

WHEN ARE OBJECTS PARTS?

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I

That there are deep and intractable metaphysical problems about material objects is evident from the unresolved antinomies and paradoxes involving material objects. The best known of these are about artifacts, the puzzle of the Ship of Theseus being the best known of all. Others, at least as worthy of remark, involve living organisms. If a cat's tail is cut off, for example, it seems natural to describe this episode in words that appear to imply that the cat becomes identical with a former proper part of itself—a violation of the attractive modal principle that a thing and another thing cannot become a thing and itself. Or, talking of cats, consider a cat that is composed at *t* of certain atoms arranged in a certain way; it is at least logically possible for those very same atoms to be arranged in exactly the same way at some later time, and then to compose a different cat; but that apparently implies that certain small material objects can compose one large material object at *t*, and, even though arranged in precisely the same way, compose a distinct material object later. How could that be?

All, or almost all, of the antinomies and paradoxes that the philosophical study of material objects is heir to involve the notion of parthood. I believe, though I shall not argue for this thesis, that most of the great, intractable metaphysical puzzles about material objects could be seen to have quite obvious solutions by one who

had a clear understanding of what it was for one material object to be a part of another. In this paper, I shall try to advance our understanding of this notion.

I shall approach the concept of parthood in a somewhat indirect way. There is a mereological concept that I have found it easier to think fruitfully about than I have parthood. (By a mereological concept, I mean one that can be given a trivial definition in terms of parthood.) I call this notion *composition*. I give some examples. Suppose there is a house made entirely of bricks. Then those bricks compose the house. If there are such things as the north and south halves of the house, then those two halves also compose the house, and each of *them* is composed of certain bricks. The eastern third of the house, the western third of the house, and its middle third also compose it. Certain molecules compose the house. Certain atoms compose the house. Certain elementary particles compose the house. These examples should make it intuitively clear what composition is.

I will now formally define composition in terms of parthood. I begin with a bit of formal machinery.

Let us call expressions like ‘the *x*s’, ‘the *y*s’, and ‘the *z*s’ *plural variables*. These expressions stand to the English pronoun ‘they’ as the familiar singular variables ‘*x*’, ‘*y*’, and ‘*z*’ stand to the English pronoun ‘it’. Singular variables combine with *n*-adic predicates to make open sentences like ‘*x* loves *y*’. Plural variables combine with “variably polyadic” predicates to form open sentences like ‘the *x*s are cooperating with the *y*s’. (Or both sorts of variable may occur together: ‘the *x*s are conspiring against *y*’.) Plural variables are bound by two plural quantifiers: ‘for some *x*s’ and ‘for any *x*s’. Ordinary open sentences containing *n* free variables express *n*-ary relations: ‘*x* likes *x* better than *x* likes *y*’ expresses a binary relation. Open sentences formed from variably polyadic predicates express relations of a type sometimes called “multigrade”: ‘the *x*s belong to the same political party’ expresses a multigrade relation. (Much of this terminology is confused and confusing; it could easily be greatly improved, but I shall not bother about that here.)

Our definition of composition is in two stages:

- y* is the sum of the *x*s if and only if
- the *x*s are parts of *y* and every part of *y* overlaps [shares a part with] at least one of the *x*s;
- the *x*s compose *y* if and only if

y is the sum of the x s and no two of the x s overlap.¹

I believe that this definition of composition is ultimately due to Whitehead. The two stages of the definition could obviously be combined into a single definition of ‘compose’, but we shall have some use for the notion of “sum” that is introduced in the first stage.

The question that will be our main topic is this: Suppose one had certain non-overlapping material objects, the x s, at one’s disposal; what would one have to do—what *could* one do—to get the x s to compose something? (I have found it to be heuristically useful to put the question in this “practical” way, in a way that invites the inquirer to contemplate various courses of action. But this way of asking the question must not be taken to imply that the x s are objects that human beings are able to manipulate. The x s may just as well be quarks or stars—or the members of some quite heterogeneous class of material things—as bricks or tinker-toy parts. The inquirer should, therefore, imagine himself to be omnipotent.) An interesting answer to this question must not, of course, involve mereological concepts. It would be no fair to answer it by saying, “To get the x s to compose something, cause them to have a sum.”

I shall call this question the Special Composition Question. It is important to realize that an answer to the Special Composition Question would not tell us what composition was. An answer to the Special Composition Question would merely tell us when, or under what conditions, composition occurred. This point is important enough for a brief digression. Suppose you have an answer to the Special Composition Question; something along these lines:

To get the x s to compose something, you must (and need only) get them to stand in the multigrade relation R .

Then you are in a position to eliminate the sentence ‘ $\exists y$ the x s compose y ’ from your discourse: You can replace it with ‘the x s stand in R ’. But you are not in a position to eliminate just any reference to composition from your discourse. You are not, for example, in a position to eliminate the sentence ‘ $\forall y(Fy \supset \sim \text{the } x\text{s compose } y)$ ’, for this sentence is not of the form ‘ $\exists y$ the x s compose y ’. To remove *all* references to composition from your discourse, you would have to have a sentence that you could replace ‘the x s compose y ’ with—a sentence, of course, in which ‘ y ’ occurred free. An answer to the Special Composition Question will provide us with no such sentence.

Suppose we call the question ‘What *is* composition?’ the General Composition Question. The General Composition Question is obviously closely related to the question, How can we remove all reference to composition from our discourse? (On one understanding of philosophical analysis, these questions are essentially identical.) To ask how to remove all reference to composition from our discourse is to ask how to remove all sentences of the form ‘the *x*s compose *y*’. Therefore, as we have seen, an answer to the Special Composition Question is not an answer to the General Composition Question. This is why the Special Composition Question is not the question: What *is* composition? This is why it is more like the question: Under what conditions does composition occur? Here is a mathematical analogy. I can tell you when, or under what conditions, a number has a (unique) reciprocal: A number has a reciprocal if that number is not 0. But this piece of information does not tell you what a “reciprocal” is, or what it is for an object to be “the reciprocal of” a given number. Note that, on the basis of the piece of information I have given you, you can eliminate ‘ $\exists y$ *y* is the reciprocal of *x*’ from your discourse: You can replace it with ‘*x* is not 0’. But this will not enable you to remove all references to reciprocity from your discourse. To be able do that, you would have to have a sentence to replace ‘*y* is the reciprocal of *x*’ with. ($y = 1/x$ is, of course, what is needed.)

