

**Phil 420: *Metaphysics*
Spring 2008**

[Handout 25]

Mark Heller: *Temporal Parts of Four-Dimensional Objects*

Professor JeeLoo Liu

§ Main Objectives:

1. The ontology of physical objects I will defend is that of four-dimensional hunks of matter.
2. The primary goal of this chapter is to develop a clear account of the nature of temporal parts.

§ Temporal Parts

[Judith Thomson's formulation]

A temporal part of O , call it P , is an object that comes into existence at some time $t_1 \geq$ ('later than or simultaneous with') t_0 and goes out of existence at some time $t_2 \leq$ ('earlier than or simultaneous with') and takes up some portion of the space that O takes up for all the time that P exists.

Heller's Critique:

___ She seems to think of physical objects as being three-dimensional and enduring through time. I am prepared to admit that this is our normal philosophical way of thinking of physical objects. But it is this way of thinking that makes temporal parts seem implausible.

§ Argument against Three-Dimensionalism

Three-Dimensionalism leads to the following unpleasant alternatives. To deny each of these alternatives and to accept three-dimensional enduring objects would lead to a contradiction.

- (a) there is no such physical object as my body,
- (b) there is no physical object in the space that we would typically say is now exactly occupied by all of me other than my left hand,
- (c) no physical object can undergo a loss of parts,
- (d) there can be distinct physical objects exactly occupying the same space at the same time,
- (e) identity is not transitive.

Deny (a): → There is such an object as my body. Call it 'Body'.

Deny (b): → There is an object that is all of me other than my left hand. Call it ‘Body-minus’.

Now consider at some time t at which my left hand is cut off. This does not affect Body-minus, so:

(1) the thing that, before t , is Body-minus = the thing that, after t , is Body-minus.

Deny (c): → My losing my hand does not end my body’s existence. So:

(2) the thing that, after t , is Body = the thing that, before t , is Body.

Deny (d): → it seems to follow that:

(3) the thing that, before t , is Body-minus = the thing that, before t , is Body.

Deny (e) then, by transitivity of identity it follows that:

(4) the thing that, before t , is Body-minus = the thing that, before t , is Body.

But since Body was bigger before t than Body-minus was before t :

(5) the thing that, before t , is Body-minus \neq the thing that, before t , is Body

Contradiction: (4) and (5)

Different approaches:

Thompson: accept (d)

Van Inwagen: accept (b)

Chisholm: accept (c)

Geach: accept (e)

Heller:

1. My way of avoiding the contradiction is to claim that (3) does not follow from the denial of (d) unless we accept the additional thesis that *physical objects are three-dimensional and endure through time*.
2. I will deny this additional thesis. Doing so will allow me to claim that Body and Body-minus are distinct objects that, even after t , do not occupy the same space at the same time.

§ Four-dimensional Objects

1. A physical object is not an enduring spatial hunk of matter, but is a spatiotemporal hunk of matter.
2. Instead of thinking of matter as filling up regions of space, we should think of matter as filling up regions of space-time.

3. A physical object is the *material content* of a region of space-time.
4. Just as a physical object has spatial extent, it also has temporal extent – it extends along four dimension, not just three.
5. Because a thing's parts are no more ontologically fundamental than the thing itself, existence of four-dimensional objects in no way depends upon their being built up out of instantaneous objects.
6. If there are many regions that do not contain matter, then they do not contain any physical objects. However, for *every* filled region there is one object that exactly fills it. → **Hawthorn's Uniqueness thesis.**
7. It should be noted that while I talk of matter as the ultimate filler, I would be prepared to accept that matter is itself composed of particles. The question of which is more basic (in the sense of which is composed of which), stuff or things, is one to be answered by scientists, not philosophers. → **Hawthorn's Fundamentality thesis.**
8. The object of my ontology has precise boundaries; *for any of the object in my proposed ontology there is a unique and determinate region that that object exactly fills.*
9. Physical objects are four-dimensional hunks of matter. They have precise spatiotemporal boundaries.
10. Every filled region of space-time contains a physical object, and which of these objects we count as *people* is **a matter of convention.**

§ *Vagueness*

I assume that for every region there is a determinate fact as to whether that region is exactly filled.

