Introduction

Smiles, talks, runs, arrivals and departures, births and deaths, thunder and lightning: the variety of the world seems to lie not only in the assortment of its ordinary and less ordinary inhabitants—animals and physical objects, or perhaps minds, sets, atoms—but also in the sort of things that happen to or are performed by them. In the last three decades this view has been a focus of considerable debate in philosophy, with implications reaching far into the concern of other disciplines as well (above all linguistics and cognitive science). It is a view that many authors have accepted, mostly on account of the prominent role played by the concept of event in the formulation and analysis of a wide variety of philosophical issues. However, there has not been much agreement as to the precise nature of such entities, and a range of alternative theories (along with a corresponding variety of identity and individuation criteria for events) have been put forward. This volume brings together a selection of essays that have deeply influenced this debate, paving the way to an understanding of the role played by events in our representation of the world.

The material is organized in five sections: (i) the role of events in the logical analysis of natural language; (ii) the metaphysical status of events; (iii) their identity and individuation criteria; (iv) their role in the analysis of space, time and causality; and (v) the distinction and classification of various types of events and event-like entities (such as processes and states). Although some of these areas have attracted more attention than others (and although a full picture would have to cover additional areas as well, such as action theory, the philosophy of mind, or recent developments in natural language semantics), it is expected that each of these will constitute an indispensable landmark for further work in this field.

I. Events in Semantics

The view that events are part of the world (next to material objects as usually understood) has of course a respectable pedigree in the history of philosophy. It has been held, for instance, by Leibniz and Arnauld, and traces may already be found in Plato. In the form prevailing among contemporary philosophers, however, this view has rather recent origins, and has been motivated initially by considerations concerning the logical structure of natural language. Some early indications can be found in Frank Ramsey (1927), who suggested that the propositional clause 'that Caesar died' should be analysed as an existential proposition asserting the existence of an event of a certain sort (the death of Caesar), just as a proposition like 'Italy has a king' may be taken to assert the existence of a person of a certain sort (the king of Italy). This idea—that action verbs should be related in some such way to an ontology of events—is also found scattered in the work of other early authors, most notably Hans Reichenbach (1947), Gilbert Ryle (1949), and Arthur Prior (1949). It is,

however, Donald Davidson who may be given credit for introducing it to current philosophical discussion, and the publication of his paper 'The Logical Form of Action Sentences' (Chapter 1 of this volume) may be said to have marked an important turning point in the debate.

Davidson's contribution was to give body to Ramsey's suggestion by construing verbs of action as containing one more argument place than is usually recognized. Thus, an ordinary 'atomic' sentence like

(1) Jones buttered the toast,

is not analysed as consisting of a binary predicate, 'buttered', flanked by two singular terms, 'Jones' and 'the toast'. Rather, Davidson construes it as involving a three-place predicate with a bound event variable:

(1') $(\exists e)$(Buttering (Jones, the toast, e)).

Overlooking tense-related complexities, we can read this as 'There is an event e which was a buttering of the toast by Jones'. In other words, the logical form of (1) involves quantification over events.

There are several reasons underlying this analysis. One that played a major role in Davidson's arguments is that it allows for a simple and effective solution to the problem of the variable polyadicity of action verbs. This is the problem, pointed out by Anthony Kenny (1963, Ch. 7), of accounting for the various apparent logical relations between a sentence like (1) and, say, any of the following:

(2) Jones buttered the toast with a knife.
(3) Jones buttered the toast at midnight.
(4) Jones buttered the toast with a knife at midnight.

Clearly, (4) entails (and is not entailed by) the conjunction of (3) and (2), each of which in turn entails (1). Yet there is no clear way one can do justice to such logical connections in standard predicate logic, if (1)–(4) are all treated as atomic sentences built up with the help of distinct, logically autonomous predicates with various number of argument places ('x buttered y', 'x buttered y with z', 'x buttered y with z at t', etc.). By contrast, Davidson's analysis enhances the internal structure of such predicates, hence their intimate relationships, allowing the function of such adverbial expressions as 'with a knife' and 'at midnight' to be explained in terms of simple predication of events. On this construal, (2)–(4) are analysed as (2')–(4'), and standard predicate logic becomes fitted for explaining the relevant adverb-dropping inferences:

(2') $(\exists e)$(Buttering (Jones, the toast, e) & with (a knife, e)).
(3') $(\exists e)$(Buttering (Jones, the toast, e) & at (midnight , e)).
(4') $(\exists e)$(Buttering (Jones, the toast, e) & with (a knife, e) & at (midnight , e)).

(This adequacy of standard predicate logic is not dissimilar from other cases of 'subatomic semantics', to use Parsons's (1990) expression: a Davidsonian analysis of the internal structure of 'buttered' makes it possible to appreciate the relationships between (1) and (2)–(4) just as, say, a Russellian analysis of 'the toast' will account for the relationships between

(5) Jones buttered the toast.
(6) Jones buttered some toast.

In both cases, standard logic does the job; the analysis only affects the algorithm for translating English into first-order languages.)

There are various other phenomena that can be adduced as evidence for an event-based semantics of this sort, besides the issue of adverbial modification. For instance, quantification over events seems necessary in order to account for relationships between sentences that do and sentences that do not appear to make explicit reference to events, as with the following:

(7) Mary cried at noon.
(7') Mary's cry took place at noon.

On a Davidsonian analysis the logical relationship between (7) and (7') is explained in terms of the logical structure of the former:

(7") $(\exists e)(\text{Cry}(\text{Mary}, e) \,\&\, \text{at}(\text{noon}, e))$.

Likewise, the analysis does justice to the logical structure of arguments involving explicit (as in (8)) and implicit (as in (9) and (10)) quantification over events (from Parsons 1985: 237):

(8) In every burning, oxygen is consumed.
(9) Agatha burned the wood.
(10) Oxygen was consumed.

Similarly for arguments where the event quantification is lexicalized, e.g. as a bare noun-phrase temporal adverb (Rothstein 1995), as in

(8') Every time something is burned, oxygen is consumed.

A still further reason ties in with the semantic account of perception reports with 'naked infinitive' complements, such as

(11) John saw Mary cry.

This sort of sentence is difficult to handle within ordinary first-order semantics, and some authors (e.g. John Barwise 1981) have regarded this difficulty as evidence in favour of alternative semantic frameworks (such as situation semantics). For instance, one cannot simply treat (11) as having the same logical form as

(12) John saw that Mary cried.

For the 'that'-clause in (12) is an opaque context, whereas the naked infinitive complement in (11) is not. However, a first-order semantics with hidden quantification over events offers a very simple way of handling such difficulties. In 'The Logic of Perceptual Reports' (Chapter 2), James Higginbotham pointed out that once events are treated in the spirit of Davidson's account, (11) can simply be analysed as

(11') $(\exists e)(\text{Cry}(\text{Mary},e) \,\&\, \text{See}(\text{John},e))$,

that is, 'There is an event *e* such that *e* was a crying by Mary and John saw *e*'. (Essentially

the same account was given by Frank Vlach 1983. See Asher and Bonevac 1985 and Neale 1988 for critical discussion.)

On the face of it, then, Davidson's analysis marks a very influential step in the logico-philosophical discussion on events. Various improvements have been put forward in order to accommodate additional phenomena. For instance, building on a suggestion of Hector-Neri Castañeda (1967) (initially rejected by Davidson 1967), various authors pursued the use of logical forms in which the event participants are separated out, placing the subject (agent) and the object (patient) in different conjuncts along with the other thematic roles (such as the instrumental role of 'with a knife'). Thus, Parsons (1980, 1985), Carlson (1984), Bennett (1988), Dowty (1989) and Schein (1993) all suggested that (1) be further analysed along the following lines:

(1") $(\exists e)$(Buttering(e) & Subject(Jones, e) & Object(the toast, e))

(and that (2)–(4) be expanded accordingly). Parsons's recent paper, 'The Progressive in English: Events, States and Processes' (Chapter 3), provides an indicative survey of the strength and range of application of the resulting account (a thorough study is found in Parsons's book, *Events in the Semantics of English*, 1990). However, this and similar developments may for most purposes be regarded as refinements of—rather than alternatives to—Davidson's original proposal.

