies about whether causes are facts or events and controversies about whether causal contexts are extensional or intensional. These issues may not at first seem directly relevant to the defense of Hume and Humeanism. As we shall show, however, it is critical for Humeans to be able to defend the extensionality of causal contexts, while rejecting a fact ontology.

I

In the *Treatise* Hume generally describes the relation of causation as holding between "objects," while in the *Enquiry* the relation is often said to hold between "events." These expressions may suggest that the relata of causation are spatiotemporally localized particulars; but for several reasons Hume's terminology alone can hardly settle the question. In many passages throughout his work Hume clearly treats facts, states, perceptions, and substances as constituents in causal relations. Moreover, several passages in the *Enquiry* and the *Treatise* strongly suggest that Hume does not consider either objects or events as wholes to be the actual or minimal units of causation. Hume implies in these passages that some particular quality or feature of a causal occasion instead constitutes the relevant cause or effect. Thus he writes, "where several different objects produce the same effect, it must be by means of some quality, which we discover to be common amongst them. . . . We must always ascribe the causation to the *circumstance*, wherein we discover the *resemblance*" (T, 174, emphasis added).

Such passages need not be supposed to reflect any incompati-

bility with Hume's description of the relata of causation as objects, for Hume employed this concept in so general a way that its extension includes an extremely heterogeneous set of kinds and categories. Items of at least the following six different sorts are alike referred to as "objects" in Hume's writings:

- (1) Ideas, impressions, sensations, perceptions (for instance, see T, 169, 201ff, 239–42).
- (2) Material objects (T, 202, 206, 193ff).
- (3) Actions or motions (T, 12, 88).
- (4) Qualities (T, 87f; EHU, Sec. 38).
- (5) Mathematical items (T, 42, 49).
- (6) The self (T, 277, 286).

Almost anything might qualify as an object in Hume's usage. Indeed it might be construed as one of Hume's intentions to show that the class of possible causes and effects is ontologically heterogeneous. This conclusion seems implicit in one of his most paradoxical dictums: "Any thing may produce any thing. Creation, annihilation, motion, reason, volition: all these may arise from one another, or from any other object" (T, 173). Hume seems to be saying that not only may events cause events, and qualities cause qualities, but that there is some sense in which events may cause qualities, qualities may cause events, bodies may cause motions, substances may cause changes, states may cause actions, etc.

By now it should be clear not only that Hume did not address the question of the ontology of causation directly, but that no consistent theory about what kinds of items are causally related is likely to emerge solely from textual analysis. Accordingly, it would be more reasonable to extract an account of the ontology of Hume's theory from reflection on the central components of his analysis of causation. These components undeniably provide at least the necessary conditions for the ontological character of causal relata. It may turn out that further consideration of them will reveal sufficient as well as necessary conditions for being a cause or an effect, for through such consideration we may isolate an arguably basic ontological category—one by means of which apparently heterogeneous ways of describing causes and effects can be systematized. If our investigation answers the question of what the relata of Hume's

account of causation *must* be, then a comparison of this result with wider ontological views will provide an important test of the adequacy of Hume's theory of causation as a whole.

II

The conditions of causation that Hume advances may initially seem no more promising for inferring a coherent ontology of causation than do his casual remarks about causes and effects, for each of his three conditions appears to contemplate a different sort of item. Consider first the requirement of spatio-temporal contiguity. Spatial contiguity is fundamentally a relation between objects and substances—particular items that can be moved about in a spatial framework, that can endure over time, and that are variously identifiable by appeal to their properties and relations. Temporal contiguity, however, is not obviously a relation that obtains among spatially extended objects. Its primary locus of application is rather the class of events, states, and conditions that have beginnings and endings relatively close in time (compared with the substances to which they happen). As with items satisfying a spatial contiguity requirement, these entities are reidentifiable particulars; but they do not necessarily have the obvious spatial borders objects have. On the other hand, objects may turn out not to have the intuitively clear temporal boundaries that events seem to possess. The requirement of spatiotemporal contiguity thus apparently selects an ontologically heterogeneous class of causes and effects.

The situation is further complicated by the implications of Hume's other two conditions of causation. Temporal priority obviously obtains between certain kinds of items, yet it is not a relation that need be satisfied by objects in *causal* relations. Objects cited in the description of an effect may exist before the objects cited in a description of the cause without Hume's requirement being violated. What is more, while the first and second requirements are at least consistent in requiring that causation be a relation between reidentifiable particular items, the central requirement of constant conjunction makes no sense as a relation between particular objects or events. Whatever is regularly conjoined must be capable of *repeated* appearance or recurrence, and particular items are conceptually incapable of such repetition. Only abstract entities such as properties and

relations can satisfy this condition of causality. Thus, the implications of Hume's third requirement make the class of causal relata still more heterogeneous—indeed so heterogeneous as apparently to render Hume's dictum that anything may cause anything a hollow *reductio ad absurdum*.

Jaegwon Kim has tried to bring ontological order out of these seemingly conflicting constraints, and to provide an ontologically coherent treatment in the spirit of Hume's account of causation. After canvassing the difficulties and apparent inconsistencies recounted above, Kim brings the time-like, the space-like, and the abstract items that Hume's account seems to require together under the category of a structured *event*. He takes this category to include the exemplification by a concrete object of a property or relation at a time or during a time-period. An event thus characterized may be capable of satisfying the constraints of Hume's analysis of causation because each component of Hume's analysis can be represented. Kim's is a promising approach to the ontology of causation and its ramifications, and we should therefore pursue it in some detail.

Kim represents events by expressions of the form $[(x_1, \dots, x_n, t), P^n]$. "An expression of this form refers to the event that consists in the ordered n -tuple of concrete objects (x_1, \dots, x_n) exemplifying the n -adic empirical attribute P^n at time t ."² The following existence and identity conditions for events are adopted:

- (1) $[(x_n, t), P]$ exists if and only if the n -tuple of concrete objects (x_n) exemplifies the n -adic empirical attribute P at time t .
- (2) $[(x, t), P]$ is identical to $[(y, t'), Q]$ if and only if $x = y$, $t = t'$, and $P = Q$.

Kim generalizes this latter condition to account for the identity of permutations of n -tuples of objects and n -adic properties. Events meeting the existence and identity conditions can satisfy the requirements of contiguity and temporal priority because their objects and times are contiguous and the time of the cause event is prior to that of the effect event. How such events satisfy the requirements of regularity is a more complicated matter. Kim notes: "There appears to be a general agreement that the

² Jaegwon Kim, "Causation, Nomic Subsumption and the Concept of an Event," *Journal of Philosophy* 70 (1973), p. 222.

requirement of constant conjunction for causal relations for individual events is best explained in terms of lawlike correlations between generic events. Constant conjunction obviously makes better sense for repeatedly instantiable universals than for spatio-temporally bounded particulars." Each event, according to Kim, is the instantiation of a universal, a type, which he calls its generic event. Because each event has a unique constitutive property that is a generic event (the instantiation of the property constitutes the particular event in question), "it follows that each event falls under exactly one generic event, and that once a particular cause-effect pair is fixed, the generic event that must satisfy the constant conjunction requirement is uniquely fixed."³

Kim holds that "generally the cause event will be a dyadic or higher-place event involving, as one of its constitutive objects, the constitutive object of the effect event; and the first term of a constant conjunction will in general be a relational generic event rather than a monadic one."⁴ Thus, the requirement of constant conjunction may be expressed in Kim's notation as follows: $[(a,b,T)P]$ is a cause of $[(b,T')Q]$ only if (i) $[(a,b,T)P]$ and $[(b,T')Q]$ exist, and (ii) $(x)(y)(t)[[(x,y,t),P] \text{ exists} \rightarrow [(y,t + \Delta t),Q] \text{ exists}]$, where $\Delta t = T' - T$, and " \rightarrow " carries the nomological force of a universal of law.

