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Events and Objects in Space and Time

P. M. S. HACKER

Events and Objects

The expression 'material object' is, to a degree, a philosopher's term of art. Nevertheless, its arcaneness is slight. Although it may be anomalous to refer to a grain of sand or speck of dust as 'a material object', it is clear enough why philosophers use this term. Their concern is with three-dimensional occupants of space that endure, for a time. They may occupy only a small part of space, as does a grain of sand, but their occupancy is both unique and exclusive. One and the same object cannot be at two places at the same time (although, of course, its parts will be at different places at the same time) and no two objects can occupy the same space at the same time (although, of course, one object may be contained within another). The time during which a material object exists may be short or long. But however short the 'life' of an object, e.g. a soapbubble blown by a child, it cannot be instantaneous.

Material objects, as the name betokens, consist of matter of one kind or another. They typically have a size, shape, texture and possess a degree of solidity. Their texture and solidity are derived from the nature and arrangement of their constitutive matter. Of course, there are relatively amorphous material objects, such as clouds, pools of water or puffs of smoke. Partly because of their amorphousness, partly because of their mere relative solidity (i.e. insertion of another material object merely displaces part of the cloud or a quantity of the water of the pool, but does not 'damage' it), such objects are indeed on the borderline of material objecthood. On the other hand, shadows, rainbows, patches of light, are clearly beyond that imprecise borderline. They do not consist of matter; although a rainbow may fill the sky, it does not *occupy* space; although a shadow may cover the path, it does not get in anyone's way.

Since the paradigm of a material object is a three-dimensional spatial object, material objects commonly have parts which are

smaller than the whole of which they are parts. One material object can contain or be contained within another, without the contained object being part of the containing object, as a stone may be kept in a matchbox. But note that the stone contained in a plum *is* part of the plum, while the leg which is part of the table is not contained in the table. Material objects can typically be broken into pieces and change shape. Hence, in the course of their life span, as they persist through time, they may lose parts and acquire new parts. Since they endure through time and occupy space, they can generally, from time to time, move or be moved from place to place.¹ Hence they can act one upon another, displace each other by so acting and affect or even destroy each other in various complex ways.

Philosophers reflecting upon the nature of events are prone to assimilate them to objects, rather strange objects, to be sure, but objects for all that. One kind of consideration which pushes thinkers in this direction is their persistent employment of the term 'entity'. We refer to events, just as we refer to material objects. 'The death of Caesar', we say, 'was a momentous event. It shook the Republic to its foundations.' This seems almost a paradigm of reference. Since we so refer, there must be something to which we refer so, namely an entity-an event. Following the slogan 'No entity without identity', we note further that we distinguish one event from another, and may refer in different ways to one and the same event. The 'it' in the above sentence 'It shook the Republic' refers to the same event as 'the death of Caesar', and so, arguably, does 'the assassination of the author of The Gallic Wars'. Hence, it seems, we must implicitly be employing some criterion of event-identity. From which it is thought to follow that events are entities. Finally, what is sometimes taken to be conclusive evidence for the 'entitative status' of events, we can quantify over events. Although not very good English, it is passable enough to the trans-Atlantic ear to say, 'There exists an x such that it occurred to O, it occurred at time t, and it occurred in place S.'

Some qualification is perhaps necessary here. If a lintel is only a lintel when fulfilling its architectural role, then removing it from the doorway is tantamount to destroying it *qua* lintel, even though it remains the same dressed piece of masonry and consists of the same marble as hitherto. If there are any material objects individuated by their spatial role (the Meridan stone?), then they cannot be moved consistently with remaining the same object, cf. D. Wiggins, *Sameness and Substance* (Blackwell, Oxford, 1980), pp. 28 ff.

We shall defer to a subsequent discussion the difficulties surrounding the notions of a criterion of identity for events and quantification over events. For the moment all we should note is the obfuscating effect of employing the term 'entity'. This, if ever an expression was, is a philosopher's term of art. It was introduced in the late sixteenth and early seventeenth century by philosophers as an abstract noun meaning being or existence. Later it was extended to encompass the essential nature of something, i.e. that which 'constitutes' its existence. Only towards the end of the seventeenth century was it used as a general concrete noun to signify an ens, something that exists (hence not attributes and relations). This latter usage has become dominant. As a philosophers' term of art its use is fairly indeterminate; the conditions of its application have never been firmly established. It is closely tied to the idea of existence on the one hand and to that of a concrete substance on the other. Certainly the mere legitimate use of 'exists' with respect to something does not license the inference that it is an entity. Food shortages often exist, but they are not entities. It is probably wisest to eschew the term altogether for philosophical purposes, but if it is used it would be best to limit its application to individual substances. Events are neither substances nor indeed do they exist. Or, if one prefers the jargon, the 'being' of events is to take place, happen, occur-but not to 'exist'. Material objects do not take place and events do not exist. A volcano exists, but an erruption of a volcano cannot exist. It may have happened, be happening, or be about to happen. The death of Caesar never existed-it took place. Caesar existed and the event of his death was the termination of his existence. The termination of the existence of an object is not itself an 'entity' which exists. It is an event.