With all this, not everybody would follow this approach and draw ontological conclusions from merely technical semantic considerations, inferring the existence of events from the robustness of a semantic theory including events in the domain of quantification. Specifically with respect to adverbial modification, for instance, alternative accounts are available which arguably serve the same purposes without requiring such ontological commitments. Generally speaking, these accounts rest on the idea of treating verb modifiers as operators of some sort. Seminal contributions in this direction have been made by Clark (1970, 1974), Parsons (1970), Montague (1970) and Rennie (1971) and were further developed *inter alia* by Schwartz (1975), Fulton (1979), Cresswell (1979) and Clark (1986). (For a different approach, based on the idea of relaxing the characterization of action predicates to accommodate variable polyadicity and argument deletion, see Graves 1994.)

In fact, there are several phenomena with respect to which Davidson's approach does not even seem to yield the correct analysis, in contrast to some of these alternative accounts. For instance, it has been pointed out that Davidson's treatment cannot do justice to the behaviour of adverbial expressions that *cannot* be validly dropped, as with 'allegedly' or 'halfway' in

(13) Herman allegedly stole the cow
(14) He filled the tank halfway

(examples from Parsons 1980: 36 and Thomason and Stalnaker 1973: 218 respectively; note that although (13) could arguably be neutralized by regarding 'allegedly' as an ad*sentence* rather than an ad*verb*—treating the former as a sentential operator rather than an event predicate—'halfway' cannot be handled that way). Difficulties like these are found scattered in much of the literature, including some of the papers essays here. Some problematic phenomena are briefly mentioned by Davidson himself at the beginning of Chapter 1 and in some later works (see especially Davidson 1985b).

Moreover, it has been argued that, by the same pattern (e.g., accounting for adverb-dropping inferences and related phenomena), the ontology should coherently be stretched further to include not only objects and events, but other entities as well. For instance, as Montmaruet (1980) and Parsons (1987/8) pointed out, the inference from (15) to (16) would seem to require a Davidsonian analysis quantifying over states:

(15) Jones was sitting quietly.
(16) Jones was sitting.

More generally, Bennett (1988: 176ff) has argued that a thorough development of Davidson's analysis should lead to an enlarged theory that quantifies over tropes (property instances) generally. There is nothing problematic with this by itself; but one seems to be caught into an infinite regress as soon as one starts analysing all sentences as involving hidden sub-atomic quantification. If the logical form of (16) is (16'), there seems to be nothing to prevent us from further analysing (16') as (16"), and so on.

(16') $(\exists s)$(Sitting(s) & Subject(Jones,s)).
(16") $(\exists s)(\exists s')$(Being-a-sitting(s') & Subject(s,s') & Subject(Jones,s)).

In the light of these consequences, one might be tempted to reject Davidson's analysis along with its ontological implications. If the question whether events are really part of the furniture of the universe is a matter of logical form, and if the analysis is found problematic, then we have a case for ontological parsimony. One may, then, look for alternative logical forms, for instance treating all modifiers as operators (as with some of the authors mentioned above). Or one may emphasize the relationship between gerundive nominals and 'that'-nominals, making the latter include the set of event expressions as a proper subset. This is, for instance, the position of Wilfrid Sellars (1973), who favours an assimilation of nominals such as 'Caesar's crossing of the Rubicon' with the corresponding propositional clause, 'that Caesar crossed the Rubicon'. The logical form of sentences containing an event expression x would then be parasitic upon the understanding of the logical form of sentences that report the event referred to by x but do not employ x. A similar position has recently been defended by Jonathan Bennett in his book *Events and their Names* (1988), where it is contended that mastering of event expressions is unlikely to precede the mastering of eventive sentences *insofar as* most event expressions are nominalizations.

Much groundwork on the relevance of nominalisations to philosophical issues concerning events goes back to Zeno Vendler (1967a) who envisioned a linguistic test for distinguishing different types of nominals. The test makes appeal to the selective sensitivity of container phrases that take nominals as their arguments. For instance, the container '… occurred at noon' accepts nominals like 'John's death' but does not accept 'that John died'. Vendler compiles a list of classes of nominals that selectively correspond to classes of containers. With some qualifications (see McCann 1979), the classification is twofold: we have on the one hand perfect nominals, in which the process of nominalization is complete ('Mary's performance of the song', 'Mary's performing of the song') and which can tolerate articles, prenominal adjectives, and the objective genitive ('Mary's beautiful performance'); on the other hand we have imperfect nominals, divided into 'that'-clauses and gerundives, in which the nominalizing process is somewhat arrested ('That Mary performed the song', 'Mary's performing the song') and which tolerate tenses, auxiliaries, adverbs

and negation ('That Mary had performed the song', 'Mary's painfully performing the song', 'Mary's not performing the song'). Perfect nominals, being more noun-like and less verb-like than imperfect ones, can enter more containers of the sort that would accept nouns like 'Socrates'; by contrast, imperfect nominals are the privileged arguments for containers expressing propositional attitudes. This is the issue taken up by Bennett. A metaphysical hypothesis is joined to, and contributes to explain, the classification of syntactic items, namely, that individual, redescribable events are the referents of perfect nominals, whereas non-redescribable, propositional entities like facts or states of affairs are the referents of imperfect nominals. The death of Socrates (an event) can be redescribed, in some appropriate circumstances, as the calm death of Socrates; but that Socrates died calmly is necessarily a different fact than the fact that Socrates died.

Here one can see two different, but not incompatible, strategies at work. There is the Davidsonian approach that favours introduction of events into the domain of discourse, as requested by the analysis of certain sentences that on their superficial form carry no trace of syntactical devices (like perfect nominals that make explicit reference to events). And there is the Vendler-Bennett approach that favours a study of these syntactical devices themselves. Obviously, the first approach must take the second into some account, for perfect nominals are a prominent component of natural languages. But one might as well argue that the second approach needs complementation by the first for, as we saw, there are valid natural language inferences that seem to require interaction between explicit reference or quantification over events and (some form) of implicit reference or quantification (as with the argument in (8)-(10) above).

II. The Nature of Events

If events are admitted as *bona fide* entities, then one needs to look for substantial theories concerning these entities—one needs to account for *what* they are. Alternatively, events will simply not be included in the ontology, but that requires some way of 'doing without' them, some means of handling the phenomena outlined in the previous section without resorting—explicitly or implicitly—to such entities. These issues are addressed by the essays in Part II.

Some authors, like P. M. S. Hacker, think that the question of the existence of events has no clear meaning and that conceptual confusion surrounds it. Hacker sets for philosophy the task to clarify the central elements of our conceptual scheme, and not to draw ontological inventories. His remarks in 'Events, Ontology and Grammar' (Chapter 4) address both eventists and eliminativists: events cannot be 'introduced' or 'eliminated' by philosophical discussions about, say, the possibility of making sense of our discourse about actions. The very question, 'Do events exist?', is suspect, for the mode of being of events is not to exist, but to occur or to take place. Caesar's death took place: it is senseless to say that it existed. Thus either the question is senseless or it means 'Does anything ever take place?', which has a trivial affirmative answer.