Despite Kim's avowed intentions, there is reason to believe this account does not reflect an ontology entirely compatible with Hume's analysis of causation. It can be shown, for example, that Kim's claims about the relation of particular events to generic events and the relation of these latter to constitutive properties of particular events is incompatible with the constant-conjunction view. Consider the following example: Oedipus married Jocasta, who, unbeknownst to him, was his mother. Some time after this event Oedipus suffered acute mental anguish. It seems reasonable to suppose that the first event caused the second. Oedipus's marriage to Jocasta can be expressed in Kim's notation as

a [(Oedipus, Oedipus's mother, t_1) married].

It is also true that Oedipus married Laius's widow. This event can be described as

3. *Ibid.*, p. 226.

4. *Ibid.*, p. 234.

b [(Oedipus, Laius's widow, t_1) married].

On Kim's criterion, $a = b$, since their constitutive objects, properties, and times are identical. *Ex hypothesi*, *a* caused Oedipus to experience mental anguish at some later time; therefore, so did *b*. The effect can be expressed in Kim's notation as

e [(Oedipus, t_2) having mental anguish].

If, following the regularity theory, the constant conjunction of generic events, i.e., constitutive properties, is a necessary condition for singular causal relations, then neither *a* nor *b* could properly be said to have caused *e*. The unique generic events of marriage and mental anguish are instantiated respectively by *a* and *e*. As the occasional happy marriage attests, there is no lawlike correlation between these generic events or constitutive properties. There is, let us assume, a constant conjunction between marrying and mental anguish when the persons related by the constitutive property of marriage are also mother and son, and for that reason we consider *a* the cause of *e*. If Kim's ontology is to sanction this claim, something in his account must be modified.

For the Humean, however, Kim's account is beset by a still more serious difficulty. Specifically, we may wonder whether his criterion of event identity is compatible with the claim that constant conjunction of unique generic events, i.e., of constitutive properties, is a necessary condition of causal relations between particular events.

Consider the following events, which parallel *a* and *b*:

c [(Oedipus, Oedipus's mother, t_1), incestuously marrying];

d [(Oedipus, Laius's widow, t_1), incestuously marrying];

$c = d$, on Kim's criterion, for the same reasons that $a = b$; and *c* (or *d*) causes *e*, in part because of the constant conjunction of their constitutive properties. On the same criterion, however, it is false that $c = a$, because the constitutive properties, marrying and incestuously marrying, are plainly not identical. Since on Kim's account⁵ every event falls under exactly one generic event determined by its constitutive property, *a* and *b* must instantiate a generic event different from the one *c* and *d* instantiate. This conclusion entails that they cannot satisfy the same statements of constant conjunction, and that therefore they cannot have

5. *Ibid.*, p. 226.

the same effect, contrary to the assumption with which we began.

The denial of identity among *a*, *b*, *c*, and *d* is plainly implausible. One simply cannot pick out features of the event described by "*a*" or "*b*" that are not possessed by the event described by "*c*" or "*d*." Their times are all the same, as are the spatial locations and features of their constitutive objects. There is nothing observable by which they could be distinguished. Faced with a choice between denying the mutual identities of *a*, *b*, *c*, and *d* and surrendering the regularity theory whose ontology Kim is attempting to expound, many will prefer the latter alternative of rejecting Humeanism. *Mutatis mutandis*, the Humean can hardly adopt Kim's exposition in the face of its counterintuitive implications for the identity of *a*, *b*, *c*, and *d*. The Humean must either modify it or reject its claims.

The denial of identity between *a* and *c* on the basis of Kim's criterion has other equally untoward consequences for the constant conjunction requirement. It seems undeniable both that *a* caused *e* and that *c* caused *e*. The consequence for Kim must be that marriage uniformly causes mental anguish, and that incestuous marriage does as well. But unless incestuousness plays no role in the cause of mental anguish, these two causal regularities are incompatible. According to one, marriage without incest is sufficient to produce an effect which, according to the other, requires the added presence of incestuousness. If *c* causes *e*, then *incestuous* marriage is necessary, and marriage alone will not suffice. On the constant conjunction view developed in our earlier chapters, *a* and *c* could not equally be the cause of *e*. If we insist that they both are causes, then either they are identical or causation does not involve the constant conjunction of generic events. If they are identical, Kim's criterion of identity as well as his claims about the character of generic events and their relations to particular ones need revision.

Any revision of Kim's account should achieve at least the following things. It should preserve the ontological homogeneity that Kim has provided for the regularity theory: i.e., it should show how one type of object can satisfy all three of the Humean conditions on causation. The revision must also be consistent with firm convictions about the identity of events whose descriptions may vary from occasion to occasion. And of course it

must in consequence of these requirements explicitly allow for the most central of Hume's claims about causation: that it consists in the instantiation of constant conjunctions expressed by universals of law. The following revision suggests itself as satisfying the foregoing requirements while entailing only minor modifications in Kim's account.

Instead of holding as Kim does that particular events manifest one and only one constitutive property, let us permit multiple constitutive properties, and revise Kim's identity criterion along the following lines: events are identical if and only if their constitutive objects are identical, their times are identical, and their respective objects all share the same constitutive properties, of which there can be more than one. How does this reconstruction apply to the case of *a*, *b*, *c*, and *d*? Given the identity of Laius's widow and Oedipus's mother, we can deduce that if *a*, *b*, *c*, or *d* contains the constitutive property of marrying, then it will contain the constitutive property of incestuously marrying. In consequence, we can show that $a = b = c = d$ on the strength of a modified criterion.

The difficulty with this procedure is that we cannot *show* that two events are identical where the objects and properties do not bear the neat logical relations the constituents of *a*, *b*, *c*, and *d* bear to one another. To address this problem, we can capitalize on the Humean's demand that if two events are identical then a statement of their identity should be compatible with the theory that causal connections rest on constant conjunctions of generic events. That is, the assertion that two putatively identical events both caused some other event should not commit one to inconsistent causal laws. Whether events are identical, however, cannot be determined merely by their descriptions, since these may make use of differing predicates, or cite differing constitutive properties. In order to determine event identity we must resort to a causal criterion of event identity: events are identical if and only if their causes and effects are identical. The criterion is Donald Davidson's,⁶ and its effect is to make Hume's causal laws the determinants of identity among events. For events will be identical only if they instantiate the same uni-

6. Donald Davidson, "The Individuation of Events," in Nicholas Rescher, *et al.*, eds., *Essays in Honor of Carl Hempel* (Dordrecht, Holland: D. Reidel, 1969), pp. 216-34.

versals of law. In order to determine these same identities, Kim's criterion must be rendered compatible with the regularity theory in the way we have suggested.

In fact, the connection between Kim's criterion and Davidson's is more intimate than might at first appear. The combination of either of these two criteria with the constant-conjunction-of-generic-events view of causality entails the other criterion. If two events possess the same constitutive objects, times, and properties, then we can infer that the constitutive properties of each event will appear in the same set of laws no matter what causal laws associating constitutive properties apply. Consequently, the particular events in question will have precisely the same particular causes and effects. Conversely, since the causes and effects of events are determined by their constitutive properties, two events having the same particular causes and effects will also have the same constitutive objects, properties, and times.

The upshot of this discussion is an account of the objects of causation as structured particulars or concrete events that consist in the exemplification of sets of properties at or during times, and which are causally connected in virtue of the constant conjunction of unique generic events that they exemplify. These generic events are to be characterized in terms of properties constitutive both of the particular events and of the particular objects that manifest these constitutive properties. Now we must consider whether this event analysis, which provides a coherent ontology for Hume's theory of causation, can stand against arguments that oppose all event ontologies.