I mention the General Composition Question only to distinguish it from the Special Composition Question, and to remark that it is immensely more difficult than the Special Composition Question. The Special Composition Question will be our concern. The Special Composition Question is easier than the General Composition Question,² but it is not easy. It is sufficiently difficult that I shall not, in this paper, propose an answer to it; I shall do no more than to reject some unsatisfactory answers.

I said above that I should approach the concept of parthood in a somewhat indirect way. I was alluding to the fact that I shall approach the concept of parthood *via* the concept of composition. I must point out, lest I raise false hopes, that an answer to the Special Composition Question, even if we had it, would not tell us what parthood was. This is an obvious corollary of the fact that an answer to the Special Composition Question would not tell us what composition was. Parthood and composition are trivially interdefinable. We have seen how to define composition given parthood. Given composition,

we may define parthood as follows:

x is a part of y if and only if
there are z s such that x and the z s compose y .

Only an answer to the General Composition Question could turn this definition into an explanation of parthood. But an answer to the Special Composition Question will tell us something about parthood: under what conditions it occurs. That is, if we know, in general, the conditions under which composition occurs, we can easily say under what conditions an object is a proper part of something. (Of course an object is *always* an improper part of something.) An object x is a proper part of something if and only if there are z s, one of which is not x , such that x and the z s compose something.

I am almost ready to turn to the Special Composition Question. Before doing so, however, I will remark that in the remainder of this paper I am going to be making a controversial assumption about material objects: that material objects are three-dimensional and strictly persist through time. I assume, for example, that a cat is a three-dimensional object (and not a “space-time worm,” whatever that is). And I assume that the three-dimensional cat I took to the vet last September is numerically identical with the three-dimensional cat I stroked last week. (I shall be told that the cat I took to the vet and the cat I stroked had different properties and hence cannot have been numerically identical. I reply that *it* had different properties at different times.) I oppose this view to the view that *two* three-dimensional cats—or perhaps I am supposed to call them “cat-slices”—figure in my history, one occupying a point in time last September and the other occupying a point in time last week, these numerically distinct three-dimensional objects having no more intimate connection than that established by their both being slices of one four-dimensional object.

I will mention three facts by way of justifying my making this assumption: (a) I believe it to be true; (b) I find the alternative unintelligible; (c) I can’t do everything in one paper. I am willing to defend the “three-dimensionalist” conception of material objects, but to do so is not my project here. Anyone who accepts “four-dimensionalism,” or takes this doctrine seriously, may regard this paper as having a conclusion that is conditional in form: ‘*If* cats and such are three-dimensional and strictly persist through time, *then* composition must have such-and-such features’. Four-dimensionalists

may in fact be extremely pleased with my conditional conclusion when they have seen its consequent.

Speaking of controversial assumptions, I am also going to assume that you and I, human beings, men and women, are material objects—the ones you see about you with clothes draped over them, things made of flesh and blood and bone and shaped roughly like statues of human beings. I would justify my making this assumption on grounds similar to those on which I have justified my assumptions about the three-dimensionality of material objects. If you reject this assumption, you may wish to consider the arguments that can be got by replacing all statements about human beings in the sequel with the corresponding statements about human bodies—or cats. *I* find the resulting arguments less persuasive than the arguments I shall give,³ but you may feel differently.

Let us now examine some answers to the Special Composition Question.

II

Answer (i) *Contact*

To get the *x*s to compose something, one must, and need only, bring them into contact; if the *x*s are in contact, they compose something and if they are not in contact, they do not compose anything.

I shall assume that we know what it is for *two* objects to be in contact.⁴ (It will be technically convenient to treat each object as being in contact with itself, and to stipulate that *two* objects are in contact only if they do not overlap.) For any *x*s, there is a binary relation that holds between *y* and *z* just in the case that *y* and *z* are among the *x*s and are in contact: the contact relation on the *x*s, so to call it. The *x*s are in contact if the ancestral of the contact relation on the *x*s holds between any pair of the *x*s. For example consider six blocks arranged like this and surrounded by empty space:



The six blocks are not in contact. The odd-numbered blocks are in

contact. The square, odd-numbered blocks are in contact. (The previous sentence “comes out true” even though there is only one square, odd-numbered block.) The even-numbered blocks are in contact. The square blocks are not in contact. The oblong blocks are not in contact. (The ancestral of *x is in contact with y* holds between any two of the oblong blocks, but the ancestral of *x and y are among the oblong blocks and are in contact*—the contact relation on the oblong blocks—does not: It does not hold between 3 and 7 or between 3 and 9. It is this sort of case that is the source of the complexity of the definition.) Blocks 3, 5, and 7 are in contact.

It is to ‘contact’ in this sense that the answer to the Special Composition Question called *Contact* refers. If *Contact* is correct, then, in the situation pictured above, there are, in addition to our six blocks, at least seven other objects—seven clumps of blocks, one might call them. “At least seven? Why not exactly seven?” Well, for one thing the blocks may have parts that are not shown. But even if the blocks have no proper parts, *Contact* entails that our picture displays exactly seven composite objects only on the assumption that, for any *xs*, the *xs* compose (at any given moment) at most one thing. (Strictly speaking, if we were not willing to make this assumption, we should have said ‘a sum’ rather than ‘the sum’ in our definition of composition. Cf. N. 1.) This assumption could be defended in various ways. For example, it follows from the principle of the identity of indiscernibles, together with the principle that the properties of a composite object are completely determined by the properties of and the relations among its parts. But perhaps these two principles are no more evident than the thesis that follows from them. In the sequel, I shall assume without further discussion that, for any *xs*, the *xs* compose at most one thing at a time.

Contact has a certain intuitive appeal. It seems plausible to say that if one has ten thousand wooden blocks none of which touches any of the others, then there is nothing that those blocks compose. It seems plausible to say that if one proceeds to build a model of Salisbury Cathedral out of them (laying them dry, as it were), then one has brought into existence something that they compose: a model of Salisbury Cathedral. But this answer seems less plausible in simpler cases. If I bring two identical cubes into contact so that a face of one is conterminous with a face of the other, have I thereby brought into existence a new thing, a solid whose volume is twice that of either of the cubes? Or have I merely rearranged the furniture of earth

without adding to it? If I cause the cue ball to rebound from the eight ball, do I thereby create a short-lived object shaped like two slightly flattened spheres in contact? One might suspect that there is no answer to these questions laid up in heaven, and that how we answer them—assuming they're worth answering—is going to be simply a matter of convention. But I think that we can see that there are at least some cases in which mere contact is not sufficient for the production of a new object.

