

# The Material Composition Problem

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Could you have two utterly ordinary material objects that occupy the very same place at the very same time and are made of the very same matter? It seems not. Mark Twain and Samuel Clemens occupied the very same places at the very same times and were made of the very same matter, but of course Mark Twain just was Samuel Clemens. There was just *one* person there, who had different names. You simply can't have two utterly ordinary material objects that occupy the very same place at the very same time and are made of the very same matter.

However, some pretty compelling philosophical reasoning says otherwise.

Suppose 'human trunk' meant the combination of the human torso and the human head. Suppose further that we lived in a community in which 'trunk' had a useful role in linguistic behaviour. So 'trunk' in this society is like 'arm' in our society. (E.g., perhaps in this society people lose their arms and legs often, so 'trunk' is really useful and used frequently.) At 1pm you have an entirely intact and normal body; at 2pm your arms and legs are removed but you are kept alive and fully conscious (with some morphine). Once your arms and legs are removed they are annihilated in an explosion. Call your trunk 'Trunk'; call your body 'Body'; call your right foot 'Foot.' The argument I'd like to focus on runs as follows.

1. At 1pm Body has Foot as a part.
2. At 1pm Trunk does not have Foot as a part.
3. If at 1pm Body and Trunk have different parts, then  $\text{Body} \neq \text{Trunk}$  at 1pm.
4. So, by (1)-(3)  $\text{Body} \neq \text{Trunk}$  at 1pm.
5. If  $\text{Body} \neq \text{Trunk}$  at 1pm, then  $\text{Body} \neq \text{Trunk}$  at 2pm.
6. So, by (4) and (5) at 2pm  $\text{Body} \neq \text{Trunk}$ .
7. At 2pm Body and Trunk are materially coincident.
8. So, by (6) and (7) at 2pm  $\text{Body} \neq \text{Trunk}$  but Body and Trunk are materially coincident.

Notice that if the conclusion, (8), is true, then there are two utterly ordinary material objects (Trunk and Body) that occupy the very same place at the very same time and are made of the very same matter. Now I'm going to defend the premises: (1), (2), (3), (5), and (7). Then I'll comment on (8).

## 1. Premises (1) and (2)

I start with premise (1): at 1pm Body (which is an entirely normal and intact human body) has Foot as a part. This seems highly intuitive. Don't bodies have parts? If anything has a part, your body has its arms and legs and feet as parts. Thus, (1) is true.

But even though one unhesitatingly says 'yes' to (1), once one starts reflecting on the argument one might develop doubts about its truth. You start to wonder: if Body really *can* go on existing without Foot, then why think that Foot was really part of Body in the first place? Maybe at 1pm Foot was just, well, an *appendage* or *accessory* of Body in something like the way that a bicycle bell or child's sticker is just an accessory to the bicycle it's on. So really, (1) is false.

This view strikes me as dubious. But even if it is perfectly correct, we still can use the argument to generate the material composition problem, as we can just substitute the notion of objects *overlapping* for parthood in (1) and (2) and have a compelling argument. That is, we could do the argument this way:

9. At 1pm Body *overlaps* Foot (i.e., they have some parts in common).
10. At 1pm Trunk does not *overlap* Foot.
11. If at 1pm Body and Trunk have different overlapping relations, then Body  $\neq$  Trunk at 1pm.
12. So, by (9)-(11) Body  $\neq$  Trunk at 1pm.
13. If Body  $\neq$  Trunk at 1pm, then Body  $\neq$  Trunk at 2pm.
14. So, by (12) and (13) at 2pm Body  $\neq$  Trunk.
15. At 2pm Body and Trunk are materially coincident.
16. So, by (14) and (15) at 2pm Body  $\neq$  Trunk but Body and Trunk are materially coincident.

The alleged problem with (1) (i.e., "Foot wasn't really a part of Body") simply doesn't apply to (9). Since there are lots of molecules in both Body and Foot, they obviously overlap at 1pm; so (9) is true. So it seems we have avoided *that* alleged problem. For most of the rest of this essay I'll go back to (1)-(8).

It's pretty clear that at 1pm Trunk doesn't contain Foot as a part, which is exactly what (2) says. So (2) must be true. If that's not clear, stick with overlapping: it's perhaps even more clear that at 1pm Trunk doesn't overlap Foot, since at 1pm Trunk and Foot have no molecules in common at all. One of the central intuitions behind the conjunction of (1) and (2) is that at 1pm Body is related to Foot differently from how Trunk is. That's just common sense. In fact, we could, in formulating (1) and (2), just note that Body and Trunk differ in lots of other ways: they have different sizes, shapes, and weights for instance. Now I'm finished arguing for (1) and (2).