III

Our modification of Kim's treatment is consistent with Hume's account of causation, but it still must confront certain difficulties and alternatives. One important alternative is the theory that causes and effects are *facts*, not *events*, and that facts are the exclusive relata of causation.⁷ This view incorporates a commitment to the intensionality of causal statements, and it therefore has serious metaphysical consequences for the Humean

7. See Zeno Vendler, "Causal Relations," *Journal of Philosophy* 64 (1967), pp. 703ff, for an influential exposition of this view. For limited support, see John L. Pollock, *Subjunctive Reasoning* (Dordrecht, Holland: D. Reidel Publishing Co., 1976), pp. 145-57.

theory of causation. On the view we have tentatively embraced, events *a* and *c*—Oedipus's marrying Jocasta, and his incestuously marrying her—are identical events. Yet Jocasta's giving birth to Oedipus is causally necessary for event *c*, but apparently not for event *a*. Accordingly, either *a* is not identical to *c*, or the substitution of coreferring descriptions of the unique event that both "*a*" and "*c*" describe, changes the truth value of causal statements containing "*a*" or "*c*" as descriptions of the cause or effect.⁸ This apparent intensionality presents a difficulty for any account of the objects of causation, and showing how it can be circumvented should add further dimensions to our Humean account. Ultimately, consideration of this issue will lead to our defense of an event theory of causal relata as against a fact theory.

On their face, questions about whether causal statements are extensional or intensional seem far removed from the regularity theory, or for that matter from the ontological issue of whether causal relata are events or facts. After all, Hume knew nothing of the distinction between extensional and intensional discourse. That issue pertains to the logical form of statements of a certain kind, whereas the events/facts question is ontological. If we can show that the explanation of whether a type of statement is extensional or intensional depends on critical ontological commitments, or vice versa, then the two issues will turn out to be intimately related. Their bearing on ontological matters of the sort that Hume does face would thus become transparent.

Roughly speaking, a sentence is extensional if coreferring singular terms are substitutable for its substantives without affecting the truth value of the sentences, or if the substitution of coextensive predicates is truth preserving. Otherwise, a sentence is nonextensional or intensional. A more general and precise characterization might proceed as follows. Consider a sentential context, $C(x)$, that takes sentences as arguments. $C(x)$ is extensional if there is no sentence *s*, such that replacement of singular terms or coextensive predicates in *s* preserves *s*'s truth value, while changing the truth value of $C(s)$. A sentential context that takes singular terms as arguments is extensional if

8. This apparent difficulty for the analysis at hand was originally broached in Monroe Beardsley, "Actions and Events: The Problem of Individuation," *American Philosophical Quarterly* 12 (1975), p. 272.

there is no singular term t such that replacement of coreferential terms of coextensive predicates in t preserves the reference of t while changing the truth value of $C(t)$.⁹ This sort of extensionality is also known as referential transparency.

Among sentential contexts that seem clearly intensional are those reporting psychological attitudes such as knowing that . . . , fearing that . . . , and descriptions of other characteristically human activities such as explaining. The truth of propositions involving these descriptions is, in an old fashioned way of talking, "mind-dependent." Their intensionality rests upon this mind-dependence. That is, the explanation of why substitution of coreferential terms and coextensive predicates does not preserve truth value in these sentential contexts usually invokes human logical lapses, or ignorance that some item satisfies different descriptions, or some other feature of the mental states of persons.

It is worth illustrating this point by reflecting on the intensionality of causal explanation.¹⁰ Consider the following example of the sentential context ". . . explains . . .":

- (1) Oedipus's marrying his mother explains his subsequent madness.

9. This characterization of extensionality is found in a number of places. For example, Adam Morton offers it in "Extensionality and Non-Truth-Functional Contexts," *Journal of Philosophy* 66 (1969), p. 159:

(a) extensionality: if t is obtained from s by substituting predicate B for predicate A , then

$$(x)(A(x) \equiv B(x)) \supset (C(s) \equiv C(t))$$

(b) referential transparency: if t is obtained from s by substituting a name of b for a name of a , then

$$(a = b) \supset (C(s) \equiv C(t)).$$

10. Rational reconstructions of the concept of explanation, like the deductive nomological model, are in part attempts to provide an unrelativized "explication" of this notion—one that expresses a purely formal relation between sentences and that is not bedeviled by problems of intensionality. Uniform substitution of coreferential terms or coextensive predicates should leave the truth values of the sentences in such an explanation unaffected, and thereby, the explanation intact. The claims made here are not about explanation thus reconstructed, but about our ordinary notion of explanation—as examined, for instance, in Peter Achinstein, "Explanation," *Studies in the Philosophy of Science, American Philosophical Quarterly*, Monograph Series, No. 3 (Oxford: Basil Blackwell, 1969). For further discussion of these issues cf. Chapter 8.

Someone might complain that (1) is misleading since events do not explain other events; rather, sentences do, even though we ordinarily speak of events and facts as explaining other events and facts. In order to accommodate this complaint, we may say that events explain other events *only under a description*. This observation makes it clear why explanatory contexts are intensional. Descriptive substitutions in the arguments of explanatory contexts may change the truth value of the whole sentence without affecting the truth values or references of the sentences or terms that figure in the whole sentence's arguments. Thus, most well-informed persons treat (1) as true, because they are generally familiar with the events to which (1) refers under the descriptions it employs. On the other hand, the following sentence referring to the same events under other descriptions would usually be considered false by well-informed persons:

- (2) Oedipus's marrying Laius's widow explains his subsequent madness.

(2), of course, varies from (1) only in respect of the way that Jocasta is described. Since this variation in truth value results from a change in description that preserves reference, explanatory statements seem to be intensional. Their intensionality consists in what we have called their mind-dependence: whether one event explains another depends on us, and on how we describe the events in question. More precisely, let us call a sentential context mind-dependent if its truth entails the truth of other statements that assert (or deny) the existence of mental conditions such as belief, desire, intention, fear, etc. Thus, for example, the truth of (1) turns on the general belief that marrying one's mother leads to deleterious consequences, while the falsity of (2) hinges on not knowing that Oedipus's mother is identical to Laius's widow and to Jocasta. In the sense we have described it above, mind-dependence is thus a sufficient condition for the intensionality of a sentential context. *A fortiori*, the extensionality of a statement should entail its mind-independence, i.e., should guarantee that its truth does not entail the truth of other statements that assert or deny the existence of mental states.

It is at this point that issues of concern to Hume and his followers become manifest. On their views, causal relations between

events are presumably *not* mind-dependent. Hume insists that the course of nature is objective, and independent of the beliefs and descriptions of mortal minds. If we were all swept away, our desires, fears, hopes, explanations, and artifacts would all disappear with us. Nature, in contrast, is no artifact. The relations between natural events would continue unimpaired; and paramount among those relations is that of cause and effect. That is why the Humean takes the truth of statements about causes and their effects to be independent of human beliefs, desires, and linguistic descriptions. There is a powerful statement of this view in the *Treatise* (167f): "[causes] operate entirely independent of the mind, and wou'd . . . continue their operation, even tho' there was no mind existent to contemplate them, or reason concerning them. Thought may well depend on causes for its operation, but not causes on thought. This is to reverse the order of nature, and make that secondary, which is really primary. . . . The operations of nature are independent of our thought and reasoning. . . ." As we saw in Chapters 1 and 4, the Humean will go to considerable lengths in order to avoid any tincture of "idealism" or mind-dependence in his characterization of causation or the laws that underlie it, despite Hume's beliefs about the subjectivity of necessary connection.¹¹

If causal relations are not mind-dependent, then—subject to the proviso that mind-dependence is necessary for intensionality, or at least for intensionality in the case of causal statements—it follows that *the Humean is committed to the extensionality of causal statements*. The mind-dependence proviso is critical to this contention, and it requires that we corroborate at least one of the two following claims: (1) mind-dependence is not only a generally sufficient condition for intensionality, it is also a universally necessary one; or (2) the only reason to suspect that causal statements are intensional is their similarity in form and employment to statements such as explanatory ones whose intensionality does consist wholly in their mind-dependence. If