Suppose you and I shake hands. Does a new thing at that moment come into existence, a thing shaped like a statue of two people shaking hands, a thing that has you and me as parts and which will perish when we cease to be in contact? Does our handshake generate an object that fits just exactly into the region of space that we jointly occupy? Not in my view. Despite our being in contact, nothing is such that you and I compose it. Or, at least, if you and I compose something, this is not *in virtue of* our being in contact. Some philosophers think that any non-overlapping things compose something, and these philosophers would say that when you and I are shaking hands, there is a thing, the sum of you and me, that occupies the sum of the regions of space that we occupy individually. But, according to the theory these philosophers advocate, the sum of you and me did not come into existence at the moment you and I came into contact; rather, this sum already existed and had existed at every moment at which you and I both existed. (It would, I suppose, be logically possible to hold that you and I had one sum before we were in contact, and another afterwards, this second sum being generated at just the moment we came into contact. But this thesis would have little to recommend it, and I am sure no one in fact holds it.) All that happened to this sum at the moment you and I touched—these philosophers tell us—is that it changed from being a scattered to being a connected object. (A connected object is an object that is “all in one piece”: For any *x*s, if the *x*s compose that object, then the *x*s are in contact. A scattered object is a non-connected object.) That is not the theory we are currently considering. We shall examine *that* theory presently. The theory we are considering entails that the thing you and I compose came into existence (or resumed existence: it might have existed at various earlier times) at the moment we came into contact.

It is a basic conviction of mine that this theory is wrong and that its being wrong is in no sense a matter of convention. I cannot

prove this thesis, for I know of no propositions more plausible than itself from which it could be derived. I will content myself for the present by pointing out that if you disagree with me about *Contact*, you face a host of metaphysical problems that I avoid. For example, suppose that I were to touch your knee with my elbow. Would the object that came into existence when this happened be the same one that came into existence when we shook hands or a different one? For that matter, does the same object come into (or resume) existence every time we shake hands? One would like to believe that these questions had answers. (The philosophers I mentioned in the preceding paragraph will of course say that the thing you and I compose when we are shaking hands is the thing that you and I compose when my elbow is touching your knee. But if you believe, as they do not, that the existence at a given time of a thing that is then our sum depends upon our being in contact at that time, then it is far from obvious whether this statement is available to you.) I am happy to have a position that enables me to avoid these difficult questions. Nevertheless, it is not in order to avoid difficulties that I have adopted the position that the coming into contact of two human beings is without metaphysical issue. I have adopted it because it seems to me, on careful consideration, to be true.

We have talked so far only about the case of two human beings coming into contact. Reflection on more complicated cases of human contact (ring-dances, say) convinces me that, however many people we may consider, those people do not begin to compose something at the moment at which they begin to be in contact. Therefore, the relation *the xs come into contact at t* is not (for it is not even coextensive with) the relation *the xs begin at t to compose something*. This is not to say, however, that there may not be some cases in which certain things come to compose something at the moment at which they come into contact. It is to say that the mere fact that they come into contact cannot be a complete explanation of the generation of the new thing that they compose.

Answer (ii) *Fastening*

To get the *xs* to compose something, one must, and need only, cause them to be fastened to one another.

To separate two normal, middle-sized material objects that are in contact, one need often do no more than apply to one of them a

force that would have sufficed to move it if it had not been in contact with the other. Contact is therefore typically a highly unstable relation, a fact that may lead one who reflects on it to the conclusion that objects that have simply been brought into contact have not really been *joined*. More generally and abstractly, one may be led to the conclusion that if the *x*s are to compose an object, then the arrangement of the *x*s should be one of the more stable among the possible arrangements of the *x*s: If a rather small force could radically change the positions of the *x*s relative to one another, then one might be inclined to say that the *x*s did not compose anything; if the direction in which an impulse of a given magnitude was applied to one of the *x*s were largely immaterial to whether that impulse would radically change the disposition of the *x*s, then one might be inclined to say that the *x*s did not compose anything.

Suppose that two objects are in contact and suppose that they are so arranged that, among all the many sequences in which forces of arbitrary direction and magnitude might be applied to either or both of them, *at most only a few* would be capable of separating them without breaking or permanently deforming or otherwise damaging either of them. Then let us say that these two objects are *fastened to each other* or, simply, *fastened*. (If we know what it is for two objects to be fastened to each other, then we can easily give a general explanation of what it is for the *x*s to be fastened to one another: We need only employ the device that was used to define ‘the *x*s are in contact’. We stipulate, moreover, that each object is fastened to itself and that *two* objects are fastened only if they do not overlap.) For example, if a nut is threaded on to a bolt, then the nut and the bolt are fastened, since most ways of applying force to the nut or to the bolt or to both would not suffice to remove the nut from the bolt: Most ways of applying force would produce no movement of either, or else would cause them to move as a unit. A structure built of tinker-toy parts, a house, and a watch are examples of things that are, in the main, built up by successively fastening things to one another—at least, assuming that there are such objects as these things and their parts. A watch is unlike a house of blocks in that an arbitrarily applied force will almost certainly not cause the watch to come apart (unless, of course, the force is great enough actually to cause something to break), while a force great enough to move any of the blocks composing a house of blocks “separately” will quite

possibly cause the house of blocks to disintegrate. One can toss a watch about, but one cannot toss a house of blocks about.

Now the concept of "fastening" is pretty vague, and my attempts to explain it could probably be improved upon. One source of this vagueness and unsatisfactoriness in the notion of "only a few among all the possible ways of applying forces to a thing." It would not be difficult to devise some set-theoretical constructions to play the parts of "ways of applying forces" to a thing. And if these objects were constructed in any standard or obvious way, the cardinality of, e.g., the set of ways of applying forces to a nut and a bolt that would unthread the nut from the bolt would be just the cardinality of the whole set of ways of applying forces to the nut and the bolt. (Still, there seems to be something to this idea. Consider the ill-named notion of a "child-proof cap." Isn't what differentiates a child-proof cap from a garden-variety cap the fact that comparatively few of the ways of applying force to a child-proof cap will suffice to remove it from its bottle?) But there would be no point in trying to provide a better account of fastening, for it does not seem to be true that if two things become fastened there must at that moment come into existence a new object that has them both as parts, an object that occupies all the space that they individually occupy and which wouldn't have existed if they had merely come into contact. I think we can find perfectly clear cases of two objects becoming fastened, cases that ought to be allowed by any reasonable way of spelling out the concept of fastening, that are simply not cases of anything's coming to be. Suppose again that you and I shake hands. We have already agreed that it would be wrong to suppose that our coming into contact in this way would result in the existence of a new object, one that you and I compose. Now suppose that the fingers of our hands were suddenly to become paralyzed, with the embarrassing consequence that we were unable to let go of each other. Suppose that, in fact, because of the paralysis of our entwined fingers, it had become impossible for anyone to pull us apart by main force, short of doing us damage. On any reasonable account, then, we have suddenly become fastened to each other. But it is certainly not true that an object composed of you and me comes into existence at the instant our fingers become paralyzed. Our paralysis has not added to the furniture of earth; it has merely diminished its capacity to be rearranged. Therefore, composition is not, primarily, a matter of things being fastened to one another. This is not to say that there may not

be some cases in which certain things come to compose something at the moment they become fastened to one another; it is to say that the mere fact that they have become fastened is not a complete explanation of the generation of the new thing that they compose.