## 2. Premise (3)

If you know that X and Y differ in some way, then you know that they aren't the very same thing. If Fred and George are different heights, or have different clothes on, or are different sizes, then of course Fred can't be literally the very same object as George. The principle here applies to Body and Trunk: if they

differ somehow, then they aren't the very same thing. But of course we have just seen that they do differ in some ways: one has parts the other doesn't have. Or, if you like, one has overlapping relations the other lacks. Or, if you like, they have different sizes, shapes, and weights. In any case, (3) is just a straightforward application of the X-Y principle I started this paragraph with.

One might object: Mark Twain and Samuel Clemens differed in some ways but were really identical, so the X-Y principle is false. But that won't work. Even though he published under the name 'Mark Twain', Clemens wrote those books just as much as Twain did. Whenever Twain was doing something, Clemens was right there doing the very same thing in the very same place at the very same time and in the very same way! If you try to insist that they had different personalities or accomplishments, then I'll reply that you are using 'Twain' and 'Clemens' to pick out different aspects of the same person, and so on your usage Twain and Clemens were not identical (as 'Twain' and 'Clemens' are referring to different aspects). And if they weren't identical, then you have no argument against (3) or the X-Y principle. All the X-Y principle says is that *if X and Y differ in some way then X isn't Y*. In order to show that that principle is false you need to find an X and a Y such that (i) X and Y differ but (ii) X is Y. You can't come up with a story in which both of (i) and (ii) are true. Try it yourself!

### 3. Premise (5)

The next premise is (5): If Body  $\neq$  Trunk at 1pm, then Body  $\neq$  Trunk at 2pm. This premise looks highly theoretical. It looks as though it's a part of logic, not "everyday life." Even so, I think it's part of common sense. Think of what things would be like if it were false. So even though Body and Trunk were *two* things at 1pm, they are literally the *very same thing* at 2pm. That's precisely what would have to happen in order for (5) to be false. Thus, if (5) is false then there's just *one* object there at 2pm. Well, then we should be able to ask, at 2pm regarding this *one* thing before us at 2pm, 'What was Body, that is Trunk, doing at 1pm?' It would be bizarre to reply, 'Well, it depends. If you're talking about Body, it had Foot as a part. But if you're talking about Trunk, then it didn't.' That sounds loony: I asked a question about X, which you *agreed* was just *one* thing, and you replied that *it* used to have Foot as a part and *it* never had Foot as a part. This looks close enough to a contradiction to make (5) part of common sense.

### 4. Premise (7)

Now we reach the last premise. If Body and Trunk aren't materially coincident at some time, then one of them must contain some material that the other doesn't. But at 2pm they have the exact same matter. Thus, they are materially coincident at 2pm, which is what (7) says. So (7) is true.

One might be tempted to say that if we cut off your arms and legs and have them lying on the floor right next to you, then they are still parts of your body, just unfortunately but hopefully temporarily not attached. (Think of taking a wheel off a bicycle for a couple minutes to repair it; even during the repair while it is sitting on the ground it seems right to say that it's one of the bicycle's parts even though it's not attached to the rest of the bike.) If that were true, then Body and Trunk would not be materially coincident at 2pm because Body but not Trunk would have some detached parts on the floor. But in our

story we have vaporized your arms and legs in a nuclear explosion; so they are not part of Body at 2pm because they don't even exist then.

Clearly, if (7) is saying that Body and Trunk are materially coincident at 2pm, it is presupposing that Body and Trunk *exist* at 2pm. Thus, premise (7) makes two presuppositions: Body exists at 2pm and Trunk exists at 2pm. I will argue for both presuppositions now, starting with the first.

It sure seems that Body exists at 2pm. It has lost some parts compared to the way it was at 1pm, but it still exists doesn't it? Losing one's arms and legs in a serious accident will be devastating, but it need not be the end of Body! Keep in mind that your body is losing parts all the time: hair, bits of fingernails, skin cells, waste, etc. Surely something can keep existing even if it loses some of its parts, right? My car still exists even though I have had the starter replaced; my favorite tree in my backyard still exists even though it has lost some leaves and we trimmed a couple branches off; my cat Macaroni still exists even though he has been shedding. If things can't keep existing even if they lose a few parts, then virtually nothing in the universe that existed a minute ago still exists now. That's a pretty radical view!