11. Hume of course argues that whatever power, efficacy, or necessity we attribute to the objects of causation is not independent of the mind, and that causation involves beliefs about necessary connection. But these claims should not be construed as assertions of the mind-dependency of causation "in the objects." See our discussion of these matters, including this passage, in Chapter 1, and related issues in Chapter 4.

neither of these claims is established, it is open to someone to argue that the intensionality of causal relations does not rest on their mind-dependence. There might, after all, be other sorts of intensional contexts which are not mind-dependent, and it could be claimed that causal contexts are members of this further class of intensional contexts. Such arguments would completely undercut any simple inference from mind-independence to extensionality. We need to ask, then, whether (1) and/or (2) can be demonstrated, or at least convincingly defended. Demonstrating (1) would of course entail a substantial analysis of intensionality well beyond the scope of the present work. We shall therefore attempt to sustain only (2). Not only will this task suffice for present purposes, but it will bear on the claims of Chapter 8 about the nature of causal explanation.

One prominent tradition in the literature on causation attempts to analyze the causal relation into explanatory relations, or even to assimilate causation to explanation—as we saw in Chapters 3 and 5. Norwood Hanson has expressed such a view, asserting that "there are as many causes of x as there are explanations of x In fact what we refer to as 'causes' are theory-loaded from beginning to end." More explicitly, Michael Scriven has written, "a cause is *an* explanatory factor (of a particular kind). Causation is the relation between explanatory factors (of this kind) and what they explain." According to Monroe Beardsley, "to specify the cause of an event is to give a causal explanation of it, and *if* explanatory contexts are non-extensional, as many would hold, then I don't see how causal contexts could fail to be nonextensional as well. They stand or fall together." Finally, in "Causal Relations," when faced with apparently nonextensional causal statements, Davidson suggests that "the 'caused' of [such statements] is not the 'caused' of straightforward singular causal statements, but is best expressed by the words, 'causally explains.' The affinities between causation and explanation are manifest."¹²

Moreover, both causal contexts and causally explanatory ones seem capable of taking either fact-describing or event-describing expressions as arguments (a topic to which we shall turn below),

12. Norwood R. Hanson, *Patterns of Discovery* (Cambridge: Cambridge University Press, 1958), p. 54; M. Scriven, "Causation as Explanation," *Nous* 9 (1975), p. 11; M. Beardsley, *op. cit.*, p. 272; and D. Davidson, "Causal Relations," *Journal of Philosophy* 64 (1967), p. 703.

and many features of causal language are distinguished by their connections with explanation. For example, it is often claimed that the distinction between causes and conditions turns on whether one of an effect's necessary conditions provides its causal explanation rather than merely one of its conditions.¹³ Thus, even if those who assimilate causation to explanation are wrong about the intensionality of the former notion (as we shall argue), they are certainly warranted in finding a close relation between the two concepts. Explanations typically appeal to causes, and it is mainly to satisfy explanatory demands that events and facts are both cited as causes. It is just this similarity of function and form between causal and explanatory contexts that encourages philosophers incautiously to treat causal statements as intensional. These similarities suggest the conclusion that the *only* reason causal statements are taken to be intensional is their similarity in form and employment to statements, such as explanatory ones, whose intensionality does consist wholly in their mind-dependence. If so, it follows directly from this conclusion and from the mind-independence of causal statements that such statements are extensional.

IV

The conviction that causal sentences are extensional is based on the even stronger conviction that the truth of intensional statements entails the truth of other statements about the existence of cognitive states, while the truth of at least some¹⁴

13. See, for example, J. L. Mackie, "Causes and Conditions," *American Philosophical Quarterly* 2 (1965), as reprinted in E. Sosa, ed., *Causation and Conditionals* (Oxford: Oxford University Press, 1975), pp. 21-23; 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), pp. 235-47; and A. Collins, "Explanation and Causality," *Mind* 75 (1966), pp. 482-500. Some of the issues broached in these papers are treated in Chapter 8 below.

14. We introduce the qualification "at least some" because certain causal statements describe causal relations between mental events. Even in these cases the relation a causal statement asserts to obtain between mental events is not the kind of relation that is mind-dependent in the sense described above. Thus the statement that "belief *b* caused action *a*" expresses a relation between *b* and *a* that also obtains between nonmental events, like a short circuit and a fire.

causal statements does not entail the truth of any such statements about mental conditions. It rests, in short, on nothing less than our belief that causal relations are "independent of the mind, and wou'd . . . continue their operation, even tho' there was no mind existent to contemplate them, or reason concerning them" (T, 167). Yet this conclusion undercuts the account of particular events as causes and effects we defended in Section II. Recall that, on the view there embraced, events consist in particular objects manifesting sets of constitutive properties at or during times. We were obliged to expand the number of properties exemplified in a single event in order to allow for variable reference to the same particulars. We thereby sought to preserve the compatibility of an account of events as the fundamental relata of causation with a constant conjunction analysis of this relation.

Yet the compromise between doing justice to events and their descriptions, on the one hand, and to a Humean account of causation, on the other, seems now to entail that causal statements are intensional. For the same event under different descriptions that pick out different properties apparently both *is and is not* the cause or effect of some other event. In the example cited in Section II, Jocasta's giving birth to Oedipus was causally necessary for their *incestuous* marriage; yet the birth does not seem causally necessary for their *marriage*, even though the marriage and the incestuous marriage were one and the same. The same event cannot at once be the cause or effect of another event and not be the cause or effect of that other event. Only an event whose descriptions determine its identity can have so varying a causal efficacy. But such events, "events *under descriptions*," now seem incapable of serving as the mind-independent causal relata to which Hume is so firmly committed.

Thus, the Humean faces a number of unattractive alternatives. The constant conjunction analysis of causation cannot be surrendered; and the Humean is equally unwilling to deny that causation exists independently of the mind (except as Hume is committed to the psychological theory of causal necessity that we sketched in Chapter 1). At the same time, the Humean should be able to account for our actual citations of causes and effects and for our well-grounded judgments about their identities. The only way to render these claims consistent would appear to be by surrendering the last mentioned task. If Hume had recog-

nized this problem, we suspect he would have chosen to revise at least some of our ordinary causal citations and beliefs about event identity in the interest of certain broader and more systematic considerations. In other words, he would have maintained that causation is extensional and that the countervailing intuitions that apparent counterexamples express are mistaken. If it can be shown that cases such as the marriage/incestuous marriage example are in fact extensional, despite contrary appearances, then the constant conjunction view can be preserved, together with the commitment to particular concrete occurrences as the fundamental relata of causation.

This general strategy is the one we shall pursue. In the next section we offer a criterion of extensionality that causal statements clearly pass, and in the following section we show that apparent cases of intensional causal statements can consistently be handled. These conclusions will reveal the final ontological commitments of Hume's account of causation.

V

Causal sentences can be analyzed into sentential contexts and their arguments, where these arguments may either be singular terms or sentences themselves. Typically, when the sentential context is ". . . because . . .," the arguments are sentences. An example involving *terms* as arguments is

- (3) The Titanic's striking an iceberg *caused* the sinking of the Titanic.

An example involving *sentences* as arguments is

- (4) The Titanic sank *because* it struck an iceberg on 14 April 1912.

To say that sentences such as these are extensional is to say that if a substitution of coreferring terms of coextensive predicates in their arguments leaves the argument's references unchanged in the case of a term-type argument, and leaves the argument's truth value unchanged in the case of a sentence-type argument, then the whole sentence will also be left unchanged in truth value.

