Brentano's Mereology

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Starting in his 1867 metaphysics lectures at Würzburg and up until his death, Brentano continuously developed systematic ideas about part-whole relations. The first published discussion of mereology is the chapter on the unity of consciousness in the *Psychology from an Empirical Standpoint* (Brentano 1874/1973a). Further developments, partially abstracted from the psychological context, appear in his Vienna lectures from the late 1880s, published posthumously as Chapter 2 of *Descriptive Psychology* (Brentano 1982/1995b). The most systematic and topic-neutral presentation of his mereological ideas published to date is in various dictations from 1908 and 1914-5, collated by Alfred Kastil into Chapters 1 and 2 of *The Theory of Categories* (Brentano 1933/1981a).

Brentano never presented an axiomatic mereological system with proofs of consistency and completeness. But his mereological ideas have influenced directly work in this direction by his students Stumpf (1890), Ehrenfels (1890), Twardowski (1894), and Husserl (1901).[i] It was a student of Twardowski's, Leśniewski, who first developed a formal mereological system (Leśniewski 1916), so-called Classical Mereology. My approach to the exposition of Brentano's mereology is to first introduce the basics of Classical Mereology and then point out the respects in which Brentano's mereology deviates from it.

1. Classical Mereology

Classical Mereology (CM) is most naturally axiomatized in terms of six propositions, couched in logical vocabulary plus four mereological notions: part, proper part, overlap, and sum. The four notions are interdefinable, and it is possible in principle

to take a single notion and define the others in terms of it (plus the logical vocabulary). Typically mereologists take 'part' as their basic notion, but sometimes they opt for 'proper part' (e.g., Simons 1987). As I find 'proper part' to be the more intuitive notion, I will use it as the basic notion here. We may then say that a *part* of A is something which is either a proper part of A or identical to A; A and B *overlap* when they have a part in common; and the *sum* of A and B is anything that has A and B as parts such that any *other* part it has must overlap them. More formally:

(Def_1) A is a part of B iff (i) A is a proper part of B or (ii) A = B.

(Def_2) A overlaps B iff there is a C, such that (i) C is a part of A and (ii) C is a part of B.

(Def_3) S is a sum of A and B iff any C that overlaps S overlaps either A or B.

In this construction, we define 'sum' in terms of 'overlap,' 'overlap' in terms of 'part,' and 'part' in terms of 'proper part.' The term 'proper part,' however, remains primitive and undefined.

The axioms of CM divide into two groups. The first are axioms that describe the proper-parthood relation as a strict partial order (irreflexive, asymmetric, and transitive):

(CM_{Ar}) A is never a proper part of A.

(CM_{As}) If A is a proper part of B, then B is not a proper part of A.

(CM_{T}) If A is a proper part of B and B is a proper part of C, then A is a proper part of C.

Not every strict partial ordering relation is proper-parthood, however. So CM includes also three more substantive axioms. One is the axiom of unrestricted composition: for any plurality of things, there is a sum composed of them. Another is the 'axiom of supplementation': if one thing is a proper part of a second, the second must have an additional proper part (to make it whole, so to speak). The last is the 'axiom of extensionality': having the same parts implies being identical and vice versa. More formally:

(CM_U) For any plurality of items A, B,…, there is a X that is the sum of A, B,….

(CM_S) If A is a proper part of B, then there is a C, such that (i) C is a proper part of B and (ii) C does not overlap A.

(CM_E) A = B iff every part of A is a part of B and every part of B is part of A.

These axioms employ the terms 'sum,' 'part,' and 'overlap,' but can be reformulated entirely in terms of 'proper part' and logical vocabulary (by using the above definitions). As noted, however, the mereological terms can *also* be defined in terms of 'part.'

2. Brentano's Mereology

So much, then, for CM. How does Brentano's mereology (BM) differ? There are two main differences: (i) regarding the axiom of supplementation and (ii) regarding the primitive notion of (proper-)parthood.

Obviously, Brentano's proper parthood is also irreflexive, asymmetric, and transitive. In addition, it is clear that the axiom of unrestricted composition holds in BM:

> Consider first that which is in the strict sense. Here we should include every individual thing, every plurality (*Mehrheit*) of things, and every part of a thing. Every plurality of things is a thing… (Brentano 1933: 11/1981a: 19)

This is often presented in conjunction with the principle of 'composition as identity':

> … each particular atom is a thing and, according to what we have said, any three atoms taken together can also be called a thing; but the latter may not now be called a fourth thing, for it consists in nothing more than the original three atoms, each of which is one of its parts. (Brentano 1933: 5/1981a: 16)

The composite thing is identical to the plurality of its components. It follows that if wholes W_1 and W_2 are composed by the same proper parts, then $W_1 = W_2$. From there, the road to extensionality is short: we only need to add that if $W_1 = W_2$, then

W_1 and W_2 have the same proper parts, which seems to fall out of the indiscernability of identicals.

However, the axiom of supplementation does not hold generally in BM. Brentano writes:

> Among the things that have parts, there are certain wholes which are not composed of a plurality of parts. Such a whole would seem to be a thing which is such that one of its parts has been enriched but not as a result of the whole acquiring a second part. (Brentano 1933: 53/1981a: 47; see also 1981a: 19, 53, 112, 115)

What are these bizarre entities? According to Brentano, in addition to Socrates and the Eiffel Tower there are also such things as wise-Socrates and the tall-Eiffel-Tower. The former are substances, the latter are accidents (CHAP. 14). Importantly, for Brentano accidents such as wise-Socrates are fully determinate concrete particulars (Brentano 1981a: 22). This is, to be sure, quite an odd concrete particular. Among its oddities is the fact that wise-Socrates contains Socrates as a proper part, but does not in addition contain any *other* proper part. Thus Socrates is an *unsupplemented part* of wise-Socrates. The reasons for this odd claim are complex and derive from Brentano's nominalist agenda (CHAP. 16). It has certainly met its share of ridicule (Simons 2006: 92), but with some charity may be made sense of (Chisholm 1978: 202). Note, in any case, that for *substances* (such as Socrates and the Eiffel Tower), the supplementation principle holds: if they have a proper part, then they also have some other proper part that supplements it.