So unless you're prepared to endorse that highly radical view, you should say that Body still exists at 2pm. Thus, the first presupposition of (7) is true.

Does Trunk exist then too, as the second presupposition says? Well, how could Trunk *not* exist at 2pm? It was there a moment ago, and *nothing* has happened to *any* of its constituent molecules (all that's happened is that some molecules *next* to it, in the arms and legs, have been removed). It's very hard to see how it could have gone out of existence given that absolutely nothing whatsoever has happened to it. Thus, both of the two presuppositions of (7) are true.

Now I'm finished arguing for all the premises. Of course one can challenge these supporting arguments for (1), (2), (3), (5), and (7), but the point is that we have seen that there are good, straightforward, and commonsensical reasons for thinking that each is true. Thus, we have every reason to think that (8) is true: at 2pm Body  $\neq$  Trunk but Body and Trunk are materially coincident.

However, the truth of (8) should strike you as very odd. Suppose at 2pm Body weighs 100 lbs. Obviously, at 2pm Trunk also weighs 100 lbs, as it's materially coincident with Body. Since Body  $\neq$  Trunk at 2pm, there are *two* things sitting in the chair at 2pm, and each weighs 100 lbs. And yet, if we put them on a scale at 2pm, if we put these *two* 100 lb things on a scale, the scale will read just 100 lbs. Recall that you are the unfortunate person who lost their legs and arms at 1pm. As you lay in the hospital bed the following week surrounded by your loved ones, they could point to you and say that there are two 100 lb objects lying in that bed. Pretty weird.

Sometimes it makes sense that two material objects could occupy the same spatial region at the same time: the familiar one might be made of electrons, protons, and neutrons while the other is made of exotic, unknown particles that never interact with the former particles (so we can't detect the exotic

object at all, say). What's really puzzling is the Body-Trunk case, where they are made of the very same particles.

If you think (8) is wrong, then you have to tell us which of (1), (2), (3), (5), and (7) is false. And then you have to explain to us exactly *why* it's false. Otherwise, you have no decent response to the argument. Good luck.

It's important to know what it means to have a "response" to the paradox. The problem, as you'll recall, is that each of (1)-(7) looks true and yet (8), which absolutely must be true if (1)-(7) are true, looks false. It follows that: we wrong that (1)-(7) are all true, or we were wrong that (8) is false. That is, the problem is that we have made a **mistake** somewhere, and it's really hard to locate the mistake.

With that in mind, it's clear what a "response" to the problem is: **a statement saying exactly which of (1)-(8) are true and which are false, and a justification for those opinions—in particular, one has to justify the opinions regarding which claims are false.** Anything less than that is not a "response" to the problem because it doesn't tell us where the **mistake** is.

Maybe you can convince yourself that (8) is true. That's great. But now you have to deal with other oddities of material composition, ones just as paradoxical as the Body-Trunk one:

For instance, I start out on Sunday with a long string of yarn, which weighs four ounces, say. Then on Monday I knit it into a glove, with no additional parts (pretend I'm unbelievably fast at knitting). Then on Tuesday I unravel it completely, so it's back to being a very long string. Finally, on Wednesday I knit it into a hat. Is the glove identical to the string? Well, the glove was made on Monday but the string was not, as it was made in a factory in 2007. So how can they be identical? And yet, if they aren't identical, then on Monday I have two things each weighing four ounces and yet they are materially coincident. Same for the glove and the hat: surely they aren't identical, since I destroyed the glove before making the hat.

Another tough case: the ship story. A ship *S* is made of nothing but planks of wood, say. (This is a simplification of course, as it would need glue or nails or something to bind the planks together.) As it grows old, the planks are replaced one by one with new planks. After a while, the ship is composed of entirely new planks. And yet, a strange man has hoarded all the old planks and constructed them into a ship in his backyard. So which ship is *S*? Is it the one in the backyard or the one sailing on the ocean? Suppose this happens over and over again, with each set of new planks being hoarded by yet another strange man in his backyard. One is made into a ship, another into a house, another into a garage, etc. Which of these hundreds of material objects is the original ship?

Another tough case, a *really* hard one in my opinion, that one must think about is the *vagueness of composition*.