The singular terms of (3) and (4) pass this test without diffi-

culty. We could substitute identicals from any of the following descriptions in (3) or (4) while preserving their truth values:

The Titanic = the largest passenger liner afloat before 1930 = the newest ship in the White Line in 1912 = the sistership of the Olympic = the ship which struck an iceberg and consequently sank on the night of 14 April 1912.

The sinking of the Titanic = the event about which Walter Lord wrote his first best-seller = the event which cost Lloyd's of London more money than any other in 1912 = the event which resulted in the only mass grave in the Halifax cemeteries.

Some of these substitutions would be unusual, and might never find their way into versions of (3) or (4) formulated in order to *explain* the sinking or state the effect of the Titanic's striking the iceberg. But this consideration has no bearing on the *truth* of (3) and (4) when they embody such substitutions. We may therefore conclude that at least some causal contexts are extensional, in that they are referentially transparent.

But what of the substitution of coextensive predicates in a sentence such as "x struck an iceberg on 14 April 1912"? Because this sentence is coextensive with "x carried Lady Astor among its passengers for the last time," substituting coextensive predicates in (4) could yield the patently false sentence

- (5) The Titanic sank because it carried Lady Astor among its passengers for the last time.

Must we infer from this substitution that, as some have suggested, the causal relation is intensional?¹⁵ One way to circumvent this sort of counterexample is simply to argue that the apparent failure of extensionality in (5) results from a misconstrual of the underlying logical form of such sentences. On this view, the appropriate logical form of (4) is that of sentences in which causation is a relation between *events*, and is correctly represented by the more cumbersome sentence

¹⁵ Dagfinn Føllesdal seems committed to this conclusion on the strength of a similar argument in his "Quantifying into Causal Contexts," M. Wartofsky and R. Cohen, eds., *Boston Studies in the Philosophy of Science* (New York: Humanities Press, 1965), p. 264.

- (6) There is an event y , the sinking of the Titanic, and an event x , the striking of an iceberg by the Titanic on the night of 14 April 1912, and x caused y .

This thesis leaves no scope for counterexamples such as the inference from (4) to (5). It treats all sentence-taking causal contexts as implicitly term-taking ones. The tactic parallels Frege's suggestion about the logical form of "... after. . . ." Although this operator takes sentences as arguments, and although its truth value *may change* when its sentences are substituted for, *salva veritate*, Frege argues that its actual logical form involves events and a claim that one follows the other in time.¹⁶ This approach is both attractive and plausible, but it ties the thesis of extensionality for causal contexts so directly to the claim that causes and effects are particular events as to beg the question here at issue. Moreover, it provides sentence-taking causal contexts with nothing like the direct and more formal test of extensionality that applies to term-taking causal contexts. Its plausibility as an argument for the extensionality of sentence-taking causal contexts rests entirely on the strength of the claim that logical form differs from apparent form (for reasons that transcend issues in the philosophy of language alone). A more convincing argument for the extensionality of such causal contexts would show that these sentences pass a test for extensionality that paradigm cases of intensional sentence-taking contexts do not pass—where the argument does not resort to allegations about underlying logical form. Let us sketch such an approach.

The admission that causal statements fail the test of extensionality when certain coextensive predicates are substituted in sentence-arguments is not very damaging. It is tantamount only to admitting that causal statements are not truth-functional, which is already well known.¹⁷ More importantly, we may

16. Gottlob Frege, *Philosophical Writings*, trans. M. Black and P. Geach (Oxford: Basil Blackwell, 1952), p. 77.

17. There is of course a well-known and controversial argument to the effect that if a context is extensional then it is truth-functional. This argument originated in the work of Frege, but its contemporary statement is W. V. O. Quine's "Three Grades of Modal Involvement," reprinted in *The Ways of Paradox* (New York: Random House, 1966). Quine employs the argument in advancing objections to modal logic, but it has been ap-

revise our criterion of extensionality so that such causal statements will accommodate the substitution of coextensive predicates in their contained sentences where other sorts of statements—such as those expressing beliefs, modalities, or explanatory relations—will not. The original criterion stipulated that an extensional statement must permit the substitution of coextensive predicates in contained sentences without changing the whole statement's truth value. But we may legitimately revise this criterion so that a sentence-taking context is extensional if the *references of the gerundive nominalization of the contained sentences remain the same*. Every sentence has at least one nominalization. For example, the gerundive nominalization of "the Titanic sank" is "the sinking of the Titanic." Such nominalizations assume the logical form of singular terms. For this reason causal contexts taking them instead of sentences as arguments pass the conventional test of extensionality without difficulty. If we require that the nominalizations associated with coextensive predicates retain the same reference, then we can take advantage of the fact that term-taking causal contexts pass our test. We can thus formulate a new test of extensionality that sentence-taking causal contexts pass, but that intensional contexts do not pass.

By using our revised criterion, it turns out that the substitution that took us from a true causal statement such as (4) to a false causal statement such as (5) provided no fair test of extensionality. The nominalizations of the sentence arguments of (4) and (5) in which coextensive predicates have been substituted are: "The Titanic's sinking" and "The Titanic's carrying Lady Astor among its passengers for the last time." These

plied in the analysis of causal statements by Anscombe, Føllesdal, and Davidson. In this connection, the argument has been used to show that since causal contexts are acknowledged to be non-truth-functional, it follows that they are extensional neither for substitution of predicates nor for substitution of terms. The argument has been criticized as invalid by Arthur Smullyan, "Modality and Description," *Journal of Symbolic Logic* 13 (1948), pp. 31-7, by R. Cummins and D. Gottlieb, "On an Argument for Truth-Functionality," *American Philosophical Quarterly* 9 (1972), pp. 256-59, and by J. L. Mackie, *The Cement of the Universe*, Chapter 10. These authors have, in Mackie's words, "drawn the claws of an argument to which excessive deference has been shown" (p. 254).

nominalizations are clearly not coreferential. We may therefore conclude that the predicate substitution in question produces a false causal statement not because causal contexts are not extensional, but because the substitution fails to meet the proper criterion of extensionality.

By contrast, while the substitution of coextensive predicates can preserve both the reference of gerundive nominalizations and the truth value of causal statements, it fails to do so for explanatory contexts of psychological attitude statements. For example, the true statement

- (7) The fact that Oedipus went mad is explained by the fact that he married his mother.

is made arguably false when we substitute "married Laius's widow" for "married his mother"—even though this substitution preserves the reference of the gerundive nominalization.

Similarly the true statement

- (8) Steve believes that Larry is his brother.

may be turned into a false one by substituting the coextensive predicate "male sibling" for brother, even though such a substitution would preserve the reference of the nominalization. And again, the presumably true statement

- (9) Necessarily ($9 > 5$).

is made false when "the number of the planets" is substituted for "9," even though "9's being greater than 5" and "the number of planets being greater than 5" have the same reference (recognizing, of course, that it may be difficult to say precisely what their reference is). Thus, we conclude that causal contexts satisfy our revised criterion of extensionality while intensional ones do not.

It may be objected that our revision amounts to a wholesale transformation bearing no interesting connection to the traditional criterion and so lacking significant implications for the question whether causal contexts are extensional. If so, our criterion would simply beg the question at issue. In reply, it should be noted that our new criterion does isolate some real differences between causal contexts. These differences reflect the permissibility of substitutions preserving reference. Whether

the differences strictly pertain to the extensionality versus intensionality discussion may be a terminological issue. Perhaps we should coin a new term to describe the property in question. *Nominal Extensionality* seems appropriate, because it reflects both the appeal to nominalizations and the doubts there may be about whether its referent really is a kind of extensionality.