On the other hand, Hacker takes seriously questions of ontological priority such as those raised by Strawson (1959, Ch. 1), who explicitly addressed the issue of whether the existence of events presupposes the existence of objects. Ontological priority is one form

of dependence. McGinn (1991: 4-5), for instance, distinguishes four types of dependence: linguistic (reference to a certain entity *x* depends on reference to another entity *y*), epistemological (we can know *x* only by knowing *y*), conceptual (the possession of the concept under which *x* falls depends on the possession of the concept under which *y* falls), and metaphysical (the essence or the existence of *x* depends on the essence or existence of *y*). Strawson's argument could then be seen as an attempt to infer the metaphysical dependence of events upon material objects either from their linguistic or from their epistemological dependence. Thus, Strawson points out the following linguistic asymmetry. Even if (17) entails (18):

(17) This is an animal
(18) There is some birth which is the birth of this,

the latter sentence could be paraphrased by

(18') This was born.

On the other hand, (19) entails (20):

(19) This is a birth
(20) There is some animal of which this is the birth,

but there is no corresponding paraphrase for (20). This is a substantive thesis and is open to the objection that sometimes we do ground the identity and identification conditions of material objects in the identity and identification conditions for events (Moravcsik 1968; see also Lycan 1970, Thalberg 1978 and Tiles 1981). Hacker's own view is that there is no general metaphysical dependence of events upon substances. In some cases this dependence is of a logical kind (in the sense in which smiles are dependent on the smiler), but in other cases (the movement of shadows, the reverberation of echoes), the connection to substances is of a looser, causal kind. At the same time, Hacker remarks that dependence (even in the stronger, logical case) does not entail the unreality of the dependent entity. Even though substances are to be taken as more basic than events, this does not entail that events should be 'banished' from ontology.

Once events are accepted, the question of their nature is open. *What* are events? Do they have constituents and, if so, what is their relation to these constituents? Are events intimately related to properties? And how do they relate to space and time? Here it is possible to display the philosophical positions on an ideal continuum, running from those which take events as abstract entities to those which take them as concrete entities (see Bennett 1988, §55).

The most abstract theories of events are those that assimilate events to propositions or proposition-like entities. One such view has been defended by Roderick Chisholm in 'Events and Propositions' (Chapter 5) and attacked by Davidson in 'Events as Particulars' (Chapter 6). Chisholm takes *recurrence* to be a fundamental fact about events, as in

(21) John takes a walk each Easter.

Chisholm would say in such a case that there is something which is the same each Easter—a repeatable walk, which is an eternal event. Eternal events are like types (they recur in the same sense in which the type of chairs would 'recur' in any single chair). The basic

objection Davidson addresses to Chisholm is that, even if we accept eternal events in this sense, we still need ephemeral, unrepeatable particular events—we need the single walks occurring each different Easter, in the same sense in which individual chairs are needed for the 'recurrence' of the chair-type. To the extent that Chisholm is compelled to admit event-occurrences, the disagreement with Davidson could be merely terminological (Davidson would call a 'particular event' whatever Chisholm calls an 'event occurrence'). Nevertheless, Davidson suggests several strategies for dispelling the temptation to admit eternal events over and above particular ones. In the case of (21), Davidson proposes

(22) There is a route along which, each Easter, John takes a walk.

(See Chisholm 1971 and Davidson 1971 for further exchange; Johnson 1975 and Brandl 1996 for elaborations. Recently, Chisholm modified his view in favour of a conception of events as 'contingent states of contingent things'; see Chisholm 1990, 1994.)

At the opposite extreme of the concrete-abstract continuum we find Quine's theory, which virtually collapses events and material objects into a single category. 'Physical objects, conceived (…) four-dimensionally in space-time, are not to be distinguished from events or, in the concrete sense of the term, processes. Each comprises simply the content, however heterogeneous, of some portion of space-time, however disconnected or gerrymandered. What then distinguishes material substances from other physical objects is a detail: if an object is a substance, there are relatively few atoms that lie partly in it (temporally) and partly outside' (1960: 131). Thus, a Quinean event is constituted by the totality of what occupies (i.e., goes on at, or is the case at, or perhaps is exemplified at) a certain spatiotemporal region. The concreteness of these entities hinges on their boundedness to a determinate region: no two distinct events can occupy the same region. The view is fully spelled out in 'Events and Reification' (Chapter 7), where some of its consequences are also examined. Quine admits that his category of events is not clearly related to our conceptual scheme (as pointed out e.g. by Strawson and Hacker). Moreover, while the temporal location of an event poses no specific problem for this theory, some difficulties seem to arise in connection with its spatial location. *Where* exactly did Jones's buttering of the toast take place? *What* is the exact spatial region occupied by Caesar's crossing of the Rubicon? These are difficult questions *per se* (see the essays in Part IV). Still, for Quine they are semantic questions, not metaphysical ones. They are instances of the general question: Which event is picked out by which event names? For instance, does every nominal of the form '*x* Verbing at *t*' refer to the unique event that wholly occupies the spatiotemporal region defined by *x* and *t*? (In its basic form, Quine's view of events as spatiotemporal occupants has recently been accepted by Davidson himself in 1985a, though not without reservations. Other subscribers include Smart 1982 and Noonan 1976; echoes may also be found in recent tools of knowledge representation, as with Pat Hayes's 'histories' in 1985.)

Between Chisholmian propositional events and Quinean concrete events we find the theory of Jaegwon Kim (and that of Davidson, in decreasing order of abstractness). Kim's theory, originally put forward in 1966 and 1969, is reminiscent of the traditional (Aristotelian) conception, which distinguished three sorts of thing with regard to which we may speak of changes. On Kim's view, an event is the exemplification of a *property* (or *n*-adic relation) *P* by a *substance* (or *n*-tuple of substances) *s* at a given *time t*. Events are, therefore, particulars, as are all property exemplifications. Actually, two readings seem available.

In the general formulation of the theory presented in 'Events as Property Exemplifications' (Chapter 8), the *set* (or 'complex') consisting of *s*, *t* , and *P* is the event; that is, events are just the ordered triples of their constituents (though not every triple $\langle s, t, P\rangle$ is an event). This, however, is at odds with the view that events are located in space and time, for ordered triples (sets) surely aren't. On a different reading, events are simply *represented by* triples of the form $\langle s, t, P\rangle$ (Kim uses the notation '[*s*, *t*, *P*]' or some variant thereof), and the account is best understood as one of the semantics of event names: a singular term '[*s*, *t*, *P*]' amounts to the gerundive nominalization of the sentence '*s* has *P* at *t*' (Kim, 1973: 223). Clearly, the two readings are quite distinct.

For instance, recently Kim's metaphysics has been endorsed by Bennett (1988), who takes events to be tropes (instances of properties) located at spatiotemporal zones. Bennett takes this as the correct way to avoid the above-mentioned objection to Kimean events as identical to triples. However, Bennett rejects any Kimean semantics for event names. 'The metaphysical thesis that Leibniz's journey was an instance of property *P* has not the faintest tendency to imply the semantic thesis that any name of Leibniz's journey must contain a name of *P* or a predicate that connotes *P*' (1988: 93). This argument is fully spelled out in Bennett's 'What Events Are' (Chapter 9, written expressly for this volume). Moreover, there is some ambiguity as to what is to count as a legitimate constituent of a Kimean event. In particular, some authors (most notably Myles Brand 1984) have urged the need for some principled criterion as to what is to count as a constitutive property of events. Surely not all properties will do: being self-identical, being a non-event, or being equal to $\sqrt{2}$ are not constituents of events; and in some cases, as with being red or being a fast running, it is not clear *whether* the properties are event constituents. A further, standard objection against Kim's conception is that it fails to accommodate events that do not involve physical objects, such as shrieks or sonic booms (Davidson), lightning flashes or changes in the strengths of fields (Brand), or things happening in Strawson's non-spatial auditory world.