A different kind of consideration brings the categories of events and objects together not by making events object-like but by making objects event-like. Events, we may think, endure. Some events last only a split second, others go on for longer periods of time. Indeed, geological events like the rising and sinking of continents may go on for millenia. Objects too, we may argue, endure through time. Some objects, like soap bubbles, may exist only for a second. Other objects, like the cliffs of Dover, are more durable. We might then think that the ordinary language distinction between objects and events is merely superficial. In fact, it may seem that the only difference between a flash of lightning and a so-called object such as the cliffs of Dover is that 'if successive slices, each one second long, be cut in the histories of both, the contents of a pair of adjacent slices may be very different in the first case and will be very similar in the second case. Such mere quantitative differences as these give no good ground for calling one bit of history an event and refusing to call another bit of history by the same name.'¹ From this we might even conclude that reference to an object at a time or over a period of time is in fact reference to a kind of event, which might be denominated 'an object-event'.²

A smattering of modern physics, in particular relativity theory, has drawn some scientifically-minded philosophers into a similar metaphysical quagmire. For some have concluded from the fruitfulness of the idea of a four-dimensional space-time continuum for purposes of physics that ordinary language, with its talk of, and distinction between, physical objects (or substances) and events, is obsolete or defective. Thus Russell contended that modern physics shows that the world consists of events not of material substances, that we perceive events, not substances, that a material object is roughly 'all that happens in a certain track in space-time'.³ Events are 'entities of structures occupying a region of space-time which is small in all four dimensions'⁴ and 'bits of matter are portions of the structure to which we find it convenient to give separate attention'.⁵ In a similar vein Quine has argued that 'Physical objects, conceived thus 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 and 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.'6 Elsewhere Quine argues that 'the four-dimensional view of space-time is part and parcel of the use of modern formal logic, and in particular the use of quanti-

4 Russell, Analysis of Matter, p. 286.

I C. D. Broad, Scientific Thought, p. 54.

² R. M. Mártin, 'On Events and Event-Descriptions', in *Fact and Existence*, ed. J. Margolis (Blackwell, Oxford, 1969).

³ Russell, 'Logical Atomism', in *Logic and Knowledge*, ed. R. C. Marsh (Allen and Unwin, London, 1956), p. 329.

⁵ Russell, 'Logical Atomism', p. 329. 6 W. V. Ouine, *Word and Object* (M.)

⁶ W. V. Quine, Word and Object (M.I.T. Press, Mass., 1960), p. 171.

fication theory, in application to temporal affairs'¹ In his view, the existential quantifier is to be read 'There [is] in space-time a thing-event x such that' in which 'x' ranges over the four-dimensional denizens of the ages and galaxies of space-time. According to this view the world consists of four-dimensional 'worms' stretching through a space-time continuum. Time is accordingly merely one of the four dimensions in which these curious denizens extend. So what we, in our framework of thought, think of as a substance at a time is an abstraction from reality, a three-dimensional cross-section of a four-dimensional whole, in much the same way that a surface is a cross-section of a three-dimensional solid.

This proposal, however, is not based upon a novel discovery of the true nature of reality, but is rather a recommendation to adopt a new form of representation, a new grammar, with which to redescribe the familiar world we currently describe in terms of substances and the changes they undergo, the events they participate in. We do not have such a language. One may doubt whether we could have, and one may be certain that it could not serve the purposes we have. In the first place, such four-dimensional wholes which are suggested as the basic particulars of the envisaged conceptual scheme must be immune to change.² For what we conceive as change of a substance over time will be no more than a variation in the properties of different *parts* of a whole. Growth, for example, will be the swelling of a space-time 'worm' along its time-axis, which is no more a change of the 'worm' than a bulge in a pillow is a change it undergoes. Increases or decreases of weight, temperature, density, elasticity, etc. are swallowed up into the properties of parts of the whole. But, of course, if there are no changes, there is no time either. Secondly, and consequently, this form of representation, far from showing, as Russell suggests, that the world consists of events, not substances, in fact abolishes events altogether. For events take place at a time, are changes which, typically, substances suffer or effect. Thirdly, there is no room, in this notional language, for our category of substances as persistent things with biographies. For a temporal 'slice' of a space-time worm, whether a thin instantaneous slice or a thicker

I W. V. Quine, 'Mr. Strawson on Logical Theory', in *The Ways of Paradox and* Other Essays (Random House, N.Y., 1966), pp. 144 ff.