There is, however, at least one consideration that would favor describing nominal extensionality as a form of extensionality: Ruth Barcan Marcus has argued that "we cannot talk of the thesis of extensionality, but only of stronger and weaker extensionality principles."¹⁸ Marcus shows that the strength of a principle of extensionality varies with the sense of the equivalence demanded between intersubstitutable arguments of a context under examination. Adapting this thought to our purposes, we could maintain that denying our criterion the title of a principle of extensionality involves a denial that equivalence of reference under transformation to gerundive nominalization is any sort of equivalence at all. Such a denial will be difficult to accept if, as Noam Chomsky has suggested,

Gerundive nominalizations can be formed fairly freely from propositions of subject-predicate form, and the relation of meaning between the nominal and the proposition is quite regular. . . . Gerundive nominalization involves a grammatical transformation from an underlying sentencelike structure. . . . The semantic interpretation of a gerundive nominalization is straightforward in terms of the grammatical relations of the underlying proposition in the deep structure.¹⁹

We conclude, then, that "nominal extensionality" is a genuine and relevant form of extensionality.

VI

The Humean's commitment to the mind-independence of causation motivates the claim that causal statements are extensional, and our criterion of nominal extensionality offers an argument for this conclusion as well. But both motive and argument must

18. Ruth Barcan Marcus, "Extensionality," *Mind* n.s. 69 (1969), pp. 55-62, as reprinted in L. Linsky, ed., *Reference and Modality* (Oxford: Oxford University Press, 1971), p. 46.

19. N. Chomsky, "Remarks on Nominalization," *Studies on Semantics in Generative Grammar* (Hague: Mouton, 1972), p. 16.

confront important counterexamples to the extensionality of causation. If these counterexamples cannot be accommodated or defeated, a serious objection to Hume's conception of causation will remain unanswered. In considering these counterexamples, we will attempt to preserve the ontological simplicity of the Humean account, which countenances only particular events subsumed under general laws connecting unique generic events. The cost of this attempt, as we shall see, is a multiplication of the absolute *number* of events that occur beyond our ordinary intuitions.

The most serious obstacle to a Humean extensional account of causation is the so-called problem of adverbial or predicate modification.²⁰ Events such as sinkings can occur rapidly or slowly, fatally or harmlessly, detectably or undetectably, expectedly or unexpectedly. In short, there seem to be different ways in which the same event can occur. For instance, the Titanic's sinking was rapid, fatal, unexpected, etc. Thus an intensionalist might argue that the invalidity of the following inference demonstrates the nonextensionality of causation:

- (4) The Titanic's striking an iceberg caused the sinking of the Titanic.

The Titanic's sinking was a rapid sinking; and therefore:

- (11) The Titanic's striking an iceberg caused the Titanic's rapid sinking.

This conclusion could well be false. After all, the rapidity of the sinking might more properly be blamed on the captain's giving incorrect orders, or the failure of the crew to execute those orders, or the passengers' panic which impeded emergency operations. So, the argument continues, the only way the Humean can preserve extensionality is to deny that the Ti-

20. Alvin Goldman, *A Theory of Human Action* (Englewood Cliffs, N. J.: Prentice-Hall, 1970), p. 3, presents this problem. More recently, Beardsley takes it up in "Actions and Events." Jaegwon Kim and Donald Davidson discuss the problem in their papers—notably, Kim's "Events as Property Exemplifications," in *Proceedings of the Winnipeg Conference on Theory of Action* (Dordrecht, Holland: D. Reidel, 1976), and Davidson's "The Logical Form of Action Sentences," in N. Rescher, ed., *The Logic of Action and Decision* (Pittsburgh: University of Pittsburgh Press, 1967), pp. 81–103, and "Causal Relations."

anic's sinking is identical to its sinking rapidly. If this strategy is admitted, there will be no way to limit the number of nonidentical events to two, for there can be as many events as there are adverbs applicable to the event of the sinking. Since the number of such applicable adverbs is indefinite, it follows that the extensionality of causation commits us to an indefinite number of events, where common sense countenances only one. Opponents of the extensionality thesis think this result is so evidently absurd that it renders the thesis indefensible.

This anti-Humean argument is questionable in several respects. It can be shown that (a) where adverbial modification renders certain causal claims false, it truly has multiplied events; (b) where adverbial modification does not change the truth value of a causal claim, there is no multiplication of events; and (c) where a multiplication of events does occur, it is innocuous.

On what basis is it claimed that the Titanic's sinking is identical to its sinking rapidly? We suspect the basis is the assumption that it could not, logically speaking, sink rapidly without also sinking. From this fact, however, it does not immediately follow that sinking rapidly is the same event as sinking. Intuition that the two events are the same presupposes some kind of direct relation between sinking and rapid sinking, but this unanalyzed relation is not alone sufficient to establish *identity*. Moreover, there may be conflicting intuitions about such cases, especially when we individuate events on the basis of their causal relations. Consider a sphere that is simultaneously spinning and changing color. In this case, we have no difficulty saying that two events occur—a color change and a spinning—even though they both happen to the same object and at precisely the same time and place. The multiplication of events is here intuitively admissible, because we believe that the *causes* of the spinning and the color change are different. In other words, at least some of our event-individuating intuitions are based on beliefs that causes are not identical. If we consider the Titanic episode in the light of such intuitions, we are led to the following conclusion: because the cause of the rapid sinking (say, a failure of command) is believed to be different from the cause of the sinking (the striking of an iceberg), there is at least some intuitive basis for holding that the rapid sinking and the sinking are distinct events.

The dispute thus comes down to a clash of intuitions, and the conflicting intuitions have equal force. The more plausible the claim that two event descriptions entail different truth values for the causal context in which they figure, the more the differences between the events described seem to mount up. But the more these differences mount up, the stronger becomes the intuition that they describe different events. After all, the *sinking* of the Titanic was arguably nothing that anyone's orders or execution of orders or panic could have done anything about, but the *rapidity* with which it sank was something that these three conditions did affect. To the extent that these considerations weigh against the truth of (11), they also weigh against the putative identity of the sinking and the rapid sinking. The intensionalist cannot without argument refuse to embrace one of our methods for individuating events, while insisting on exclusive use of the other. The extensionalist, by contrast, can accept both of these criteria for event individuation. If the criteria conflict, and one criterion is better fulfilled, extensionality may still reign. Depending on which is better fulfilled, we will prefer to multiply events or to deny the truth of some causal assertions.

Consider, for instance, how the opponent of extensionality would defend the claim that (11) is false. He would do so by pointing out that although the striking was necessary for the rapid sinking, it was not sufficient for it. This is an insufficient ground for denying the truth of (11), but if it is even a reason to suppose (11) false, it is an equally strong reason to believe in the falsity of (4), "The Titanic's striking an iceberg caused its sinking." But if (4) is false, it is not surprising that an alleged falsehood such as (11) should follow from it without undercutting its extensionality. The mistake in the argument is the supposition that causes are ever *cited* in a way that supposes them to be anything more than necessary for their effects. The extensionalist may reason that if events are cited in true causal statements under descriptions which suppose them to be only causally necessary for their effects, then citing the striking as a cause of the rapid sinking is perfectly in order. Thus, an argument for the truth of (11) might be mounted.

Such an argument would again invoke Davidson's dictum (cited in Chapter 3) that deletions from (or additions to) the

description of an event are not deletions from (or additions to) the event described.²¹ The terms selected to describe the cause in (11)—the Titanic's striking an iceberg—pick out a particular event, but cite only some of its features in designating it. To cite others of its features would make no difference to the question of which event was described, but it might lessen any pre-analytical reluctance to accept the truth of (11). In the present example, "The Titanic's striking an iceberg" cites an event that also had properties involving a ship with insufficient lifeboats, relatively inexperienced crewmen, a complacent captain, etc. Similarly, "The Titanic's sinking" refers to an event with properties that the expression does not cite—properties such as being rapid, fatal, and unexpected. These considerations support the truth of (11), and thereby deprive the intensionalist of his argument. They also show how the extensionalist accommodates the identity of an event whose description is adverbially unmodified with one whose description is so modified. He simply exploits our occasional inclination to individuate events by reference to their *inclusiveness*.