Be that as it may, Kim's account has been very influential, also thanks to related proposals by Richard Martin (1969) and Alvin Goldman (1970). A similar view has also been put forward within the framework of Barwise and Perry's 'Situation Semantics' (1983). Moreover, the account allows for various interesting generalizations. For instance, one can imagine letting the first term of a Kimean triple [*s*, *P*, *t*] be itself an event (or letting one or more of the *s*'s be events when *P* is relational). Intuitively, the result can be thought of as the event of some concrete event *having* a property at some time. Thus, not only is there the basic event of Caesar's crossing of the Rubicon, but there are also 'higher order events' such as Caesar's crossing of the Rubicon *being before* Napoleon's crossing of the Alps. This line of development is briefly considered toward the end of Kim's paper and has been fully worked out by Philip Peterson in a series of articles beginning in 1979. His 'Complex Events' (Chapter 10) gives a comprehensive overview, including various applications to the semantics of natural language expressions.

There are at least two more theories concerning the nature of events that must be mentioned. The first is the theory of Lawrence Lombard, originally presented in 'Events' (Chapter 11). This theory shares various structural features with Kim's theory. However, Lombard puts considerable emphasis on the requirement (foreign to Kim) that events always involve *changes* of some sort. On Lombard's theory, events are changes that physical objects undergo—more precisely, events are 'movements' by physical objects through

some portion of a quality space during a stretch of time. This view is combined by Lombard (1981, 1982) with a strong form of essentialism (it is essential to an event that it has the subjects it actually has, and that it occurs at the time it actually occurs), and is extensively elaborated in Lombard's book *Events* (1986). The second theory is David Lewis's ('Events', Chapter 12), which may be regarded as a combination of Quine's account with Montague's (1969) theory of events as properties of times. For Lewis, events are properties of spatiotemporal regions, i.e., in the end, classes of individuals from various worlds (or classes of 'segments of worlds', as von Kutschera 1993 put it in a recent variant of this theory).

The last essay in this section, Terence Horgan's 'The Case Against Events' (Chapter 13), stands in sharp contrast with all the others. The papers mentioned so far bear witness to the wide range of event theories that agree on the basic tenet that events are denizens of the world. Horgan's is representative of the opposite, eliminativist stance. Eliminativists contend that, in spite of the seeming wealth of evidence in favour of events, consideration of parsimony should prevent us from accepting their hasty introduction into ontology. This view has been put forward by most of the authors mentioned in the previous section in connection with the operator-based account of the logic of adverbial modification, which allows one to deal with the difficulties pointed out by Kenny and Davidson without requiring quantification over events. (See also Trenholme 1978 for a detailed statement of this position.) Horgan's essay, however, not only focuses on the seeming evidence stemming from issues of logical form, but addresses a number of topics, including causality, identity and redescription, and the mind-body problem. In each case, Horgan's strategy is to brandish Occam's Razor. Thus, for instance, when it comes to the need for an event-free paraphrase of causation reporting sentences, one possibility open to the eliminativist is the use of a sentential connective instead of a relational predicate applying to pairs of events; one must then block the argument—discussed by Davidson in Chapter 13—that this leads to paradoxical conclusions (see also Horgan 1982). In the same vein, the alleged necessity of a linguistic means for redescribing one and the same action (hence, of singular terms whose intended reference are individual actions and events) is questioned on the basis of the availability of a sentential connective '…and thereby…', mimicking the structure of what Goldman (1970) calls 'generating relations'. (These ideas are further developed in Horgan 1981; compare Stern 1988, 1989 for critical discussion.) Altman, Bradie and Miller (1979) suggested that the opposition between eliminativists and eventists could be reduced to two different interpretations of parsimony: the price Horgan must pay for the elimination of events is the proliferation of logical connectives—special, non-truthfunctional connectives; the price the eventist must pay is the proliferation of entities in the domain—whence an increase in the number of categories.

III. Identity and Individuation

Making sense of assertions or denials of identity between entities of some sort is often considered a minimal prerequisite for the viability of a theory resting on the idea that there *are* entities of that sort. This is Quine's motto: 'No entity without identity'. In the case of events, the issue has received particular attention, and we may again distinguish a wide

spectrum of positions arranged as on a continuum. At one end, we have the defenders of the coarse-grained account—the 'unifiers', to use Thalberg's (1971) felicitous terminology—according to which a single event can be referred to by distinct linguistic expressions. For instance, a unifier would maintain that, in a given context, all of the following may record the same event:

(23a) Jones's flipping the switch.
(23b) Jones's turning on the light.
(23c) Jones's illuminating the room.
(23d) Jones's alerting a prowler.

At the other extreme we have the fine-grained approach—the 'multipliers'—emphasizing dissimilarities in meaning from one event-referring expression to another. A multiplier would be inclined to claim that the events reported by (23a)–(23d) are all distinct. In between, we have a variety of intermediate accounts, resting on a corresponding variety of theories concerning the nature of events. (Of course, the idea of a continuum here is a simplification. For one thing, the 'event identity' issue is best regarded not as clear-cut, but as a conflation of questions and requirements, more often pertaining to semantics and epistemology than to ontology or metaphysics. See e.g. Stenner 1974 and Bradie 1981 for a survey. Second and more importantly, comparing theories by looking at the way they *count* events is a slippery strategy in itself, as it is not events *in general* that can be counted. As E. J. Lowe put it, 'there seems (…) to be no more sense in the idea that one might set about counting the events that have occurred in this room during the last hour than there is in the idea that one might set about counting the things now in it. What one *may* intelligibly count are *sorts* of event, e.g., one might well count how many door-shuttings have occurred during the last hour' (1989b: 114n). However, this is not something that holds equally for all metaphysics of events (think of Quine's), and a suitably general formulation may not even be available. Our classification must therefore be taken as an expository device more than as a metaphysical taxonomy.)

Starting from the coarse-grained approach, we may distinguish between a radical and a moderate position. The radical position is that substitutionally or logically equivalent sentences describe the same event. On some analysis, this account (which may be traced back to Reichenbach 1947, sec. 48) yields the unpalatable result that there is in fact *exactly one* event (*via* Davidson's celebrated argument in the first part of Chapter 1, patterned after Frege's argument to the effect that all sentences alike in truth-value must name the same thing, if they name anything; see the next section for an informal presentation). By contrast, the moderate approach is to find a nexus of relations providing a framework for the individuation of events, in much the same way as space-time provides a framework for the individuation of material objects. Moderate unifiers include Davidson and Quine among others. The latter occupies a *sui generis* position in the group for, as we saw, he contents himself with taking space-time as a suitable coordinate system for events just as it is for material objects: two distinct events cannot occupy the same spatiotemporal regions. (See Quine 1950 for a first statement; essentially the same criterion was later put forward by Lemmon 1967.) This account is, one could say, weakly moderate, for it is still strongly unifying. For instance, it does not distinguish between the rotating and the becoming warm of a metal sphere which is simultaneously rotating and becoming warm (Davidson's example). Other

unifiers reject this as inadequate and suggest different grounds for their identity criteria. They are more moderate, as it were.

Davidson is a chief representative of this moderate view (along with Anscombe 1957), and his account in 'The Individuation of Events' (Chapter 14) has been a focus of great debate. Events are identical, according to Davidson, if and only if (iff) they occupy the same place in the causal network, i.e., have exactly the same causes and the same effects:

(24) if e and e' are events, then $e=e'$ iff $(\forall z)(\text{Cause}(e,z) \leftrightarrow \text{Cause}(e',z))$
$\&\ (\forall z)(\text{Cause}(z,e) \leftrightarrow \text{Cause}(z,e'))$

(This is Davidson's original criterion, based on a suggestion of Thomas Nagel 1965; more recently, Davidson 1985a rectified it along the lines of Quine's and Lemmon's criterion.) Davidson offered (24) with the specific intent to satisfy Quine's dictum and legitimize his own ontological commitment to events. From the very beginning, however, (24) has been variously questioned, with respect to both its formal and material adequacy.