² Cf. P. T. Geach, 'Some Problems about Time', in *Logic Matters* (Blackwell, Oxford, 1972), p. 304.

one, is not a substance at all. As Aristotle pointed out, the most distinctive mark of substance is that, while remaining numerically one and the same, it is capable of admitting contrary qualities at different times. The rusty and dilapidated bicycle I now own is identical with the brand new bicycle I purchased fifteen years ago; it was shiny and new and is now rusty and old. But the 1965 'temporal slice' of the bicycle space-time worm is not the identical segment as the current slice, nor is it the same substance. What I cycle to work on every day is the bicycle, not a part of it; the bicycle, not a slice of a bicycle-worm, leaves tracks on the muddy path. It is the bicycle which cost so-and-so many pounds, not a temporal-slice of it; and what badly needs a clean is not today's space-time segment, for that will not take polish. Finally, since it is material objects which are the primary occupants of space, we can only trace the 'outline' of these bizarre thing-events by identifying the spatial position and dimensions of a particular substance at a time, and then following the path it traces through space in the course of its history.

The suggestion that physics, which, for certain specialized purposes, employs the notion of a space-time continuum, shows that the world consists of events not things, or that substances are in some sense fictions, is bred of a miscegenous crossing of divergent conceptual schemes. The concept of a material object, a three-dimensional occupant of space which exists for a time, and the concept of an event, a change or transformation which takes place at a time, are concepts which belong to our ordinary conceptual scheme with its framework of reference constituted by the forms of space and time familiar to us. That some branches of physics have developed a different form of representation for purposes of explanation and prediction of sub-atomic or stellar phenomena need not concern us. For whatever utility such a language may have for specialized purposes, it cannot incorporate out concepts of event or material object, for they are firmly embedded in our conceptual scheme, and intimately bound up with our ordinary notions of space and time. These reticulations cannot be severed while leaving our notions of event and object intact.¹ If our philosophical problems concern the way we think

I The fallacy is similar to that involved in Carnap's suggestion that we can 'opt for' a material object language or a phenomenological language according to our theoretical purposes and in the light of pragmatic considerations. What Carnap failed to understand is that phenomenological language, talk of seeming, about the world, little light can be shed on them by uncritically conflating two quite different forms of representation. Above all, we should not criticize our current concepts for failure to fit into a wholly different conceptual structure. Chess pieces are not defective because one cannot play bridge with them.

Objects, then, are not 'cross sections' of events, and events are not kinds of objects. While material objects occupy space, events typically occur in space, at a place, but they do not fill or occupy space. Two objects cannot occupy the same place at the same time, but two distinct events may occur simultaneously at the same place, as when an object in the fire simultaneously gets hotter and changes colour. Events, unlike material objects, do not consist of matter. Since they do not consist of matter, they have no size or texture, and are not solid (nor not-solid). Although shadows or patches of light undergo changes (they move or fade, grow darker or lighter) the events which consist in these twodimensional 'objects' changing are not illuminatingly conceived as two dimensional events.¹ For events do not occupy space as objects do, hence are neither two-, nor three-dimensional. While many events need space to take place, they do not themselves have any spatial dimensions. The parts of a material object are most characterically conceived as being spatial parts, consequently they are smaller than the whole of which they are parts. The most typical analogue of part for an event is the notion of a *phase*. As an object is made up of the sum of its parts, appropriately ordered in space, an event is made up of the sum of its phases, appropriately ordered in time. But these 'parts' of events are, of course, not smaller than the event of which they are parts, but shorter (temporally) than it. While one may have doubts about the intelligibility of instantaneous (as opposed, perhaps, to momentary) objects, it is clear that some events are instantaneous. This is evident from reflection upon 'conventional events' such as declarations of war or establishments of peace, in which, e.g., an ultimatum is sent, or an agreement signed, specifying a time from which two countries will be at war, or an armistice will come into

looking as if, appearing, etc., is *part of*, conceptually interlocked with, our ordinary discourse about objects. One cannot sever talks of things looking, seeming, or appearing thus-and-so from talk of things *being* thus-and-so without rupturing grammatical, conceptual, connections which thereby reduces phenomenological language to incoherence.