If there is real indeterminacy in the world, if there really is no fact of the matter as to whether a given region of space-time is full, then the world is really imprecise, and that must be reflected in the true ontology. This is the a very different sort of imprecision from that which is involved in the vagueness of our everyday objects; the imprecision here arises from the structure of the world, not just from our way of conceptualizing the world.

Charge of Vagueness:

___ There may be no precise line between those shapes that count as a region's being full and those that count as the region's not being full. It could be that certain regions are shaped in such a way that they neither count as full nor count as not full.

Heller's response:

___ For a spatiotemporal region to be full, in the sense in which I am using that term, is just for it to contain no empty subregions. Because what it is for one spatiotemporal region to contain another is not in any way vague, 'full' is only as vague as 'empty.' And 'empty' seems to be a paradigm non-vague term. If a region can possibly contain less than it does in fact contain, then it is not empty.... There

should be a determinate fact for any specified region whether that region could have less in it than it does.

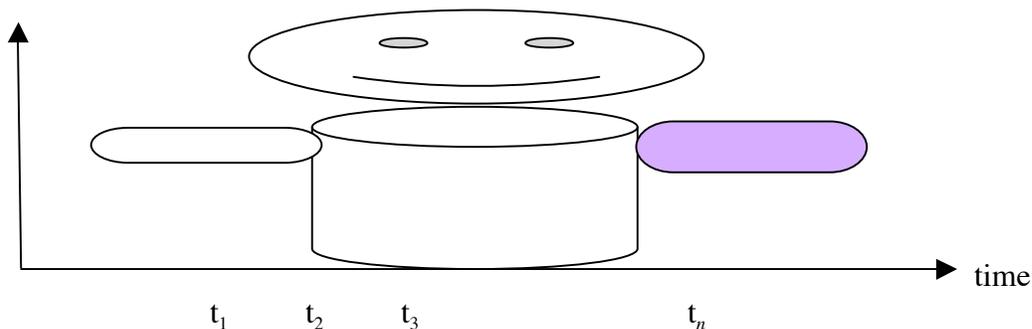
I will build this precision into my concept of four-dimensional object.

§ Temporal Parts Theory (vs. the Stage Theory)

Parts: A part of a physical object is itself a physical object.

A four-dimensional object is the material content of a filled region of space-time.

A spatiotemporal part of such an object is the material content of a subregion of the space-time occupied by the whole. A spatiotemporal part is not a set or a process or a way something is at a place and time. *It, like the object it is part of, is a hunk of matter.*



example: Mark Heller's left hand from t_1 to t_3 is a *part* of Mark Heller from t_1 to t_n .

[Temporal part]:

1. Any proper part of a four-dimensional object is smaller than the whole object along at least one dimension. A proper *temporal* part is smaller along just one dimension, the temporal dimension.
2. A temporal part of O is a spatiotemporal part that is the same spatial size as O for as long as that part exists, though it may be a smaller temporal size.
3. In general, a temporal part of O is the material content of a temporal subregion of R . 'Temporal subregion of R ' means spatiotemporal subregion that shares all of R 's spatial boundaries within the subregion's temporal boundaries.

• The Case of 'Whitey'

Consider a particular physical object, this piece of paper. Call this object 'Whitey'. Whitey has certain spatiotemporal boundaries – there is a region that it exactly occupies.

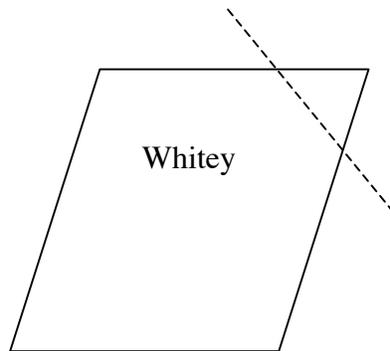
Whitey exists now = Whitey exists within the spatiotemporal region that it exactly fills and regions of which that one is a subregion. The present time is within Whitey's temporal boundaries.

Strictly speaking:

___ Put Whitey in the drawer, but leave a small corner sticking out. Now if asked where Whitey is, you will answer that it is in the drawer. Strictly speaking, however, your answer would be false....