Concerning formal adequacy, several authors (including Beardsley 1975, Wilson 1974, Sher 1974, Tiles 1976, Brand 1976, Tye 1979 and Quine, among others) have argued that this criterion is viciously (if not formally) circular. Not only does the right-hand side of (24) mention the events between which the identity relation is to be defined, but it quantifies over a domain which includes events (and only events, if one agrees with Davidson that no other entities can enter the causal relation). If therefore one requires identity criteria for objects of a certain sort to be fixed before quantifying over them, then (24) is open to the charge of circularity. (See Katz 1978a, Lowe 1989a and Savellos 1992 for qualifications and counterarguments.) Moreover, the appeal to singular causal statements on the right-hand side of the 'iff' is itself problematic. For instance, Tiles (1976) pointed out that judging whether an event e causes an event e' rests ultimately on the question of whether e and e' are identical with events described in some true causal law (at least on a Davidsonian analysis).

As to the material adequacy of (24), the debate on this has been rather controversial, for it involves appealing to one's notion of an event. Also, Davidson quite explicitly offers (24) with warnings, making it clear that it should not be taken as expressing the only criterion always sufficient to establish sameness of events, but simply the idea that causal relations provide for events a 'comprehensive and continuously usable framework' (quoting from Strawson 1959: 53) analogous in many ways to the framework provided by the space-time coordinate system in the case of material objects (or by the membership relation in the case of sets). Even so, the material adequacy of (24) has been questioned in several ways. For instance, it has been objected that it makes all ineffectual events come out identical—a consequence that seems questionable on pre-analytic grounds unless one subscribes to some form of universal causal determinism (see Brand's essay below). More importantly, it has been objected that (24) does not really achieve the expected results. For instance, the moderate unifier holds that, in the appropriate context, the nominals

(25) Jones's pulling of the trigger
(26) Jones's killing of Pierre

describe the same event (act). However, as Alvin Goldman (1970: 2-3) has argued, it sounds rather bizarre to say that the act described by (26) causes the event described by

(27) The gun's going off,

whereas there is no apparent question as to the causal link between the referents of (25) and (27). So either we conclude—by (24)—that the events described by (25) and (26) are not the same event after all, contrary to the unifier's expectations, or we need some way of resolving the seeming asymmetry between these events with respect to their causal relationships. Indeed, if Jones killed Pierre by pulling the trigger, and if these are one and the same act, what prevents one from inferring the seeming oddity that Jones pulled the trigger by killing Pierre? (Parsons 1980). On the other hand, supposing that Jones pulled the trigger at *t* and that Pierre died at some later time *t'*, how can the referents of (25) and (26) coincide? We have here an instance of the so-called *time problem*, discussed at length by Judith Jarvis Thomson in her paper 'The Time of a Killing' (Chapter 15). Supposing that *t** is some instant of time between *t* and *t'*, how can one and the same event enjoy and also not (yet) enjoy the property of having occurred at *t**? And how can an event occurring at *t'* be the cause of an event which occurred at *t**, as the referent of (27) arguably is? (A detailed discussion of these and related puzzles can be found in Karl Pfeifer's book, *Actions and Other Events. The Unifier-Multiplier Controversy*, 1989.)

In 'Under a Description' (Chapter 16), G. E. M. Anscombe replies that the event description in (26) is proleptic, and that the bizarre sound of the causal nexus between (26) and (27) is removed by paraphrasing it as:

(28) The act which (as things turned out) was the killing of the victim by Jones caused the gun to go off.

This is no different from the way the bizarre sound is removed by paraphrasing a causal statement like (29) as (30):

(29) The widow stuck her husband with a knife.
(30) The person who (as things turned out) is now the widow stuck her husband with a knife.

But of course the modifier 'as things turned out' is itself rather problematic. What sort of relation is '… is (as things turned out) the same as …'? Clearly it cannot be plain identity, on pain of circularity. This line of thought is also found in Jonathan Bennett's essay, 'Shooting, Killing, and Dying' (Chapter 17). (See also Vollrath 1975 and Grimm 1977; discussion in Thalberg 1975, MacDonald 1978 and White 1979/80.) For Bennett, (25) and (26) refer to one and the same action—the action of Jones's pulling the trigger, *which later became* his killing of Pierre. This not only solves the cause problem; it also solves the general time problem. For of course, if one agrees with Anscombe and Bennett, then from the fact that Jones pulled the trigger at *t* and Pierre died at some later time *t'*, it does not follow that the killing of Pierre has not yet occurred at *t* or at any time between *t* and *t'*. It has occurred, but was not yet a killing. (Lombard 1978 goes further on this line, defending the identification of shooting and killing by analysing every action sentence '*x* ϕed *y*' as a causal statement '*x* caused *y* to be ϕed'. Davidson himself had something similar in mind, though he would rather say that the analysis should display *two* events: somehing *x* did and something that happened to *y*, the first event qualifying as a cause of the second. This is already hinted at in the final part of Davidson's essay, and is elucidated in Davidson 1985b.) If, on the other hand, one does not agree with Anscombe and Bennett, then one

may as well acknowledge that—as things turn out—Jones's pulling of the trigger and his killing of the victim are not the same act, for they do not occur at the same time and do not have the same effects after all. Thus, again, if (24) is to be taken as a *specification* of some pre-analytical intuitions of the moderate unifier, then it fails, whereas if it is taken as a *constitutive* criterion, then it is more prolific than expected, and the moderate unifier becomes a 'multiplier'.

The leading exponent of the 'multiplying' account of event identity is Kim, along with the other authors mentioned above in connection with his theory of events as property-exemplifications. To some extent, this account follows directly from the view that events have a uniform internal structure (in contrast with the unifier's view, which tends to disregard the internal structure of events in favour of their external properties/relations), and can already be found in Chapter 8. (Early statements date back to Kim 1969 and to Brandt and Kim 1967.) If events are defined by triples of objects, times, and properties, then a corresponding identity criterion becomes straightforward, for it reduces to the more general and familiar identity criterion governing ordered triples in set theory: e and e' are the same event iff their constituents are the same, i.e., iff they are exemplifications by the same objects of the same properties at the same times:

(31) if (s, P, t) and (s', P', t') are events, then $(s, P, t)=(s', P', t')$ iff $s=s'$, $P=P'$, and $t=t'$.

(This is the case where the event involves only one object. More generally, the criterion is that events are the same iff they are exemplifications by the same n-tuples of objects of the same n-adic properties at the same time—with some technicalities concerning the relevant criterion for property sameness; see Kim 1973.) However, the ambiguity between metaphysical and semantic issues in Kim's theory shows up crucially in this regard. For (31) may take on quite different meanings depending on whether one takes it as a true criterion of identity for eventive entities or as a criterion of coreference for event-names, and the connection between the two is not clear. Both Kim and his critics (with few exceptions) seem to have underestimated the distinction, with the result of embroiling things even further. If one accepts, with Bennett, that the notion of an event e as an exemplification of a property P (by some objects at some time) does not imply that any name of e must contain a name of P, then, if Bertram assaulted Candice by kicking her, we have two distinct event-names for referring to what happened:

(32a) The kick that Bertram gave Candice.
(32b) The assault that Bertram made on Candice.

But from the fact that 'kicking' and 'assaulting' refer to different properties nothing follows with respect to the question of the identity of the thing that happened, for nothing rules out that the properties of being a kick and being an assault may only be parts of the one relevant event constitutive property P. (See Kim 1991 for a recent tentative clarification.) Likewise, there is no difficulty for an endorser of (31) in equating the event of Oedipus's marrying Jocasta with the event of Oedipus's marrying his mother, given that Jocasta is Oedipus's mother; but it is not immediately clear how an endorser of (31) can deal with the events referred to by

(33a) Oedipus's marrying his mother
(33b) Oedipus's incestuously marrying Jocasta

(example from Rosenberg 1974). For, on the one hand, any plausible account of property identity would hold that marrying and incestuously marrying are different; on the other, in (33a) the incestuousness of the marrying(s) at issue is expressed in one of the singular terms ('his mother'), whereas in (33b) it is expressed explicitly in the (modified) verb phrase.