I As suggested by A. M. Quinton, 'Objects and Events', *Mind*, lxxxviii (1979), p. 210.

force. Similar considerations apply to a multitude of legal and commercial transactions.

The attribution of perceptual qualities to events is consequently an interesting point of contrast between them and material objects. One can observe, watch, look at the falling of leaves or the performance of a play. But events have neither shape nor colour, just because they do not have spatial dimensions, do not fill space, and do not consist of stuff. How then can they be seen? An object which is colourless and shapeless is, at best, an invisible object! Indeed-but events are not objects, and they are not amorphous and colourless. Rather, it simply makes no sense to attribute shape or colour to them. A colourful event is not a multi-coloured event, but an event which consists in various transformations of vari-coloured objects or production of multi-coloured flashes, as in a firework display. To observe an event is to see something happening, most commonly to see something happening to certain material objects that are undergoing various changes. I may observe the event of the poker's becoming red hot. The poker changes from black to glowing red, but the event of its becoming red does not change from black to red, it is the change from black to red.

As one can see an event happening, so too one can feel an event happening, even though events have no tactile qualities (i.e. it makes no sense to attribute tactile qualities to events). Thus I may be able to feel the rapid drying of linen in front of a heater, or feel the warming up of water gushing from a gas-geyser. But again, the event is not first wet then dry, first cold then hot. Rather, one can sense the change of tangible characteristics of the object undergoing that change of which the event consists.

Although it makes no sense to attribute shape, colour or tactile quality to events, it is striking that auditory and olfactory qualities can be attributed to them. This is not coincidental. Sounds and smells, unlike shape, size, colour, texture, are the least substancedependent perceptual qualities. An object may disappear, leaving its smell behind—but it cannot leave its colour, shape or texture behind. As smells linger, so sounds travel or reverberate. They may be distinctly perceived without perceiving (in any nonauditory mode) the substance emitting the sound. Sounds are characteristically produced by objects in consequence of changes the objects undergo. Doors creak when they close, twigs crackle when they burn, and unoiled hinges squeak when they are moved. We can refer the noise to the substance that emits it or to the event which produces it. Hearing the creak of the door is hearing the closing (or opening of the door) that produces the creak. Hearing the crackle of the twigs is hearing their burning. Events can be noisy, quiet or deafening. Similar considerations apply to smells. The transformation of states of an object, or the destruction of an object, may produce an odour, as when one burns incense. Hence it is legitimate to speak of smelling the incense or smelling the burning of the incense.¹ A deepening of the contrasts between events and objects may emerge from a more detailed examination of the relations between events and space, and events and time. It is to this that we now turn.

Events and Space

Our preliminary reflections upon the contrasts between events and substances revealed significant differences in their respective relations to space. Some issues, however, require further clarification. For the fact that events generally have a spatial location, but do not have spatial dimensions, that they take place, typically, at a certain spot or over a certain area, but do not occupy space, illuminates certain features of the locatability and mobility of events which have puzzled philosophers.

It might be argued² that if a man's arm goes up, the event takes place in the spatio-temporal zone occupied by the arm. On the other hand, the answer to the question 'Where did the event of his arm's rising occur?' is surely—wherever he was when his arm rose. So does the event fill the zone occupied by the whole man? If a car rolls into a garage, how much of the garage does the event occupy? All of it, or only the zone occupied by the car? Does a wedding that takes place in a church occupy the whole church? 'We can distinguish', it is suggested,³ 'small weddings where all those taking part are huddled together up near the altar from large weddings where the participants are all over the place, penetrating into the remotest aisles and chapels. But then we are

¹ There is, however, a difference here between smells and sounds, in as much as objects may smell without undergoing any overt changes, but they emit sounds only as a consequence of participating in certain events.

² Cf. D. Davidson, 'The Logical Form of Action Sentences', in N. Rescher (ed.), The Logic of Decision and Action (Univ. of Pittsburgh Press, Pittsburgh, 1967), p. 16.

³ A. M. Quinton, 'Objects and Events', p. 208.

at a loss as to whether the event extended to the loftier parts of the church, just under the roof, for example.' Are we really at a loss? And if we are, is it due to ignorance of fact?