Answer (iii) *Cohesion*

....one need only cause them to cohere.

Objects that are merely fastened to one another can often be separated by one who knows how without his breaking anything. It is, of course, possible to join objects so that they can't be pulled apart, or even moved in relation to one another, without breaking some of them. One might, for example, glue two blocks of wood together, using a glue the particles of which attract particles of wood more strongly than particles of wood attract one another. (Perhaps the layer of dried glue is a third object. In that case we have three objects joined in this fashion.) Or one might weld two pieces of metal together. We might say that in such cases one causes objects to *cohere*. If one causes two things to cohere, does one thereby cause a new object to come into being, an object that they compose and which would not have existed if they had merely been in contact or had merely been fastened to each other? It would seem not. Suppose once more that you and I shake hands, this time after I have smeared my hand with one of those glues whose manufacturers warn us that they "bond skin instantly." No new thing comes to be in the course of our consequent painful adventure.

Answer (iv) *Fusion*

....one need only cause them to fuse.

Between objects that have been caused merely to cohere, there is a discernible boundary: a welding seam, say, or a layer of dried glue. It is possible to cause objects to be joined more intimately than this, so that they melt into each other in a way that leaves no discoverable boundary. If two very smooth pieces of chemically pure metal are brought together, for example, they become attached to each other in just this intimate way. (Such an event could scarcely occur outside a laboratory: Under normal conditions, each of the pieces of metal would almost immediately acquire a coating of its oxide, and these coatings would be thick and irregular enough to prevent the pieces being brought into effective contact.) Let us say that if two

things are caused to “merge” in this way, they become *fused* or that they *fuse*. Is the fusion of two or more objects a sufficient condition for their beginning to compose something? No. Consider Alice and Beatrice, who are identical twins. A mad surgeon cuts off Alice’s left hand and Beatrice’s right hand and joins their stumps together, so that they look rather as if they were part of a chain of paper dolls. The surgeon thus produces what might be described as a case of artificial Siamese twins. It is at least theoretically possible that the anatomy of Alice’s wrist be so nearly an exact match to the anatomy of Beatrice’s wrist, and the healing of one to the other be so nearly perfect, that no boundary between Alice and Beatrice be discoverable; it may be that there is a region such that there is simply no answer to the question whether the cells in that region are Alice’s cells or Beatrice’s cells. And yet, it seems to me, it is quite unreasonable to say that our mad surgeon, like Dr. Frankenstein, created a new being by causing parts of existing beings to fuse. (Perhaps Dr. Frankenstein’s success was due to his using only *proper* parts of existing beings.) Despite the fact that they are fused, and separable only by further surgery, there is nothing but Alice and Beatrice (and such undetached parts as they may have) *there*: If R_A is the region of space that Alice fits just exactly into and R_B is the region of space that Beatrice fits just exactly into, there is no one thing that fits just exactly into the region of space that is the sum of R_A and R_B . That is, despite their fusion, nothing is such that Alice and Beatrice compose it. Or, at least, if Alice and Beatrice compose something, this is not *in virtue of* their fusion. It may, of course, be, as we noted in our discussion of *Contact*, that any two non-overlapping objects “automatically” compose something. But if Alice and Beatrice of necessity compose some object at every moment at which they exist, then, surely, they always compose the same object. (While this seems evident enough, it is formally possible to deny it. An analogous possibility was briefly noted in our discussion of *Contact*. We shall discuss this matter more fully later.) And if, necessarily, Alice and Beatrice always compose the same object, then one could not bring the object they compose into existence by surgically fusing them. *Fusion*, therefore, is not the right answer to the Special Composition Question.

We have failed to find an acceptable answer to the Special Composition Question. Perhaps we have been looking in the wrong place for one. Let us divide all possible answers to the Special Composi-

tion Question into two classes. One class will comprise those answers that have the following consequence: It is possible for there to be objects that compose something, and it is also possible for there to be objects that do not compose anything. Let us call such answers *Moderate*. If you believe that you and I and the Eiffel Tower exist and have proper parts and yet do not compose anything, then you believe that the right answer to the Special Composition Question is Moderate. Answers that are not Moderate we shall call *Extreme*. While there are many Moderate answers to the Special Composition Question—we have examined four of the simpler ones—, there are only two Extreme answers. To these I now turn.

III

Answer (v) *Nihilism*

It is impossible for one to bring it about that something is such that the *x*s compose it, because, necessarily, (if the *x*s are two or more) nothing is such that the *x*s compose it.⁵

If this answer is correct, then either there is nothing material at all—a possibility I shall not bother to discuss—or else there is nothing material but what I shall call simples: material objects that have no proper parts. In the latter case, the material world consists entirely of simples. These simples might be in constant motion in the void and might affect one another or become fastened to one another (or even cohere with or become fused with one another), but there would never be anything that had two or more simples as its parts. The history of the material universe consists in a continuous rearrangement of simples, but no arrangement out of all the possible arrangements of them could ever give birth to a material object. If Nihilism is the correct answer to the Special Composition Question, then there is at any time one particular number that is the number of material things: It is the number of simples. (Of course, the number of simples might change, for perhaps simples can be annihilated or created out of nothing.)

Nihilism has an interesting and unique logical property. I have said that a correct answer to the Special Composition Question, even if we had it, would not provide us with an answer to the General Composition Question. This is not quite true. Nihilism alone, among all

the answers to the Special Composition Question, does entail an answer to the General Composition Question. It entails the answer: The x s compose y if and only if each of the x s is y . Suppose, for example, that Cicero is a material simple. Then Nihilism countenances the truth of 'Tully and Cicero compose Cicero', 'The things identical with Tully compose Cicero', and 'The authors of *De Fato* compose Tully'. Unfortunately for the student of the General Composition Question, Nihilism would seem to be false. You and I (and Cicero) are material things and none of us is a simple: There are, if nothing else, elementary particles that compose me and others that compose you. And yet you and I exist.