Sometimes this rough criterion seems to give implausible results, in contrast with one that individuates events by reference to *causes*. Can the extensionalist accommodate these cases? Consider the following sentence:

- (12) The Titanic sank rapidly because the captain gave incorrect orders.

If we accept the view that the Titanic's sinking = the Titanic's rapid sinking, we must infer the obviously false statement that:

- (13) The Titanic sank because the captain gave incorrect orders.

But perhaps the nominalizations of "the Titanic sank" and "the Titanic sank rapidly" do not refer to the same events. If so, then they fail our test of nominal extensionality. When we ask for the cause of the Titanic's sinking *rapidly*, emphasizing rapidly, we are asking for the cause of an event's (the sinking) having a *particular* property (being rapid). An event's taking place is not the same as an event's taking place rapidly, or fatally, or unexpectedly. It is equally clear that an event's taking place

21. Davidson, "Causal Relations." Davidson himself says nothing about additions.

rapidly, fatally or unexpectedly may have effects or causes quite different from those of the unvarnished event itself. Insofar as a rapid or fatal or unexpected event can participate in causal relations, it is reasonable to suppose that the event's being rapid or fatal or unexpected is itself an event, or at least an entity quite distinct from the event modified. This line of argument of course results in a multiplication of events, where ordinary intuitions might promote a contrary inclination to posit event identity. But as we have seen, these intuitions do not hold the field uncontested, and the Humean has independent grounds that encourage the multiplication of the objects of causation.

Our long digression into questions of extensionality has brought us back to the characterization of Humean causal relata that we initially elaborated in the exposition of Kim's analysis of events (in Section II). There we examined the view that causal relata had to be spatiotemporally bounded particulars of a certain sort: the manifestation of *unique* constitutive properties by particular objects at specific times. But this account set our intuitions about event identity at variance with our commitment to constant conjunction as the basis for causation, a problem which led to a multiplication of constitutive properties manifested by particular objects in a single event. Plausible as this move appears, it was found to generate an intensional character for causal statements. The Humean can no more embrace this consequence of a causal ontology than he can accept an ontology incompatible with the requirement of constant conjunction. Faced with this inconsistent triad of beliefs, the Humean must surrender something. We conclude that what must be surrendered is the ontology of causal relata reflected in our ordinary intuitions about event identity. Such intuitions are no more likely to give a Humean pause than like intuitions about causation. If his ontology renders the regularity theory consistent with the extensionality of causal statements at the cost of a counterintuitive multiplication of the sheer number of events that make up the history of the universe, then this is a consequence he should willingly embrace.

In the present case, the Humean will insist that the Titanic's sinking and its sinking rapidly are two distinct spatiotemporally restricted particulars. The former is an event. The latter may not be so classified by ordinary thought, but it is surely as much

a concrete particular item with its own causes and effects as the former. Whether we call it an event or not is merely a matter of nomenclature. What is crucial for the Humean is that the resulting multiplication of events makes possible a coherent and defensible ontology, a commitment to the extensionality of causal sentences, and an analysis of events that complements the regularity theory.

VII

In conclusion, we may test the adequacy of the Humean commitment to particular events as the objects of causation by comparing it with the sustained alternative view offered by J. L. Mackie, who embraces facts as well as particular events as causes and effects.

In Chapter 10 of *The Cement of the Universe*, Mackie takes up two questions: (1) Are causes and effects facts or events? (2) Are statements that describe causal relations extensional or intensional? His answer to the first question is that we must recognize both facts and events as the relata of causal relations, although facts "seem to have every advantage over" events.²² His answer to the second question is that causal assertions are only occasionally extensional, and that when they are it is because of our ignorance about the causal relata we are describing. Mackie does not explicitly say why these two questions—concerning the ontological nature of causes and concerning the statements that describe them—go together; but our arguments in Section III of the present chapter provide the main lines of an explanation. As we there noted, some philosophers have embraced an intensional account of causal contexts just because it accords with their view that causation is to be understood in terms of explanation (or, more radically, that it consists in explanation). Mackie is influenced by these views, but nonetheless writes, "I would reject any . . . theory that what is there is constituted or determined by how things appear to us (or to me)."²³ Since he explicitly warns that "the causation that I want to know more about is a very general feature . . . of

²² J. L. Mackie, *The Cement of the Universe*, p. 262.

²³ *Ibid.*, p. 2.

the way the world works," it seems natural to expect that Mackie will reject any treatment of the causal relation as mind-dependent, and will defend the extensionality of causal sentences. This expectation turns out to be mistaken.

Before we assess Mackie's views, let us ask what the question of extensionality has to do with the issue of whether causal relations are events or facts. Roughly, an events ontology seems to be substantiated by an extensional treatment of causal statements, while a facts ontology goes hand in hand with an intensional account. Events are particulars, and they are designated by singular terms. The relations between pairs of such items should not be affected by the terms we hit on to refer to them, and from this observation it is a short step to the conclusion that the descriptions of these relations are extensional. A facts ontology, by contrast, suggests a quite different conclusion. While it remains unclear what facts are (a controversy Mackie fails to advance), they do seem to bear affinities to *propositions* rather than to concrete particulars. Moreover, the only extensional relations between propositions appear to be truth-functional. Causation is certainly not a truth-functional relation. Accordingly, an ontology of causation in terms of facts leads naturally to an intensionalist theory of causal statements.

Mackie first considers the view, defended most notably by Davidson²⁴ (and embraced by us in modified form above), that causes and effects are events (concrete occurrences) with features beyond and sometimes even entirely different from the ones we hit upon for describing them. According to this treatment, we can specify the whole cause of an event without wholly specifying it, for "the event *qua* concrete occurrence includes everything that was relevant to the production of the effect and much more besides."²⁵ On this view, causation is a two-place relation between particular items whose (definite) descriptions are freely substitutable in causal sentences without changing truth value, so long as reference is preserved. That is, causal statements turn out to be extensional. Although Mackie admits that "We can . . . and sometimes do, take causes (and effects) as concrete occurrences and causing as a two-place relation between such

24. Donald Davidson, "Causal Relations," *passim*.

25. Mackie, *The Cement of the Universe*, p. 256.

events," he goes on to maintain that "it is far from clear that this is the best treatment, and it is certainly not the only possible one."²⁶

If Mackie's arguments against extensionalist views such as Davidson's are sound, they are equally strong objections to the view we have embraced as an account of the Humean causal ontology. We think, however, that Davidson's views can be defended against Mackie in a way that will demonstrate the general adequacy of the theory we have sketched in this chapter. Let us, then, take up Mackie's objections against events and extensionality.

Mackie objects to Davidson's position principally on grounds that "it seems a disadvantage of concrete occurrence causes that they will nearly always include *irrelevant components*," while "we are, sometimes at least, interested in a more selective, more discriminating relation than can hold between concrete occurrences."²⁷ Facts allegedly enable us to land on the causally relevant features of events in a way that reference to the entire event does not; entire events are individuated merely "by their spatio-temporal regions," not by their causally relevant features.²⁸ Facts are said to be ontologically compelling, because "it will be such facts only that can be explained, rather than a concrete occurrence in all its infinite detail."²⁹ Mackie raises the question, "Why, then, do we bother to recognize producing causes [events] as well as explanatory causes [facts]?"³⁰ He answers, quite simply: our ignorance. His meaning is that when we are ignorant of the particular causally relevant features of whole events, we refer to the event as best we can. When our knowledge permits the requisite precision, we cite facts.