These are surely nonsense problems, for they require us to identify the 'precise location' of an event by delineating the exact volume of space the event fills, or worse, the spatio-temporal zone it occupies in the course of its occurrence. But these are pseudoproblems resting on the false assumptions that events are occupants of space, and have spatial dimensions as do bodies. The rising of an arm needs space, but does not occupy space, only the arm that rises does that. A car fills a space, but the event of its rolling into the garage does not; rather it occurs at a place. A small wedding gets no larger by getting the little gathering of family and friends to spread out, and a large wedding gets no smaller, only stuffier, by being crammed into a little chapel. Unless the choir is placed in the loft, no part of the wedding, neither phase nor concurrent constituent event, takes place in the loftier parts of the church, although the happy event may be audible up there.

One might see the error of thinking that if an event is a change in a substance then the location of the event is the entire space occupied by the substance, yet nevertheless react wrongly to this confusion. Thus one might worry that since every substance is part of the universe, every change in a substance is a change in the universe, and hence be driven to the conclusion that all events have the same location. One might then try to avoid this unhappy conclusion by amending the original thesis. The location of the event is *not* the entire space occupied by the substance, but rather the space occupied by the smallest part of the substance the change in which is identical with the event.¹

This replaces one confusion by another. First, the problem is bogus. The universe is not a substance of which individual substances are parts. It is a totality, not a unity. Secondly, although every change in, of, or to a substance is indeed a change in the universe (though not obviously a change of the universe), it does not follow that all events have identical location, since the universe is not a location, at best it is, *inter alia*, the totality of locations. Thirdly, the amendment to the original thesis is still unsatisfactory. Contracting tonsilitis, suffering a heart attack, getting suntanned 'all over' are all changes of or to constituent parts of a

I Thus D. Davidson, 'The Individuation of Events', in N. Rescher et al. (eds.), Essays in Honour of Carl G. Hempel (Reidel, Dordrecht, 1970), p. 228.

human body. But it is not true that the answer to 'Where did A catch tonsilitis?' (or 'Where did the event of A's contracting tonsilitis occur?') is 'In (let alone "on") his tonsils' nor is it 'In the space occupied by his tonsils'. It is rather responses such as 'In London' or 'In the lake, when A was swimming'. Although a heart attack is a change in the activity of the heart, the question 'Where did A's suffering a heart attack occur?' cannot be answered by 'In his heart'. It is an event which happens to, is suffered by, a living being, and it occurs wherever that being is when the heart attack occurs. Of an event which consists of a change to a part of a substance one may ask what part is thus affected, or one may ask where the substance was located when the event occurred. But the questions are distinct. Their distinctness may be superficially concealed if the question does not incorporate an explicit eventreferring expression. Thus, e.g. 'Where did A become suntanned ?' may be a request for an identification of the parts of the body which became suntanned, and hence answered: 'On his shoulders' or 'All over'. But it may equally mean 'Where was A when he became suntanned?', in which case it is answered by the reply 'In St. Tropez'. But the event of A's becoming sunburnt, whether on his shoulders or all over, does not occur on the surface of the epidermis; the skin is what becomes suntanned. In short, what part of a substance undergoes a change which consists in that part being transformed does not specify where that event undergone by the substance occurred.

Consequently although two distinct events may occur to the same substance at the same time and place, they do not compete for space. A sphere may simultaneously rotate and heat up. The rotation of the sphere and the warming up of the sphere are distinct. This is misleadingly described by saying that 'the two events . . . have their unique positions in space and time, in that each occupies only one region, although that region is not occupied by only one event. Each, furthermore is a full occupant of space and time, since it extends through space, through the whole volume of the ball involved.'¹ This is misleading, since events do not occupy space. It is mystifying, since one may well puzzle how two full occupants of space can non-competitively co-exist in the same space. But there is no mystery, for the possibility of two simultaneous events occurring at the same place simply consists,

in this case, in one and the same object suffering two distinct changes at the same time.

The location of events, however, is not always so straightforward. Indeed in some kinds of cases we intuitively feel something awry with the question 'Where did it happen?'. Note first normative changes: husbands and wives lose their spouses and become widowers or widows; tangible or intangible property changes ownership as a result of sale, contract or inheritance; leases expire and companies go bankrupt. Do such events have a spatial location? Socrates' death took place in an Athenian prison, but where did the event of Xanthippe's becoming a widow occur? On the death of the first Marquess of N.N. his eldest son inherited the title, but where did the latter event occur? These questions are decidedly odd. One is inclined to reject them: the event of Xanthippe's becoming a widow did not occur anywhere, i.e. it makes no sense to assign a location to the event. The only intelligible question to ask is 'where was Xanthippe when she became a widow?' Maybe the reason is that such changes are mere 'Cambridge changes',¹ i.e. a proposition true of a subject at one time is false of the same subject at a later time, but the change in question is merely a consequence of some other event (in Xanthippe's case, the death of Socrates) which is a 'real' event. This, of course, is not a peculiarity of normative events (although it is characteristic of many of them). One may become the tallest boy in school in two ways, by growing, or by all the taller boys leaving, and one becomes the oldest man in town through the departure or demise of one's elders. Such changes have temporal locations, but our reluctance to ascribe them spatial locations is perhaps derived from our awareness of their complete dependence upon other events which do have spatial locations.