There are further objections to (31) in the literature, most of which concern its ontological abundance. At least three of them should be mentioned. The first is that, on the semantic reading, (31) makes *all* sorts of adverbial modification introduce unwarranted distinctions (Katz 1978b). Whenever there is an incestuous marrying there is a marrying, but the two always turn out to be distinct events. (The table in the room is the same object as the brown table in the room; why should Oedipus's marrying Jocasta be a distinct event from his incestuously marrying her? Bennett would detect here a sign of a more general confusion between facts and events that seems pervasive in Kim's work.) The second objection is that the multiplication of entities induced by (31) tends to explode also as a result of irrelevant distinctions in the constituent objects, let alone properties (Gjelswik 1988). A statue rotates. The bronze it is made of rotates too. If we regard the statue and the piece of bronze as distinct, then so are the rotation of the statue and the rotation of the piece of bronze—and this seems unacceptable even from a multiplier's perspective. (Reference to Davidson's criterion (24) would, by contrast, treat these rotations as one and the same event.) The third objection concerns the multipliers' account of the relations holding among the herd of events which crowd their universe. Is there any systematic way one can account for the obvious unity among, say, (23a)–(23d), while keeping all of these events distinct?

A way to answer this last question is proposed by Alvin Goldman in 'The Individuation of Action' (Chapter 18). Instead of capturing the unity that one senses here in terms of the (symmetrical and reflexive) identity relation, Goldman captures it in terms of the (non-symmetrical and irreflexive) 'by'-relation: Jones alerted a prowler *by* illuminating the room *by* turning on the light *by* flipping the switch. In other words, the unifier's scheme (34) is replaced by the scheme (35), where '⇐' symbolizes the 'by'-relation (Goldman 1970 also speaks of 'level generation'):

(34) (23d) = (23c) = (23b) = (23a)
(35) (23d) ⇐ (23c) ⇐ (23b) ⇐ (23a).

This is not straightforward. For instance, as Brand (1972) pointed out, the diagram is incomplete. There are (as the multiplier must recognize) infinitely many missing action descriptions. Between (23b) and (23c), for example, there are:

(23b') Jones's making the electricity flow 1/2 way to the light socket
(23b") Jones's making the electricity flow 1/4 way to the light socket

and so on. Secondly, properly completed, the diagram branches indefinitely leftward. From (23c), for instance, we obtain by generation:

(23c') Jones's bringing it about that such-and-such a corner of the room is lighted
(23c") Jones's bringing it about that such-and-such a bit of plaster is slightly heated

and so on. These of course introduce complexities in the account, assuming we take the 'by'-locution to state a relation between events or acts. (This is itself rather controversial.

For instance, McCullagh 1976 argued that the proper 'by'-relata are not the events (= doings of things) but the acts (= what is done), a confusion between the two notions being responsible for the apparent empasse between Davidson and Goldman. A still different view, according to which the 'by'-relata are facts, has recently been defended by Bennett 1994.) Even so, Goldman's account has been very influential, and represents a significant meeting point between theories of events and action theory.

Alternatively, one can think of the 'by'-relation as a relation between events and yet keep events and actions separated. This is Kent Bach's suggestion in 'Actions Are Not Events' (Chapter 19). On this view, which goes back to von Wright (1963) and Chisholm (1964), actions are instances of the relation of 'bringing about' that may hold between an agent and an event. They are not themselves events—in fact, they are not even objects of quantification, and one need not therefore produce a corresponding theory of identity and individuation. It follows that the nominals in (23a)–(23d) do not refer to any action at all, but rather to a series of events brought about by Jones 'in one stroke'. The question remains, however, whether these events should be related as in (34) or according to some different scheme.

The remaining essays in Part III represent intermediate positions between the Anscombe-Davidsonian unifier and the Kim-Goldmanian multiplier. Generally speaking, they agree in their hearts with the unifier's coarse-grained perspective, but are nonetheless struck by certain fine-grained distinctions pointed out by the multipliers.

One such view, illustrated by Davis's paper 'Individuation of Actions' (Chapter 20), may be labelled the mereological account. (The view is also advocated in Thomson 1971 and thoroughly articulated in Thomson's book *Acts and Other Events*, 1977; other proponents include Thalberg 1971, Beardsley 1975, Smith 1983). This view agrees with the basic idea behind (24), but finds it inadequate insofar as it does not appreciate the possibility that an action or event occurs as *part* of another. Thus, assuming that Jones pulled the trigger at t, and that Pierre died at some later time t', the relation between the events (acts) referred to by (25) and (26) is not identity. Nor is it a 'by'-relation. Rather, on this account, it is a part-whole relation. And events (just like any other sort of entity) are identical just in case they have exactly the same parts:

(36) if e and e' are events, then $e=e'$ iff $(\forall z)(\text{Part}(z,e) \leftrightarrow \text{Part}(z,e'))$.

A second influential view is the modal account put forward by Myles Brand in 'Identity Conditions for Events' (Chapter 21). Brand's criterion is a strengthening of the Quine-Lemmon criterion mentioned earlier, according to which events are the same which occur within the same spatiotemporal region. According to Brand, the criterion must refer to *necessary* sameness of spatiotemporal regions. More precisely, his proposal is the following:

(37) if e and e' are events, then $e=e'$ iff $\Box(\forall r)(\text{Occupies}(e^{+},r) \leftrightarrow \text{Occupies}(e'^{+},r))$,

where r ranges over spatiotemporal regions and e^{+} and e'^{+} are the result of applying Kaplan's (1978) *Dthat*-operator to the names and descriptions occurring transparently in the nominalized descriptions of e and e' respectively. (This is a technical device required to avoid problems arising from contingent identity sentences: from the (contingent) truth of

(38) Nixon = the 37th President

one should be allowed to infer that

(39) Nixon's resigning = the 37th President's resigning.

See Tye 1979, Horgan 1980, Wierenga and Feldman 1981, Simons 1981, Tomberlin 1987, and Neale 1990: 148ff, for more discussion of this aspect. Brand himself clarifies it further in his later writings, where (37) is eventually emended by restricting its use as a semantic criterion to those cases where e^{+} and e'^{+} are sure to be rigid designators: see especially 1979, 1984, 1989.) The modal step allows Brand to overcome the problem arising with the Lemmon-Quine criterion, namely the identification of simultaneous events, as suggested by Davidson's example of the rotating sphere. According to various authors, however, it does not help to overcome the feeling that the approach is still misleading insofar as reference to spatiotemporal coincidence makes events look too similar—metaphysically—to material objects. (Quinton 1979 and Lombard 1986, among others, made this objection. See also Binkley 1989 for misgivings about introducing a modal distinction here.)

Finally, Carol Cleland's account ('On the Individuation of Events', Chapter 22) is illustrative of a treatment of identity from the standpoint of a theory of events as tropes. This is formulated in terms of time-ordered exemplifications of differing states by particularized determinable properties, or 'concrete phases': events are unrepeatable individuals whose identity conditions amount to involving the same concrete phase exemplifying the same initial and terminal states at the same times. This position agrees with Lombard's in taking events to be first and foremost changes, and it resembles the approach of Quinton (1979) and Bennett (1988) in analysing these in terms of tropes (Quinton also agrees that all events are changes, unlike Bennett). On this view, those events are the same which reduce to the same tropes. And since on this view material objects too are constituted by tropes, the account is not specific of events—the difference lies exclusively in the type of constituent tropes, or in the way they are aggregated.