Answer (vi) *Universalism*

It is impossible for one to bring it about that something is such that the x s compose it, because, necessarily, (if no two of the x s overlap) something is such that the x s compose it.

According to this answer, one can't bring it about that any non-overlapping material objects, the x s, compose something, because they already do; they do so "automatically." Just as, according to the theory of sets, there has to be associated with the x s a certain uniquely defined object, their set, so, according to Universalism, there has to be associated with the x s a certain uniquely defined object, their sum. Universalism corresponds to a position about sets that almost everyone holds: In every possible world in which, e.g., Tom, Dick, and Harry exist, there also exists a set that contains just them. Nihilism corresponds to nominalism (about sets): In no possible worlds are there any sets. Some philosophers accept Universalism because it is entailed by a certain stronger thesis, which they accept on grounds that are, in theory, independent of their views about material things. This stronger thesis, which we may call Super-universalism, is the thesis that any two objects, whether material or not, have a sum. According to Super-universalism, for example, if there are such things as the color blue and I, then there is an object that has the color blue and me as parts. I do not understand Super-universalism because, though I think that the color blue and I both exist, I am unable to form a sufficiently general conception of parthood to be able to conceive of an object that has me and a color as parts.

Whatever problems Super-universalism may face, however, it is simple Universalism that is our present concern. In my view, Univer-

salism is false: There are non-overlapping material objects that compose nothing whatever. My conviction that Universalism is false rests on three theses that, on reflection, appear to me to be correct. First, Universalism does not seem to force itself upon the mind as true. A theory that denies Universalism is not in *prima facie* trouble, like a theory that denies the reality of time. Secondly, there is no known way to derive Universalism from premises that force themselves upon the mind as true, or even from premises that seem more plausible than not. Thirdly, Universalism is in conflict with certain plausible theses (which I shall presently lay out). Now these three judgments are highly subjective ones. Many philosophers for whom I have the highest respect not only accept Universalism but, apparently, regard it as just obviously true. And many of these philosophers will say that some of the “plausible theses” I shall lay out are obviously, or at least demonstrably, false. Well, I shall have to do the best I can. Here are the theses I regard as plausible and which entail the falsity of Universalism.

- (1) I exist now and I existed ten years ago.
- (2) I am an organism (in the biological sense) and I have always been an organism.
- (3) Every organism is composed of (some) atoms (or other) at every moment of its existence.
- (4) Consider any organism that existed ten years ago; all of the atoms that composed it ten years ago still exist.
- (5) Consider any organism that exists now and existed ten years ago; none of the atoms that now compose that organism is among those that composed it ten years ago.
- (6) If Universalism is true, then the *x*s cannot ever compose two objects. More formally, if Universalism is true, then it is not possible that $\exists y \exists z \exists w \exists v$ (the *x*s compose *y* at the moment *w*, and the *x*s compose *z* at the moment *v*, and *y* is not identical with *z*).

Of these propositions, (3), (4), and (5) would appear to express empirical facts.⁶ Propositions (1) and (2), however, entail theses that have been denied on various philosophical grounds. At least one philosopher⁷ would deny that I ever exist. Many philosophers deny that, in the strict, philosophical sense, objects persists through time, and others find special reasons to doubt that persons—I suppose I am a “person,” though what philosophers mean by this word is not

always clear—persist through time. And, of course, all manner of philosophers have argued that personal pronouns do not refer to material things and would therefore reject (2).

I should be willing to defend the thesis that such things as you and I exist and strictly persist through time. But to defend a thesis against particular objections is not to prove it, and in any case, my defense would depend on an answer to the Special Composition Question that is inconsistent with Universalism, the refutation of which is our present concern. I have, therefore, nothing to say in defense of (1).

In view of the history of Western philosophy, (2) deserves an extended and careful defense. I have a lot to say that is relevant to the contention that we human beings are organisms—a lot of remarks to make about the ontology of human beings—though I am not sure that what I have to say would add up to a “defense” of premise (2). In any case, most of what I have to say about the ontology of human beings is only very obliquely relevant to our present concerns. But because this topic is a very important one, and because (2) is essential to my argument against Universalism, I will make one remark (more autobiography than argument). Perhaps this remark will explain a certain otherwise puzzling lacuna in my vocabulary.

Many philosophers, I believe, will concede that there is a biological organism, which, though it is not identical with me, stands in a relationship to me that is far more intimate than the relationships in which it stands to anyone else. These philosophers will say that this organism to which I am so intimately related (they will differ among themselves about my intrinsic nature and about my relation to it) is properly referred to as ‘my body’. I do not understand them. I believe that ‘body’, as such philosophers use it, has no clear meaning. It has neither a sense that is supplied by ordinary speech nor a sense that has been supplied by explicit definition. But I have argued for these conclusions elsewhere,⁸ and I will not repeat my arguments here. Given that I think this, however, it is not surprising that I do not use the word ‘body’. (It should go without saying that I am unwilling to accept the thesis that we “are our bodies.” I don’t know what that means. I do think, as I have said, that we are material objects, things made of flesh and blood and bone, and that we are shaped roughly like statues of human beings. If this constitutes a belief that we “are our bodies,” then I believe that we are our bodies; but I do not know why those words are an expression of my belief.)

Let us turn to (6). All the Universalists I am aware of do accept

the consequent of (6). (Generally this acceptance consists simply in treating expressions of the form 'the sum of x and y ' as unproblematical proper definite descriptions, ones that no more demand the addition of 'at t ' than does 'the set that contains just x and y '). And I think they are right to. Here is the reason why. The consequent of (6) might reasonably be denied by adherents of certain of the doctrines about parts and wholes that we have considered. Take, for example, those who accept *Contact*. If someone thinks that in building a model of Salisbury Cathedral out of a set of blocks, I thereby bring a certain object (the model) into existence—that is, that I do not merely transform an already existing scattered object into a connected, cathedral-shaped object—, and if he also thinks that in building a model of the Colosseum out of the very same blocks I thereby bring (the object that is) that model of the Colosseum into existence, then perhaps it would be reasonable for him to suppose that the model of the cathedral and the model of the arena are numerically distinct objects, and that, therefore, the same blocks can compose—at different times—numerically distinct objects. But suppose someone thinks (as Universalists do) that the arrangement of the blocks is quite irrelevant to the question whether they compose an object: Suppose he thinks that the blocks must at any moment at which they all exist compose an object, even if at that moment each of them is thousands of miles from the others, and even if they are moving at high velocities relative to one another, and even if they exert no causal influence to speak of on one another. If the arrangement of the blocks is irrelevant to the question whether they compose anything, why should it be supposed to be relevant to the identity of the thing they compose? Consider the object that is said to be composed of the blocks at t , when they are widely scattered and moving rapidly in relation to one another. How long does it last? Only two answers seem possible. (a) It doesn't last at all; it exists only at t . (b) It lasts as long as its constituent blocks do. Any compromise between these two answers would be intolerably arbitrary: If the blocks "automatically" compose an object, then either any rearrangement of the blocks *must* destroy that object, or else no rearrangement *could* destroy it. And the former answer seems intolerably severe: It implies a doctrine beside which mereological essentialism pales: *positional* essentialism, according to which not only the identities of the parts of a whole are essential to that whole, but their relative positions and attitudes as well. It is bad enough