Similar considerations apparently apply to changes involving spatial relations. If A moves away from B, it is initially true of B that it is close to A, and later that it is distant from A, but the 'reality' underlying the event of B's becoming distant from A consists wholly in A's moving, not in any non-relational change to B. Consider therefore such an event as an eclipse of the sun : it has a 'when' but no 'where'. 'Where did the eclipse of the sun take place?' can only be a misguided way of asking 'From which places was the eclipse visible?'

¹ Cf. P. T. Geach, *God and the Soul*, (Routledge and Kegan Paul, 1969), pp. 71 ff, 99.

However, it is not obvious that all normative changes can be viewed in this manner. In some cases legal or economic changes have a conventionally, normatively, assignable location. In the case of a firm going bankrupt, we can intelligibly ask in what legal jurisdiction it became bankrupt, and that is the only sense we can give to the question 'Where did the event of its going bankrupt occur?'. Since a company is not a substance, being a 'corporate body' rather than a material one, it does not have a location in the sense in which a material object does. A company is 'located' in the jurisdiction in which it is registered, hence it can only be said to go bankrupt in such-and-such a jurisdiction. Lack of sharp spatial co-ordinates in specifying the location of such events is not a result of our ignorance of their exact location. Similar considerations apply to the location of a fall in the value of sterling, or, slightly differently, to a rise in the price of butter in the E.E.C. Of course, in such cases, there is an array of 'operative facts' which do, mediately or immediately, non-causally bring about the normative changes in question. But their location is certainly not to be identified with the location of the normative events in question.

The spatial identification of mental events has, in recent years, given rise to philosophical perplexity. Recollectings, decidings or resolvings take place wherever the recollector, decider or resolver is when he recollects, decides or resolves. Sensations, of course, have a bodily location (although not in the way in which inflammations, cuts and bruises do). But sensations are not events. Feeling a sudden pain in one's back may be a mental event, but that event does not occur in one's back. Nor, of course, does it occur in one's brain. Psychological events are essentially changes which persons (or other sentient creatures) undergo, not parts of persons. Although my headache is tautologically 'in' my head, my toochache 'in' my tooth and my earache 'in' my ear, it is not my head, tooth or ear that suffers, it is I. An event can occur inside an object, but only if the event is a transformation of some smaller object which is contained within the spatial confines of the larger object. Since psychological events are changes persons undergo and since a person is not a substance contained within his own body, it makes no sense to attribute a location to a psychological event other than by giving the location of the subject. While a neuron's firing may take place in my skull, inasmuch as the neuron is in my skull, my deciding to go to London tomorrow

cannot be an event that takes place in my brain, since I am not in my brain. The identification of mental events and neural events is but one of the many absurdities involved in Central State Materialism.

Hence it is erroneous to think that 'we have no reason to locate mental events more precisely than by identifying a person, for more than this would normally be irrelevant to individuation',¹ and to compare this with the convention of locating a mountain by giving the co-ordinates of its highest summit, despite the fact that the mountain occupies more than a point. There is nothing *imprecise* about saying that A's experiencing so-and-so occurred when A was *at* such and such a place. We could not have reasons for more precise identifications, for we can give no *sense* to being more precise in this respect (as if further investigation might reveal that the event occurred two inches behind A's left eye).

