

## Thomson's 'Parthood and Identity Across Time'

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### 1. Background: the Calculus of Individuals

A very simple theory of parthood, unfortunately based on a bizarre choice of primitive:  $x D y$ , 'x is discrete from y'.

Definition 1:  $x$  is part of  $y$  iff everything discrete from  $y$  is discrete from  $x$ .

Definition 2:  $x$  overlaps  $y$  iff something is part of both  $x$  and  $y$ .

Definition 3:  $x$  fuses  $S$  (a set) iff the things that are discrete from  $x$  are exactly the things that are discrete from every member of  $S$ .

(A more intuitive definition, equivalent to this one:  $x$  fuses  $S$  iff every member of  $S$  is part of  $x$ , and everything that overlaps any member of  $S$  overlaps  $x$ .)

Axiom 1:  $x = y$  iff  $x$  is part of  $y$  and  $y$  is part of  $x$ .

Axiom 2:  $x$  overlaps  $y$  iff  $x$  is not discrete from  $y$ .

Axiom 3: every nonempty set has a fusion

Theorem 1: if  $x$  is part of  $y$ , and  $y$  is part of  $z$ , then  $x$  is part of  $z$

Theorem 2 ('the fusion principle'): every nonempty set has exactly one fusion

Note: you end up with the same theory if you take Theorems 1 and 2 as the axioms. You can then take 'is part of' as primitive, and take Axiom 2 to be the definition of 'is discrete from'. This is much more intuitive!

### 2. Thomson's question (III)

We embrace colocation as the solution to the paradoxes of material constitution. JJT's example: the tinkertoy house  $H$ , and either  $W$  ('the fusion of the tinkertoys on the shelf'), or  $W'$  ('the wood on the shelf').

But we aren't happy just to state that  $H$  isn't the same thing as  $W$  or  $W'$  and leave it at that:

So it is the identity sentences (3) and (3') which have to go. But it seemed intuitively right to say that a Tinkertoy house is made only of Tinkertoys. It was that intuition which led us to identify  $H$  first with  $W$  and then, anyway, with  $W'$ . There has got to be something right in that intuition; but what is the something right in it, if (3) and (3') are not true? How is  $H$  related to  $W$ —and to  $W'$ , if there is such a thing as  $W'$ ? (p. 28)

The doctrine of temporal parts has an answer to this question:  $H$  and  $W/W'$  share a temporal part at the relevant time.

### 3. Thomson's presentation of the doctrine of temporal parts (IV)

Definitions:

***x* is a cross-sectional temporal part of *y*** iff there is a period of time *T* such that *x* and *y* both exist throughout *T*, and no part of *x* exists at any time outside *T*, and at every instant during *T*, *x* and *y* occupy exactly the same place.

***x* is a temporal part of *y*** iff there is a period of time *T* such that *x* and *y* both exist throughout *T*, and no part of *x* exists at any time outside *T*, and at every instant during *T*, *x* occupies a subregion of the region of space occupied by *y*.

'Metaphysical principles':

***M*<sub>1</sub>**: if *x* is a temporal part of *y*, then *x* is a part of *y*

***M*<sub>2</sub>**: if *y* exists throughout *T*, then *y* has a temporal part at *T*

***M*<sub>3</sub>**: if *x* is part of *y* and *y* is part of *x*, then *x* = *y*

***M*<sub>4</sub>**: Everything is a temporal part of itself

Theorem: if *y* exists throughout *T*, then *y* has exactly one cross-sectional temporal part at *T* (from ***M*<sub>1</sub>**, ***M*<sub>3</sub>**)

Theorem: if *x* is part of *y*, then *x* exists only at times when *y* exists (from ***M*<sub>4</sub>**)

Surprising consequence: pieces of wood, cloth, etc. aren't parts of chairs

**Sider's response to this objection:** our ordinary talk about parts uses the time-relative notion '*x* is part of *y* at *t*', which can be defined in terms of the atemporal notion of parthood as follows:

(P@*T*) *x* is part of *y* at *t* iff *x* and *y* each exist at *t*, and *x*'s instantaneous temporal part at *t* is part of *y*'s instantaneous temporal part at *t*.

### 4. Thomson's argument against the doctrine of temporal parts (V)

[According to the doctrine of temporal parts,] As I hold the bit of chalk in my hand, new stuff, new chalk keeps constantly coming into existence *ex nihilo*. That strikes me as obviously false. (p. 36)

(i.e. at every time, a thing that is made of chalk starts to exist)

Why does she say the temporal parts come into existence '*ex nihilo*'?

### 5. Thomson's answer (VI)

The relation between *H* (the Tinkertoy house) and *W* / *W* is this: each is part of the other at the time in question.

NB: Sider, at least, agrees with this.

Thomson's 'cross-temporal calculus of individuals'