to suppose that the replacement of a rusty bolt leaves me with what is, “in the strict, philosophical sense,” a new car. It is infinitely worse, and never has the phrase ‘infinitely worse’ been used more appropriately, to suppose that when I sit in my car and turn the wheel, what I am occupying is, “in the strict, philosophical sense,” a compact series of infinitesimally differing cars. Or let us consider a simpler case, easily visualized because it involves only two objects. According to Universalism, this cup and this pen always (when they both exist) compose an object, one that presumably fits exactly into the non-connected region of space they jointly occupy. Assuming we can make sense of this thesis, can we make sense of the thesis that at different times they compose different objects? I think not: If they always compose an object, then they always compose the *same* object. Universalism, therefore, cannot countenance the supposition that at two different times the *x*s compose two different objects. For the Universalist, ‘the sum of those blocks’ must be a proper definite description—assuming “those blocks” to exist—, one that needs no temporal qualification. In this respect it is like ‘the product of those numbers’ or ‘the set containing just exactly those blocks and those numbers’.

It is pretty evident that propositions (1) through (6) entail the denial of Universalism. Here is the argument in outline: Assume the truth of Universalism; consider the atoms that composed me ten years ago; if (6) is true, those atoms compose me now; but those atoms obviously do not compose me now, and Universalism is therefore false. But let us set out the argument in pedantic detail to make sure that nothing has been overlooked.

It follows from (1) and (2) that I existed ten years ago and was then a biological organism. It follows from (3) that ten years ago that organism—I—was composed of certain atoms. Let us use ‘T’ as an abbreviation for ‘the atoms that composed me ten years ago’. By (4), all of T still exist.

Now assume that Universalism is true. Then T now compose something. Call it ‘the thing that is at present the sum of T’ or ‘+T’. From Universalism and (6) it follows that T composed +T ten years ago. But, by definition, T composed me ten years ago. Therefore, by (6), I was +T ten years ago. But then I am +T now. If ten years ago a certain object and I were such that there was only one of us, then there is only one of us still: A thing and itself cannot go their separate ways. But I am not now +T. At present, +T, if it exists at

all, is (I would suppose) a rarefied spherical shell of atoms, about eight thousand miles in diameter and a few miles thick; in any case, +T is composed of atoms none of which are now parts of me. Our assumption of Universalism has, therefore, led us to a falsehood and Universalism must be rejected.

We must conclude that Answer (vi) is incorrect: Objects do not necessarily and automatically compose anything. (I would suggest, for example, that T do not now compose anything,⁹ though they did once.) Alternatively, it does not follow from the mere existence of certain objects that there is any object that has them all as parts; not every set of objects has a sum.

IV

If the arguments of the previous section are correct, then some Moderate answer to the Special Composition Question is correct: It is at least possible that there are objects that compose something, and it is also at least possible that there are objects that compose nothing. Moreover, the actual world is so rich and complex that it would be hard to believe that these possibilities exist but are unrealized. If, therefore, the arguments of the previous sections are correct, then *there are* objects that compose something, and *there are also* objects that compose nothing. (I would say, for example, that the elementary particles that are now parts of me compose something while my two cats and I compose nothing.)

It is not my intention in this paper to endorse an answer to the Special Composition Question. While I do have an opinion about this, I could not possibly defend this opinion adequately in a paper of this length. I have been concerned not to answer the Special Composition Question, but rather to try to make this question “come alive” by showing that the answers to it that come most quickly to mind—the two Extreme answers and several of the more obvious Moderate answers—are unsatisfactory. (And we must not lose sight of the fact that I have been working within the scope of a certain assumption: that one and the same three-dimensional material object can exist at two different times. Many philosophers regard this assumption as incoherent, and will not, therefore, be impressed by arguments that derive incoherencies from positions that incorporate it. A definitive treatment of composition would have to include an examination of

the thesis that the only three-dimensional material objects are “slices” of four-dimensional wholes.) In this, the final section of the paper, I wish to explain why I find my position—that the right answer to the Special Composition Question is Moderate—a rather uncomfortable one.

If the correct answer to the Special Composition Question is Moderate, then it seems very likely that the multigrade relation expressed by ‘ $\exists y$ the x s compose y ’ is a causal relation, or is at any rate necessarily coextensive with one. All of the Moderate answers we have examined in this paper have this feature. For example, both ‘the x s are in contact’ and ‘the x s are fastened’ express multigrade causal relations.

I will concede that I can think of Moderate answers to the Special Composition Question that are *not* causal. Suppose for example, that the physical universe consists of, and any possible physical universe would have to consist of, exactly two kinds of simples, the a s and the b s. And suppose that, loosely speaking, Universalism holds for the a s and Nihilism holds for the b s. This supposition amounts to a non-causal but Moderate answer to the Special Composition Question. But it hardly seems plausible, even when stated so abstractly as I have stated it. If just any a s compose something, necessarily and automatically, no matter how scattered they may be, how is it that two or more b s never compose anything, however tightly they may be grouped? It seems to me that any plausible Moderate answer to the Special Composition Question will have the following feature: If two or more x s in fact compose something, then it is at least possible that those x s *not* compose anything. Or, to put the matter another way, if there are two or more x s that must, under any circumstances in which they all exist, compose something, this can only be because, for *any* non-overlapping x s, those x s must, in any circumstances in which they all exist, compose something. Or again: If there are two or more x s that *essentially* compose something, this can only be because Universalism is true. I conclude, provisionally, that any plausible Moderate answer to the Special Composition Question will identify the relation expressed by ‘ $\exists y$ the x s compose y ’ with some causal relation.