Because of the indirect relation of events to space, the spatial relations between objects and events are asymmetrical. Events can occur inside objects (as when weddings take place inside churches), underneath objects (as the freezing of the water beneath the bridge) or on top of objects (as the landing of a helicopter on top of a building). But objects cannot strictly speaking be located under or on top of events (even though a party may be going on in the room above me, or I may look down from the top storey upon the parade taking place below). An object can be in an event only in the sense that it is involved in, i.e. a participant in, the event, or in the sense of being at the time and place at which the event took place. It cannot be inside an event, for events do not have insides and outsides. Objects can move from place to place. Can events move?²

The mobility of events is decidedly bizarre. Cursory reflection suggests that events can move, either under their own steam or by transportation. A party may move from the lawn to a marquee when it starts to rain, and a battle may sway up and down a hill and across fields. Equally, if a party is held on a moving vehicle, a ship, plane or train, does the party not move? If A attended the garden party, and if he and the other guests moved from the lawn to the marquee, surely the party must have moved too. If a

D. Davidson, 'The Individuation of Events', pp. 228 ff.

² An issue illuminatingly discussed by F. Dretske, 'Can Events Move?', *Mind*, 1967, to which the following two paragraphs are wholly indebted.

battleship was in the thick of a naval engagement, and steamed twenty knots in the course of the event, must not the naval battle have moved twenty nautical miles? And do not the events that take place on the ship during the battle move with the ship?

Appearances are deceptive. Of course, objects move, and objects which participate in events move. But does it follow that the events in which they take part move? The unity of an object is primarily spatial, but the unity of an event is primarily temporal. The whole material substance exists in its totality at any given time during its life span (even though it may lose or gain inessential parts, i.e. parts inessential to its being the substance it is). But at any given time during the period in which an event occurs it is not the case that the whole event occurs, at best only a phase of it takes place. In the paradigmatic sense of 'part of a material object', the parts of an object are spatial. The fact that its front is thirty feet from its back does not imply that the object has moved thirty feet, but only that it is thirty feet long. Analogously, the fact that an event commences at one place and later terminates some miles away does not imply that the event has moved some miles. The beginning of a prolonged event is itself an event and so is its termination. The former may occur at S_1 , the latter at S_2 , but the total event which begins and ends thus no more moves from S_1 to S_2 than an object whose front is at S_1 and whose back is at S_2 moves from S_1 to S_2 . If an event E begins at S_1 t_1 and ends at $S_2 t_2$, then to say that E moved from S_1 to S_2 would imply that its beginning e_1 moved from S_1 to S_2 , and also that its end e_2 occurred both at S_1 and S_2 —which is absurd. What initially appears to be the movement of an event is simply the fact that a temporally extended event takes place over a spatial zone, and hence that its constituent phases take place at different positions within that zone. Unlike an object, an event cannot 'occupy' different positions at different times, but its phases, which necessarily occur sequentially, may occur at different places. Since the motion of a thing is a change of the position of the thing over time, that which moves must exist as a unity first at $S_1 t_1$, then at $S_2 t_2$. Events cannot intelligibly fulfil this requirement.

The argument seems impeccable; and yet we do speak of battles moving, of riots spreading, of conferences being moved from one lecture hall to another. Battles, riots, meetings are paradigms of an event. One suggestion to resolve the tension might be that in the case of such verbal nouns we are inclined to

reify the events they denote, to conceive of them as more objectlike than they are. If a battle can move from hill to dale, then it must be conceived as having a unity at a time akin to the unity of an object, and not merely the unity over time which characterizes a race (we would not say that a race moves from the starting post to the finishing post, only that the runners, in the course of the race, do so). But this is to rest satisfied with the recognition of an intolerable tension. For if we treat the battle, e.g., as a unity that moves we must say that *it*, the whole of it, took place first of the hill, later in the dale. A preferable suggestion is that when we do speak of events moving, these turns of phrase are merely facons de parler for successive phases of events taking place at spatially distinct but contiguous locations. Although we may say that the Revolution spread from Paris to the provinces, this surely does not mean that the whole French Revolution took place first in Paris, and then moved elsewhere, where it took place afresh.¹ Rather, we mean that the Revolution broke out in Paris, and its outbreak was followed by further riots and killings in the provinces, these subsequent events being later phases of one and the same revolution. Though we say that a conference moved, halfway through its proceedings, from one lecture hall to another, all this amounts to is that the first half of the conference took place in this lecture hall, and the second half in that one. So where we do, harmlessly, speak of events moving, their pseudo-movement in no way resembles the movement of an object. For to say of an object that it moved from S_1 to S_2 is not to say that the first part of the object was at S_1 and the other parts of it at S_2 .