IV. Cause, Space, and Time

The complexity of the event issue becomes particularly apparent in connection with questions concerning space, time,and causality. Are events in space in the same way that material objects are? (Davidson's sphere, that simultaneously rotates and warms up, indicates that co-location is *prima facie* a less problematic property of events than of material objects.) Are events in time in the way material objects are in space? What is the role events play in causality? Are the relata of causality material objects, events or facts?

As Kim (1973) puts it, concrete particular events seem to be necessary to an analysis of causation in terms of temporal priority of causes with regard to effects, whereas abstract, generic events (event types) seem necessary to an analysis of causation in terms of constant conjunction of cause and effect and also to provide the possibility of subsumption under a law. If so, then a single kind of entity is unable to satisfy the requirements of a unified theory of causality.

Kim's own proposal, as we have seen, is to consider events as property exemplifications; thus each individual event falls under exactly one generic event (its constitutive property), 'and once a particular cause-effect pair is fixed, the generic events that must satisfy the con-

stant conjunction requirement are uniquely fixed' (1973: 226). In contrast to Kim's view, Davidson considers events as unstructured terms of the causal *relation*, shifting the problem of the apparent propositional structure of (some) event names to an analysis of the causal explanation. His paper on the logical form of causation-reporting sentences ('Causal Relations', Chapter 23) contains an important argument for the semantic introduction of events that in many ways parallels the one deployed in Chapter 1 on the logical form of action sentences. The overall strategy is much the same: just as talk about action would be meaningless if our ontology did not include events, so would talk about causation. Quantification over events is needed to account for a speaker's understanding of action and causation sentences, and no other rendering of the logical form of these sentences could provide such an account. In the case of causation, this is especially striking when we try to render a sentence such as

(40) John's shot caused Mark's run

by means of a sentential connective, e.g., by paraphrasing it as

(40') John shot, *and as a consequence* Mark ran

(whose logical form is 'p ∗ q', where '∗' is the causal sentential connective), or as

(40") *The fact that* John shot *caused it to be the case that* Mark ran

(where the sentential causal operator includes nominalizing operators as subcomponents). Davidson argues that the use of such a causal connective has implausible consequences, and that a more intuitive eventive analysis should regard 'John's shot' and 'Mark's run' as singular terms that denote events, of which the binary relation 'caused' is predicated.

The general argument might be informally expressed as follows. First, the sentential connectives '… and as a consequence …' and 'the fact that … caused it to be the case that …' are surely extensional; they also admit of substitution *salva veritate* of logically equivalent sentences. But then, second, one can prove that these connectives are truth-functional too, and this is undesirable if they are supposed to represent a causal connection. The proof consists in the so-called 'Frege argument' (or 'slingshot argument'), which Davidson already used in Chapter 1 to show the implausibility of Reichenbach's analysis of the logical form of action sentences. In its causal variety, this argument establishes that, assuming that 'Mark ran' and 'Nero fiddled' are both true (hence materially equivalent), the pattern of inference from (41) through (44) applies:

(41) John shot, and as a consequence (a) Mark ran.
(42) John shot, and as a consequence (b) the class {*x*: *x*=*x*} is the same as the class {*x*: *x*=*x* and Mark ran}.
(43) John shot, and as a consequence (c) the class {*x*: *x*=*x*} is the same as the class {*x*: *x*=*x* and Nero fiddled}.
(44) John shot, and as a consequence (d) Nero fiddled.

To see this, one only need appreciate that (a) is logically equivalent to (b), for (b) is an identity statement which equates the universal class to the class of those things that satisfy both the condition defining the universal class itself and the condition of the truth of (a): the latter class is the universal class just in those cases in which (a) is true. By the same rea-

soning, (c) is logically equivalent to (d). On the other hand, the compound singular terms in (b) and (c) ('the class {*x*: *x*=*x* and Mark ran}' and 'the class {*x*: *x*=*x* and Nero fiddled}') are coextensive, given that it is true both that Mark ran and that Nero fiddled. Thus, material equivalence is shown to be sufficient for substitution in causal contexts. (The Frege argument has spatial and temporal varieties, obtained by replacing the causal connective with connectives such as '… and to the left of it …', or '… and before that …', and the like.)

On Davidson's diagnosis, this shows that the idea that causes are fully expressed by sentences is radically defective. We must interpret (40) and similar cases as involving, not a causal *connective*, but a causal *relation* holding between events. Accordingly, the logical form of (40) will be something like

(40‴) $(\exists e)(\exists e')(\text{Shot}(\text{John},e) \,\&\, \text{Run}(\text{Mark}, e') \,\&\, \text{Caused}(e, e'))$,

which can be rendered, in analogy to the basic paraphrase of (1), as 'There exist events *e* and *e*' such that *e* is a shooting by John, *e*' is a running by Mark, and *e* caused *e*' '. (In fact (40‴) will also represent the logical form of (40') and (40"), if these are understood as natural language sentences: as with the logical form of action sentences, the events quantified over in the logical form of a singular causal statement need not be *referred to* directly in the statement.)

Davidson's analysis has been influential, though it should be emphasized that agreement on his semantic argument does not carry a commitment to his actual analysis of singular causal statements of the form '*e* causes *e*' ' as meaning that there are descriptions *x* and *e* of *x*' of *e*' so that '*x* causes *x*' ' follows from a 'true causal law'. For instance, this latter analysis has found a serious competitor in modern versions of Hume's counterfactual account (Lewis 1973, Swain 1978), which reads '*e* causes *e*' ' as '*e* depends counterfactually on *e*' '. As to the semantic argument, objections have of course come from the event-eliminativists. As we have already seen in Section II, authors like Terence Horgan believe the Frege argument can be resisted, and reject the relational account of causation in favour of an analysis in terms of sentential connectives (perhaps a *modal* connective, as Needham 1988 has recently suggested). Even among the realists, various authors from Vendler (1967b) to Bennett (1988) and Mellor (1995) have objected to Davidson's view, arguing that the terms of the causal relation are not events but facts. Others have submitted that the events are not the *only* terms of the causal relation. For instance, Mackie (1974) argued that we mention facts as causes if our purpose is explanatory—to allude to the law connecting the explanandum to its circumstances—whereas we mention events if our aim is simply to identify the causal conditions we are interested in; Dretske (1977), Sanford (1985) and others have argued that the causal relation holds between events as well as between aspects of events (the blotches on Flora's skin were caused by her drying herself with a *coarse* towel—see also the recent exchange in Stern 1993 and Peterson 1994); moreover, authors in the tradition of von Wright's (1963) and Chisholm's (1964) theory of action take at least some causal relations to hold between *agents* and events (see e.g. Chapter 20 by Bach). Needless to say, these issues have been and still are the focus of an intense debate about causality that goes far beyond the limits of this volume.

The relation which events have to space is also problematic, as already mentioned in connection with Quine's theory. *What* is their exact location? This in turn raises a further

question that is nicely summarized in the title of Fred Dretske's paper, 'Can Events Move?' (Chapter 24). Dretske observes that events often occur in particular spatial containers, and that these can move. Thus it would not be unreasonable to say that these events, at least, move. However, this would open the way to a hierarchy of events: events happening to material things, movements of these events, and so on. In order to delineate the class of events, Dretske uses a semantic criterion: events are the entities referred to by event expressions, i.e., those expressions that generate meaningful questions when they replace the blanks in 'When did … occur (happen, take place)?' Accordingly, 'table' is not an event-expression, while 'picnic' is. At the same time, Dretske does not believe that the problem of event location can be resolved on purely grammatical grounds. In particular, he rebuts the idea that, if events are in space, the 'in' here is different from the 'in' of the spatial location of objects. Nevertheless, he observes that events are linked to a location in a way material objects are not. A chair can be said to be in a building (at a particular time) even though most of its life is spent elsewhere, whereas a picnic cannot be said to occur in a building if it just starts there but then winds up in the garden (we can at most say that the picnic occurs in the place which is the spatial sum of the building and the garden). The reason for this asymmetry is that an event expression refers to the entirety of an event, and also to the event as temporally extended. It follows that there is an incompatibility between our ascription of spatial location to events and the concept of movement—hence events cannot move.