Mackie argues additionally that by using the Method of Difference we can "progressively localize" a cause. For example, after it was discovered that drinking wine causes intoxication, we eventually were able to distinguish between relevant and irrelevant causal factors. By making observations and performing experiments, the precise cause of intoxication was "progressively

26. *Ibid.*, p. 257.

27. *Ibid.*, p. 258 (italics added).

28. *Ibid.*, p. 257.

29. *Ibid.*, p. 260.

30. *Ibid.*, p. 262.

localized." This process constitutes an "important kind of advance in knowledge," since it identifies the aforementioned irrelevant components of concrete occurrences and so removes a barrier to the increase of knowledge.³¹

Whatever its ontological significance, Mackie's notion of an irrelevant feature of an event needs sharpening. Mackie cannot mean by an irrelevant component of an event a feature that plays no role in bringing about the event's effects. If this is what an irrelevant component of an event is, then events have no irrelevant components. Features of an event may well be irrelevant to some of the event's causes and effects under various descriptions, but for them to be irrelevant to all of an event's causes and effects under all possible descriptions would entail an implausible causal indeterminism, as well as introducing a large number of "nomological danglers." Thus, for example, that the Titanic's striking the iceberg had the feature of involving a ship with insufficient lifeboats is irrelevant to the description of its effect as the sinking of the Titanic, but it is clearly relevant to another description of the effect as the sinking of the Titanic with fearful loss of life. Thus, there appear to be no causally irrelevant components of events, although there may be many causally irrelevant ways of describing an event. Mackie presumably would not disagree.

Mackie's contention is probably better interpreted as the claim that a component is irrelevant if it plays no role in bringing about some particular effect. A feature of an event may thus be relevant for its effect under some descriptions, and irrelevant under others. But relevance will then turn out to be not an *ontological* distinction about features of events, but an *epistemological* distinction about which features are important for *explanations* of why a particular event had the cause or effect it did have. This interpretation may reasonably be attributed to Mackie, for he describes the isolation of such a feature as "an important kind of advance in knowledge." Understood, then, as a point in causal epistemology, the claim that concrete occurrences include irrelevant features is correct, but the objection has no force as a complaint against the view that causes (independent of our descriptions or knowledge of them)

31. *Ibid.*, p. 258.

are concrete occurrences. To show that a feature of some event is irrelevant to the occurrence of *one* of the event's effects is hardly to demonstrate that it is not a feature of the causing event in question. *Whether* one event caused another is a separate issue from *why* one event caused another. The description of an event through its causally irrelevant features will pick out the same cause, even though it will not provide an explanation of why it had this particular effect. To infer that irrelevant features are not parts of the cause—i.e., features of the cause in question—or that it is the features themselves that are *the* cause, amounts to an illicit inference from epistemological truths to ontological falsehoods.

Mackie's appeal to relevant and irrelevant features, on the one hand, and to explanatory considerations on the other, determines his preference for facts over the concrete event analysis of causes. What are we to say regarding his alternative, the notion of "fact"? Mackie provides no explicit definition of a fact, but it is easy to cite passages in his book where a fact is described not as a proposition but as a "feature of an event."³² Exploiting the claim that facts and not events are employed in explanations, Mackie introduces the notion of a *minimally complete causal account*; it is "one which mentions all the features that were actually causally relevant to some event."³³ He describes the typical form of a minimally complete causal account as follows: "*a*'s being *B* and there being an *x* such that *x* is *C* and *x* has relation *R* to *a* and . . . caused there to be a *z* such that *z* is *D* and *z* has relation *S* to *a*." Such an account will single out from a concrete occurrence "in all its infinite detail" a single set of explanatory facts:³⁴

What is here said to cause something may be called an *explanatory* cause. An explanatory cause is a fact, but of an unusually pure sort. Everything causally relevant about it is expressed by general terms and existential quantifications; the individual that this fact is about, the only item with respect to whose description the expression that states this fact is referentially transparent, is causally irrelevant, everything that is causally relevant about this individual having been covered by explicit monadic, dyadic, or polyadic predicates. . . .

32. *Ibid.*, pp. 265-67 and the passages quoted below.

33. *Ibid.*, p. 260.

34. *Ibid.*, pp. 260-61.

A minimally complete causal account is explanatory in at least two ways. The conjunction of features in the cause will be related to that in the result by some regularity. . . . Also, since the first conjunction includes all the features that are causally relevant to the latter, this regularity will be . . . a pure law of working. . . .

Pushed to this extreme, facts as causes seem to have every advantage over events. Why then, do we bother to recognize producing causes as well as explanatory causes? The reason lies, as so often, in the extent of our ignorance. A minimally complete causal account is an ideal which we can hardly ever reach.³⁵

Mackie gives a number of more particular reasons why we might take concrete events rather than facts as causes:

We may know that a certain event caused another without knowing what features of the former event were relevant, and therefore without being able to specify any facts as causes. And since less knowledge is needed to pick out an event as a cause, the knowledge that is needed is more easily acquired. One event's causing another is observable whereas the identification of a fact as a cause requires some theory, some assumptions, or some comparison of cases with one another.³⁶

Mackie's rationale for choosing facts over events relates exclusively to the limitations of knowledge—ignorance in knowing which specific features of an event were causally relevant to the production of a second event. As knowledge increases, the possibility for citing features or facts increases. Thus, on Mackie's view, producing causes and explanatory causes differ in degree, not in kind; and the difference that makes the critical difference is epistemological, not ontological.

The quoted passages from Mackie's book raise many questions. We think the answers to these questions all lead back to the view of causes as events, as concrete occurrences, and away from Mackie's conclusions that causal relata are facts. Apparently, facts are explanatory causes because they are the features of events cited in the regularities and theories we employ to explain why one particular event caused another. When we do not possess such laws and theories, we may refer to one event as the cause of another, but we shall not be able to say why it was

35. *Ibid.*, pp. 261–62.

36. *Ibid.*, p. 265. In his 1980 "Preface to the Paperback Edition" of *The Cement of the Universe*, Mackie offers further clarifications of his views, but the position remains unaltered (see pp. ix, xv).

the cause—i.e., in virtue of which of its features it had this result. These claims about causal explanation are correct and important, but they have no bearing on the *ontological* issue of the objects of causation. That Mackie's theory of explanatory causes cannot be a correct ontological account of causal relata becomes clear when we consider what a *feature* of an event is. A feature of an event is a property or aspect of it. It is not a particular item or occurrence; it is a universal. Universals do not cause things (or explain them); only their instantiations do. Similarly, effects are not features, but the instantiations or exemplifications of features. The items that exemplify features are particulars: either substances or events. When a substance exemplifies a feature, the "result" is an event, and when an event exemplifies a feature (for instance, the Titanic's sinking exemplifying the feature of being rapid, or fatal, or unexpected), this too is a particular. It is the *having* of a feature by *particular* items that constitutes the feature's causal role. A feature is an explanatory cause only because of its exemplification by a substance or an event—that is, only because it is "part" of a producing cause or concrete occurrence.

How, then, shall we express the relationship between features, intensional facts, and explanatory causes, on the one hand, and events, concrete occurrences, and producing causes, on the other? To answer this question we need to recall Davidson's treatment of events and their descriptions, the treatment Mackie rejects as an exhaustive account. What Mackie calls explanatory causes are merely those features of events that are mentioned in descriptions of the events for purposes of causal explanation. Our quest for these features is likely to be interminable, as a result of the impossibility of specifying an event under a description that shows it to be sufficient for its effects or causes. Mackie therefore describes a minimally complete causal account as "an ideal which we can hardly ever reach."³⁷ Additions to the list of causally relevant features by which we describe the events constitute additions to our knowledge about causal relations, and so "explanatory causes" are of epistemological importance. But this importance is again no reason to offer them as ontological alternatives to concrete occurrences. Moreover,

37. *Ibid.*, p. 262.

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