The indirect relation of events to space casts some light upon the analysis of causal relations. Hume, with some hesitation with respect to mental causes, required a cause to be spatially contiguous to its effect. Yet to the extent that causes are events rather than objects, the very notion of spatial contiguity, as opposed, say, to proximity, is hazy. Clearly the Humean paradigm or protopicture of causation was that of mechanical causation involving pushes and pulls. If one billiard ball hits another, it causes the latter to move. The *impact* of the first ball upon the second causes the movement of the second. The spatial contiguity obtains

I Still less do we mean that 'Large events, like the French Revolution, may get larger in size, starting in Paris, in the square just outside the Bastille and spreading to the whole of France' (A. M. Quinton, 'Objects and Events', p. 209), as if events, given sufficient agitation, were inflatable.

between the objects; the only (rather dubious) sense we can give to the notion of these events being spatially contiguous is simply that the objects touched each other. The first ball caused the motion of the second by hitting it. Here a substance causally brings about a change by a particular action or mode of operation viz. impact. For Hume, as for Newton, 'causation at a distance' seemed puzzling. Yet surely it is only puzzling to the extent that our thought is caught within the paradigm of pushes and pulls as the protopicture of causal modes of operation. The motion of the moon causes the tides on earth (the motion of the seas). To be sure, the moon does not touch the oceans, and does not cause the tides by impact. Is the event of the moon's moving along its orbit from S_1 to S_2 contiguous with the waters of the Atlantic moving? It is doubtful whether we can give any sense to this question. Yet there is no puzzle about the mode of operation whereby the moon causes the tides, or at least none apart from the captivating proto-picture of pushes and pulls, which Newtontian mechanics actually undermined. For the moon causes the tides by exerting gravitational force, and the earth, with its oceans, lies within the gravitational field of the moon. Substances can bring about changes without impact, pushes or pulls. The merely apparent mystery of 'action at a distance' was confused with the fact that Newtonian physics had no further explanation of gravitational force. Seventeenth century physics, at that point, hit the bedrock of brute contingency.

Events and Time

Events, unlike objects, are directly related to time. They occur before, after, or simultaneously with other events. They may be sudden, brief or prolonged. They can be fast or slow, not because they move quickly or slowly, but because they may take relatively long or short time. None of these temporal predictates apply in the same way to objects. 'Before' and 'after' have *spatial* application to objects in relation to motion in a direction (e.g. coming from London on the A40, Oxford is before Stratford) or else have a covert reference to events (King Richard I was before King John only in the sense that his reign preceded John's). Objects are fast or slow only if they move quickly or slowly. They cannot be sudden or prolonged, although their appearance may be sudden and their life may be prolonged. In considering the relation of events to space we saw reason to deny that events can move in the sense in which objects can. A more general question concerns change. Can events change? If a stone rolls downhill at ever increasing speed, does not the event of the stone's rolling downhill change from being slow to being fast? Surely not; the stone moves faster. The event of its moving from B to C takes less time than its earlier movement from A to B. On the other hand, battles grow fiercer, celebrations become more riotous, lectures get duller. Yet changes of events are unlike changes of objects.

A change of an object consists in it first having a given attribute and later not having that attribute (or vice versa). An object exists 'in its totality' at any given moment of its lifetime. An event occurs 'in its totality' only over the time it takes to happen. So a change of or to an event cannot consist in the (complete) event first having one property and later lacking it (or vice versa), since events do not continue to occur after they have happened.

Nevertheless, since events often go on for a time, we do distinguish earlier and later times *within* the event. Events commonly go through phases or stages; they may have beginnings, middles and ends. Hence if we are to talk of changes in events, we must thereby be speaking of transformations within the event from one phase to another. Battles, meetings or riots grow noisier if their successive phases make more noise than their earlier phases. Lectures, plays (i.e. theatrical performances) or discussions grow duller if their later parts are less interesting than their earlier parts. A birth may become easier and less painful, the crying of the neonate may become lustier and more strident.

In these kinds of cases we are necessarily concerned with prolonged events, events that involve becomings rather than happenings, goings-on rather than occurrings. In some such cases we talk of *processes* rather than of events (but not all 'prolonged events' are processes). Clearly, in the case of processes we talk of changes without hesitation. These changes in the regular development of the process consist of the differences between the successive phases. Transformation of a quantity of one chemical substance into another may be speeded up by addition of a catalyst, it may then make more noise, build up more pressure, release greater amounts of energy, etc.

Instantaneous and momentary events (events which occupy only a 'specious' present) apart, the duration of an event is often clockable. But not all events which go on for a time have sharply determinable beginnings or endings. There is typically no saying at precisely what time a storm at a certain place begins or ends, we have not laid down any sharp criteria for determining the precise time at which a rowdy meeting becomes a riot. This occasional temporal indeterminancy, and not the bogus questions of the spatial contours of an event, are surely the event-analogue of the spatially indeterminate limits of, say, mountains or clouds.

ST. JOHN'S COLLEGE, OXFORD