Dretske's arguments are endorsed by Hacker in 'Events and Objects in Space and Time' (Chapter 25). Hacker provides a detailed map of the relations, in our conceptual scheme, between events, objects, space and time. He rejects the idea that the difference between an event and an object might be just a matter of degree, and that both might be Quinean 'four-dimensional' worms. Much of the difference between objects and events is apparent from their respective relation to space. Both have spatial location, but objects, not events, *occupy* space. Thus, events have no dimensionality, no shape, no size. This has some consequence as to the location of events. Davidson, and after him Lombard (1986), propose (somewhat stipulatively) that an event's location is the location of the minimal part of the event (the part occupied by the minimal subject of the event). Hacker, and before him Quinton (1979), object that answers to questions such as 'Where did … happen?' seldom mention any minimal area in this sense, and that the question itself is meaningless for various classes of events—e.g., for most social events or purely relational changes. One part of the trouble, they suggest, comes from the tendency to reify events, assimilating them to entities (too) similar to material objects.

Hacker also draws a clear line here between objects and events in terms of their relation to time: this is a direct relation only in the case of events (which can sensibly be said to be brief or prolonged, to take more or less time) but not in the case of objects. Moreover, objects exist, but events occur. As is already clear from Chapter 4, this distinction is central in Hacker's view, which gives it all the weight of a metaphysical fact. In the last essay of Part IV, 'Why Objects Exist but Events Occur' (Chapter 26), Max Cresswell questions this account and defends an ontologically more neutral position. For Cresswell, the difference between existence and occurrence is essentially semantical, and reduces to the difference between sentences that do and sentences that do not have the 'sub-interval property': if the truth of a sentence at some interval of time t implies its truth at every sub-interval t' of t, then it reports a state or describes an object; otherwise it reports an event. Of course, this forces

an opposition not only between eventive sentences and objective or stative sentences, but also between eventive sentences and sentences reporting activities or processes, which some authors (including Hacker) would regard as a *type* of event. This is itself controversial, and takes us to the main issue addressed by the essays in the final section.

V. Events and Processes

The discussion on the classification of different types or structures of events was opened by Zeno Vendler (1957) and by Anthony Kenny (1963, Ch. 8). Vendler presents a fourfold typology of activities, accomplishments, achievements, and states. These are illustrated by the following, respectively:

(45) John's walking uphill
(46) John's climbing the mountain
(47) John's reaching the top
(48) John's knowing the shortest way.

An activity like (45) is homogeneous (its sub-events satisfy the same description as the activity itself: *vide* Cresswell's sub-interval property) and has no natural finishing point or culmination; an accomplishment like (46) may have a culmination but is never homogeneous; an achievement like (47) *is* a culminating event (and is therefore always instantaneous); and a state like (48) is homogeneous and may endure over time, but it makes no sense to ask how long it took or whether it culminated. Kenny's account is essentially similar, except that accomplishments and achievements are grouped together in a single category of 'performances'. Kenny, however, introduced aspectual considerations in the analysis: according to Kenny, who draws on Aristotle, different verbs describe different types of temporal entities at large: verbs with no continuous form ('know') correspond to states; verbs with continuous form and for which the present continuous entails the past perfect ('John is walking uphill' entails 'John walked uphill') correspond to activities; and, lastly, verbs for which the present continuous entails the negation of the past perfect ('John is climbing the mountain' entails 'John has not yet climbed the mountain', provided this is the first time John climbs the mountain) correspond to performances. These criteria, as well as Vendler's, are amply discussed by Alexander Mourelatos, 'Events, Processes, and States', in Chapter 27, and by Kathleen Gill, 'On the Metaphysical Distinction Between Processes and Events', in Chapter 28. Mourelatos points out that the important distinguishing feature is one related not to verb types, but to the aspectual component of the verb. This in turn is associated with a focus on the structure of event-like entities, based on the second-order properties of countability and homogeneity. Several authors (including Taylor 1977, Dowty 1979, Bach 1981, Galton 1984, Verkuyl 1989, Jackendoff 1991 *inter alia*) have followed in these footsteps towards the development of linguistically sophisticated theories. By contrast, Gill criticizes Mourelatos for drawing ontological categorizations from linguistic distinctions; she issues a plea for a more explicit, autonomous metaphysical theory.

We can in fact separate two main issues here. On the one hand, natural languages seem to incorporate an *epistemological* distinction through the use of aspect. The same action or event could be represented as an undecomposable whole or perfect unit, for instance for the

purposes of repeated reference, and as something incomplete and unbound; the distinction in question is epistemological because we do not talk about different entities or different properties, but we include in our descriptions of the same action or event an implicit reference to our point of view on it. (Smart 1982: 303 holds that the difference between events and processes is a contextual one and not a category difference: 'We speak of a process as an event when we are not much concerned with its inner temporal structure, and as a process when we are so concerned'.) On the other hand, there is a *metaphysical* issue concerning the categorization of types of events. This should not be reducible to the first distinction, for the differences in question are expected not to depend on a point of view. Thus, we can consider the distinction between the *process* (activity) of uniformly moving towards the North Pole and the *event* (performance) of travelling to the North Pole (and thus reaching it) as grounded, not in any particular stance we take, but in the possibility (respectively, impossibility) of crediting these temporal entities with the property of homogeneity. Every phase of a uniform movement towards the North Pole is itself a movement towards the North Pole, but a phase of a travel to the North Pole is itself a travel to the North Pole only if it includes the event (achievement) of reaching it. (In Chapter 3, Terence Parsons goes so far as to say that a process is actually a 'series' or 'amalgam' of events.)

There are other ways of drawing metaphysical distinctions between a category of processes and a category of events, for instance by considering the former as extended over time, the latter as temporally punctual. (This was e.g. Roman Ingarden's view (1935), who considered events as the beginnings, the endings, or the crossings of processes thus defined.) Reference to homogeneity, however, seems effective also because it brings to the fore an analogy of (certain features of) verb aspect with another grammatical fact—the distinction between mass and count nouns (Link 1983). The property associated to the referent of a mass term ('quantity of water') is homogeneous, whilst the property associated to the referent of a count noun ('statue of Mozart') is not. This issue is explored in subsequent literature, here represented by Emmon Bach's influential essay 'The Algebra of Events' (Chapter 29). (See Link 1987 and Krifka 1989, 1990 for developments.)

One fascinating, related chapter in event theory centres around the task of explaining how our cognitive systems come to a categorization of the world which adopts certain basic concepts such as those of a material object, an event or a process. One hypothesis might be that at least some features of these concepts are related to perceptual abilities. Cutting's 'Six Tenets for Event Perception' (Chapter 30) is the only paper from the psychological literature in our selection. Cutting's theory, inspired by work of the psychologist J. J. Gibson and developed in his book *Perception with an Eye for Motion* (1986), is that event perception is grounded on some important structural invariants. To perceive an event is to pick out these invariant structures in the environment. Some of these invariants are spatial, and concern event localization, spatial distribution and relation to an observer; other invariants are dynamic and concern the flow of event phases. Most importantly, some invariants are present in the coordination of events' phases to one another and are hierarchically organised. (This explains certain—at times odd—groupings of events around dynamic centres, or centres of moment.) Cutting takes event perception to be crucial to human cognition insofar as the determination of centres of moment in the environment contributes to the detection of

fundamental properties. Arguably, this is yet a rather unexplored hypothesis which may prove enlightening, if not for the resolution of the metaphysical and linguistic issues addressed by the other authors in this volume, at least for a reconstruction of our basic conceptual scheme.

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