Why is this an “uncomfortable” position? It is uncomfortable because causal relations—or perhaps I should say ‘names for causal relations’—would seem to be inherently vague. Take contact. Suppose I toss a piece of chalk on the table. You hear a sharp noise and

you perhaps suppose that the transition between the chalk's not being in contact with the table and its being in contact with the table was a sharp one. But contact between gross physical objects like tables and pieces of chalk is ultimately a matter of the interaction between continuous electromagnetic fields. I doubt whether the event that was the chalk's coming into contact with the table could be "dated" within a millionth of a second. That is, if you maintained of a certain millionth-second-long interval that the chalk came into contact with the table during *that* interval, and I maintained that this event occurred during the following millionth of a second, it is hard to see how one of us could be right and the other wrong. A dispute between us on this point would be like a dispute about the exact distance in inches between the earth and the sun. Therefore, if *Contact* were the correct answer to the Special Composition Question, there would be a period during which it was not definitely true that the table and the chalk composed something *and* not definitely false that they composed something. (A short period, to be sure, but that is logically irrelevant. And, anyway, we could no doubt produce long-lasting "borderline" cases of contact in a laboratory.) But where is the promised discomfort? Isn't this just a case of vagueness, a philosophical problem we are going to have on our hands no matter what we say about composition? It is a case of vagueness, but it is very unlike the standard philosophical cases of vagueness. To see this, let us examine one of these standard cases.

John is 5'11 1/2" tall. Is he tall? There is (let us suppose, at any rate) no definite answer to this question. What is the source of this indefiniteness? The answer is obvious: its source lies in language, in the adjective 'tall'. For one reason or another, we English-speakers have not bothered to fill in the rules governing the adjective 'tall' in such a way that the speaker who follows these rules will never have cause to hesitate over the question, 'Is that man "tall"?' One is tempted to say of the present case that what we have is a perfectly definite *object*, John, and a fuzzy *adjective*, 'tall'. But it would probably be better not to have to explain what we mean by calling an object "definite." Perhaps we should say that the fuzzy/definite distinction applies only to adjectives and certain other linguistic items, those that have *extensions* in the semantical sense of the word. At any rate, it seems obvious that we should locate the vagueness that infects the question 'Is John tall?' entirely in language. And it is tempting to universalize this obvious thesis: *All* cases of vagueness can

be traced in pretty much the same way to the vague extensions of, or to the vague instructions for determining the extensions of, certain linguistic items. Let us call this universal thesis the Linguistic Theory of Vagueness.

A major problem for causal answers to the Special Composition Question is that they seem to generate cases of vagueness that cannot be accounted for by the Linguistic Theory. (I owe this point to David Lewis.) Consider, for example, *Contact*. Suppose *Contact* is right. Suppose that there is nothing material but two one-foot cubes. Suppose that they drift together in such a way that they constitute a borderline case of two material things in contact. Consider the sentence 'There is something larger than a one-foot cube'. Does this sentence express a truth? We can't answer, "Definitely, yes," for that answer would be right only if the two blocks definitely composed something; and that in its turn would be right only if the blocks were definitely in contact—which they are not. A similar argument shows that we cannot answer, "Definitely, no." We appear, therefore, to have a case of vagueness. Can it be explained by the Linguistic Theory of Vagueness? It is hard to see how. The only predicate in this sentence is 'is larger than a one-foot cube'. Is there something in our imaginary universe that is a borderline case of a thing that falls under this predicate? What is it? The obvious answer is: the thing the two cubes compose. But if there is such a thing, it definitely falls under this predicate, and if there is no such thing, then everything is such that it definitely does not fall under this predicate. What seems to be indefinite is this: *whether* there is an object that the two cubes compose. This suggests that the locus of vagueness in our sentence is not in its predicate but in its quantifier. But, really, what could that mean? How could the existential quantifier, as opposed to a predicate it is prefixed to, be vague? I think that there is only one way to make sense of this idea: To suppose, first, that there is a Meinongian realm of non-existent objects, and, secondly, that the function of the existential quantifier is to pick out the items that do not belong to this Meinongian realm, and, thirdly, that the border between the realm of the existent and the realm of the non-existent is vague. But I am convinced, as are many, that the idea of a non-existent object is a self-contradictory one; therefore, in my view, there can no more be a thing that is a borderline case of a non-existent object than there can be a thing that is a borderline case of a triangular circle. I speculate, moreover, that even convinced

Meinongians will be reluctant to say that there are objects of which it is neither definitely true nor definitely false that those objects exist.

What I have said about *Contact* applies, I think, to any interesting Moderate answer to the Special Composition Question. If any interesting Moderate answer—that is, any *causal* answer—to the Special Composition Question is correct, then there will be cases of vagueness that cannot be accounted for by the comfortable and sensible Linguistic Theory of Vagueness. If any causal answer is correct, then the vagueness inherent in multigrade causal relations like *being in contact* and *being fused* will infect notions like existence, number, and identity, that, one would have supposed, cannot, because of their pristine logico-mathematical character, admit of the least tincture of vagueness.

Now the conviction that existence, number, and identity do not in any way involve vagueness can be preserved by one who accepts an Extreme answer to the Special Composition Question. Take, for example, our two-cube universe. If Universalism is true, this universe contains an object that the two cubes compose, and it contains this object whether or not they are in contact. Recall the term 'connected': A connected object is an object such that, for any *xs*, if the *xs* compose that object, then the *xs* are in contact. What we have said about contact entails that the predicate 'is connected' is vague: Sometimes there will be no fact of the matter whether the object our two cubes compose is connected. But *it* will always be there: All the vagueness that we confront when we ask whether it is connected can be traced, *via* the vagueness of the monadic predicate 'is connected', to the vagueness of the variably polyadic predicate 'are in contact'. If Universalism is true, then there is no way for the vagueness involved in contact or in any other causal relation to spill over into the realm of existence, number, and identity, for the extensions of these austere concepts within the class of material objects will be determined by factors quite independent of the causal relations that happen to hold among material objects. If Universalism or Nihilism (or something like our uninteresting Moderate mixture of them) is correct, then the existence and number of composite material objects are determined by the existence and number of material simples, and vagueness in our statements about material objects will be comfortably located in the predicates (such as 'are in contact') that we have devised to talk about them. I have no doubt that many philosophers will regard this result as providing us with a decisive

reason for accepting an Extreme answer to the Composition Question, since few philosophers—or so I judge—are prepared to accept any account of vagueness that is at variance with the Linguistic Theory.