A loose way of speaking:

___ If only a corner of the paper were inside, we would be less likely to say that Whitey is in the drawer. But if asked 'Does Whitey exist inside that drawer?' I think that we would all say 'yes'...



* Coincidence

The problem with coincident entities is that of overcrowding. There just is not enough room for them.

Q: How to avoid coincident entities with the whole and the part?

On the account provided above, an object and a proper spatiotemporal part of that object do not compete for room. There is a certain spatiotemporal region exactly occupied by the part; the whole object is not in that region. There is only as much of the object here as will fit – namely, the part.

When we say that Whitey is in the drawer, that is just a loose way of saying that part of Whitey is there. When we say that Whitey exists now, we are only saying that a part of Whitey exists now.

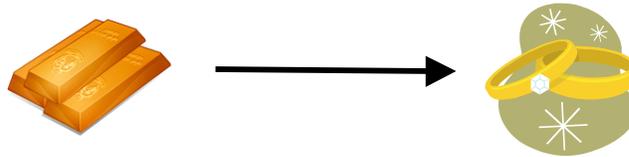
Keeping this in mind allows us to avoid being committed to coincident entities.

[example 1]: Heller's temporal part

Analogy to spatial relationship: The relationship between my hand and me is not that of coincidence, but, rather, that of part to whole.

Temporally: Heller is not coincident with Heller-during 1983. *Strictly speaking*, there is only one entity in the relevant spatiotemporal region – my 1983 part.

[Example 2]: a hunk of gold is shaped into a ring



The gold has a ring-shaped temporal part, the ring has a golden temporal part, and the gold's part is identical with the ring's part.

The relationship between the part of the one and the part of the other is identity, not coincidence. The relationship between the gold and the ring is that they share a common part; they overlap.

§ Temporal Parts Theory *without* the Three-dimensional Ontology

Thompson's attack on temporal parts depends on her accepting the thesis that physical objects are three-dimensional. In fact, Thompson's problem of coincident entities is a symptom of a much deeper problem with trying to explain temporal parts without rejecting the old three-dimensional picture.

* temporal parts are not created *ex nihilo*:

The objects that I am defending do not just pop into existence. It is not as if there is empty space and then, poof, the space is filled. It is the causal mechanisms together with the material configuration of matter at any given time that affect which parts will exist at the next moment. The structure of the world at one moment does affect the structure of the world at the next moment.

There are causal connections among temporal parts.

e.g.

The state of a brain-at- t_2 (a temporal part of a brain) is affected by the state of the relevant brain-at- t_1 . This causal connectedness explains the unity of consciousness in different temporal parts of the same person. There is no unity of consciousness for an object composed of me-at- t_1 and you-at- t_2 . But if we had been wired differently, if the relevant causal connections had been different, then the thing composed of me-at- t_1 and you-at- t_2 might have had a unity of consciousness.

It is just a matter of contingent fact that causal connectedness does lead to a person's experiencing a unity of consciousness.

→ This is his rebuttal to Chisholm's *argument from the unity of consciousness* against the theory of temporal parts (of a person)

§ Back to Body and Body-minus

Once we adopt the four-dimensional picture, we can deny all five alternatives without having to be committed to:

(3) the thing that, before t , is Body-minus = the thing that, before t , is Body.

The objects claimed to be identical in (3) are distinct and do not, except in a loose sense, occupy the same space at the same time.

Body and Body-minus are distinct four-dimensional objects, since they have different spatial shapes before t . *Strictly speaking*, neither of them is in R . They are both temporally too long. They each take up a spatiotemporal region that is temporally larger than R , because their regions begin before t .

Of course, each has a temporal part that is in R , but that does not entail that either Body or Body-minus is in that region. They overlap in R , but neither one exactly fills R .

Body and Body-minus have a common temporal part, just as my living room and my dining room have a common spatial part.

Q: Do you think this analogy works?

§ Summary of Heller's Position

1. **Four-dimensional objects are hunks of matter.**
2. **Parts of four-dimensional objects are also just hunks of matter, not stages.**
3. **No vagueness:** *for any of the object in my proposed ontology there is a unique and determinate region that that object exactly fills.*
4. **No coincidence:** *There is a certain spatiotemporal region exactly occupied by the part; the whole object is not in that region.*