I myself find the Linguistic Theory extremely attractive. I can get myself into a frame of mind in which it seems not only attractive but indisputable. Nevertheless, I do not believe we should regard it as sacrosanct. If the problems I have raised in this paper for Universalism—I suppose few people are attracted to Nihilism—prove intractable, then I think we should consider seriously the possibility of trying to work out an account of vagueness that is compatible with a causal answer to the Special Composition Question. Let us remember the fate of the Linguistic Theory of Necessity, the theory that necessary truth is entirely a product of our linguistic conventions. I am just old enough to remember a time when that theory seemed not only attractive but indisputable. The Linguistic Theory of Necessity has had a hard time of it over the last twenty years. It is not beyond all reason to suppose that the Linguistic Theory of Vagueness deserves to be in for a hard time of it.¹⁰

Notes

1. The two *definienda* and the two *definienda* should be understood to be in the present tense: What we have is a definition of ‘the *x*s now compose *y*’. I say this because I wish to leave it an open question whether the *x*s might compose one object at one time and another object at another time. (Consider the puzzle about cats and atoms touched on in the first paragraph of this paper.) I also wish to leave it an open question whether a given object might be composed of the *x*s at one time and (exist but) not be composed of the *x*s at another. Strictly speaking, our *definienda* and *definienda* should include a time-variable: ‘*y* is at *t* the sum of the *x*s’, and so on.

If I were being really pedantic, I should write not ‘the sum of the *x*s’ but ‘a sum of the *x*s’, since nothing has been said to justify the assumption that, at any given moment at which the *x*s all exist, there is at that moment *at most one* object *y* such that the *x*s are then parts of *y* and every part of *y* then overlaps at least one of the *x*s. But I doubt whether anyone is likely to reject this assumption, so I shall not be that pedantic. We shall later briefly discuss this assumption. See p. 27.

2. This statement requires some qualification. If one has an answer to the General Composition Question, then one “automatically” has an answer to the Special Composition Question: One has only to prefix an existential quantifier to one’s answer to the General Question. But the answer

so obtained will not necessarily be the “best” or “deepest” or “most interesting” one. An analogy may indicate the reason for this. Consider two answers to the question, When does a number have a reciprocal?: (a) When there exists something that is the result of dividing 1 by that number; (b) When that number is not 0. Both of these answers, of course, are right. The former is got from the general answer to ‘What is a reciprocal?’ by existential quantification. But the latter is the better, the more informative, answer. Something formally similar to this might be true in respect of the Special and General Composition Questions. And it might be that the best or most informative answer to the Special Question is harder to discover than the right answer to the General Question.

3. For one thing, I do not understand the term ‘human body’ well enough to be comfortable about allowing it to function as what Jonathan Bennett would call a “load-bearing member” in a metaphysical argument. (See my paper, “Philosophers and the Words ‘Human Body’,” in *Time and Cause: Essays Presented to Richard Taylor* (Dordrecht: D. Reidel, 1980). While I no longer accept everything I said in that paper, I continue to be puzzled by ‘body’.) For another: One of the central arguments of the present paper depends on the premise that human beings—you and—I strictly persist through time. This is a premise that few of us would be willing to reject. But, as regards human *bodies*, even those philosophers who believe that our bodies strictly persist through time would probably be willing to give up this belief if they were presented with a demonstration that it had untoward metaphysical consequences—provided that they could continue to hold that *they themselves* strictly persisted through time. The thesis that each of us is, in the normal course of events, continually “changing bodies” is a rather curious thesis, but one a philosopher might be willing to put up with; the thesis that one exists only at an instant, or only for a few minutes, on the other hand, has the aspect of a moral and metaphysical calamity. I expect most of us would say the same thing about cats: The strict persistence of cats through time is negotiable in a way that the strict persistence of human beings is not. For this reason, an argument whose premise is the strict persistence of human bodies or of cats will be less persuasive than an otherwise similar argument whose premise is the strict persistence of human beings.
4. But we don’t really. Not in general. The notion of contact applies only to objects whose dimensions do not differ from ours by more than five or six orders of magnitude. It would make no sense, for example, to speak of protons being (or not being) in contact. And yet protons are proper parts of things if any objects ever are. This consideration alone shows that *Contact* cannot be the right answer to the Special Composition Question. In the text, however, I shall argue that *Contact* can be seen to be wrong independently of such “scientific” considerations. Similar remarks apply to the three proposed answers to the Special Composition Question that we shall examine next after *Contact* (*Fastening, Cohesion, and Fusion*).
5. Peter Unger calls himself a nihilist, but he uses the word in a different

sense from mine. In my terminology, Unger is a Universalist (*vide infra*, in text) who holds that none of the many objects that exist according to Universalism, can correctly be described as a "table" or a "stone" or a "human being" or as falling under any of the other count-nouns that we use in everyday life. See "There Are No Ordinary Things," *Synthese* 41 (1979), pp. 117-154, and "Skepticism and Nihilism," *Noûs* 14 (1980), pp. 517-545.

6. Well, not quite. Organisms have parts that overlap no atom, such as ions, free electrons, and photons. A few of the atoms that composed me ten years ago were unstable (carbon-14 atoms, for example) and no longer exist. The atoms that ten years ago made up the cholesterol molecules in the myelin sheaths around the neurons in my brain are mostly still there, and a few of the atoms expelled from my system ten years ago have no doubt wandered back into it during the last few weeks and are still there. Let us ignore these subtleties.
7. Peter Unger. See "I Do Not Exist," in *Perception and Identity: Essays Presented to A. J. Ayer, with His Replies* (Ithaca: Cornell University Press, 1979). See also Samuel C. Wheeler III, "On That Which Is Not," *Synthese* 41 (1979), pp. 155-173.
8. In "Philosophers and the Words 'Human Body'." See n. 3.
9. Of course they *might*. It is not impossible for there now to be an object—one that weighs just what I weighed ten years ago—that T compose. It is, however, astronomically improbable.
10. The problems raised in this paper are discussed in much greater depth in my book *Material Beings*, which is to be published by Cornell University Press.

Versions (or ancestors) of this paper have been read at the University of Connecticut, the University of Rochester, Princeton University, the University of Massachusetts at Amherst, Virginia Polytechnic Institute and State University, Memphis State University, the Western Washington Philosophy Colloquium (1985), and the Tenth Annual Symposium in Philosophy at the University of North Carolina at Greensboro (1986). I wish to thank the audiences at these colloquia (and my colleagues at Syracuse University) for their thoughtful criticism. I wish also to thank Joshua Hoffman, who was the only formal commentator on the paper, for his careful and penetrating comments.

Of all the people who have tried to change my mind about composition, I must single out David Lewis as having been especially effective in getting round my deep disinclination to do so. Samuel C. Wheeler III and Peter Unger (whose views are much closer to mine than Lewis's are) have also made me change my mind on various points. I have benefited from conversations with Mark Heller and Mark Johnston.