One difference between CM and BM, then, is that the latter does not include an axiom of supplementation. The more important difference, arguably, concerns the primitive notion of (proper-)parthood. In CM, there is a single, univocal notion at play. This does not seem to be the case for Brentano:

> … one may be able to distinguish parts that are actually *separable* from one another, until one reaches parts where such … separation can no longer take place. … However, even these ultimate actually separate parts, in some sense, can be said to have further parts. … To differentiate these from others, we may refer to them as *distinctional* parts. (Brentano 1982: 13/1995b: 16; my italics)

Brentano seems to distinguish two types of proper part: *separable* and *distinctional*. Here is one example in which they come apart:

> Someone who believes in atoms believes in corpuscles which cannot be dissolved into smaller bodies. But even so he can speak of halves, quarters, etc. of atoms: parts which are distinguishable even though they are not actually separable. (Ibid.)

By 'atoms' Brentano means not the entities referred to as atoms in physics, but the entities genuinely admitting of no physical division. A physics' atom with one proton and three electrons does have separable parts, since we can separate the electrons from the proton – this is called 'splitting the atom.' The proton too has separable parts – the quarks making it up. But the electrons have no separable parts. It is impossible to 'split the electron.' Still, even though we cannot separate *in reality* different parts of electron E, we can distinguish *in thought* different parts of it. We can call the top half of E 'Jimmy' and the bottom half 'Johnny.' (More precisely, since E has a determinate mass *m*, we can divide *m* by half and consider each of E's two halves independently.) Jimmy and Johnny are thus *distinguishable* parts of E, but not *separable* parts. Brentano calls them *distinctional* (*distinktionelle*) parts, or sometimes *divisiva*.

It would seem, then, that Brentano distinguishes two notions of (proper-)parthood, which we may call *parthood-as-separability* and *parthood-as-distinguishability*. Accordingly, he recognizes two kinds of (proper) part: separables and distinguishables/divisives. The former are separable *in reality*, the latter are distinguishable *in thought*. It may well turn out that whatever is separable in reality is distinguishable in thought, but clearly, not everything which is distinguishable in thought is separable in reality – as the electron case shows.

3. Distinctional Parthood

It might be objected that the distinction between two *notions* of parthood is unneeded to accommodate the atom case. All we need are two kinds of separable

part: *physically* separable and *spatially* separable. Jimmy and Johnny are not physically separable from E or from each other, but they are spatially separable, in the sense that the *portion of space occupied by E* can be separated into two halves.

There may be other cases, however, that suggest more forcefully a distinction between two kinds of parthood. Consider the difference between Marie Antoinette's head and Marie Antoinette's smile. There is a sense in which Marie Antoinette's head is part of Marie Antoinette, and a sense in which her smile is a part of her, but they do not seem to be the *same* sense. Remarkably, Marie Antoinette's head is manifestly a separate part of her, whereas her smile is a merely distinctional part.

The relationship between a person and her smile is an instance of the much more general relation between a 3D object and its 2D surface: the surface cannot be separated from the object and exist on its own. In general, Brentano uses many topological phenomena as examples of distinctional parthood (Brentano 1976). Thus, a boundary between two adjacent regions of space is merely distinguishable from either region. It may be true that here too, the 2D surface is simply a spatial rather than physical component of its 3D owner. Still, there is a clear intuition that although it is a genuine part of its owner, it is such in a different sense than the owner's 3D top half.

There is more than just intuition here, however. There is a real and deep difference between two kinds of part: some parts are *ontologically independent* of the wholes of which they are parts, some are ontologically *dependent*. We may mark this difference any way we want, but it is deeper than the difference between the physical and the spatial. One perfectly natural way to mark the difference is to call the former separable parts and the latter distinctional parts. When P is a separable part of some whole W, P is ontologically independent of W. For it can exist *without* W. Accordingly, the destruction of W does not entail the destruction of P. (It may entail a redescription or renaming of P, but it does not entail the going out of existence of P.) By contrast, when P is a distinctional part of W, it is very much ontologically dependent upon W. Since it cannot be separated from W, it cannot

exist without W. The existence of W is a precondition for its existence. Accordingly, the destruction of W entails the destruction of P.[ii]

The case of a 3D object and its 2D surface is one of *unilateral* mere distinguishability. The surface is merely distinguishable from the object, but the object is not merely distinguishable from the surface. Destruction of the object would entail destruction of the surface; the latter is incapable of independent existence. In contrast, by scraping the surface off an object, one would be effectively separating the object from the surface: the object would acquire a *new* surface, certainly, but it would go on existing despite its *original* surface's destruction.

We might wonder, then, whether there are also cases of *bilateral* mere distinguishability, cases where two parts P_1 and P_2 of a whole W are mutually inseparable.[iii] Brentano offers as an example an individual blue dot at location L (Brentano 1982: 14/1995b: 18). According to Brentano, the dot's particular blueness and its particular L-locatedness are mutually inseparable. The very same individual dot cannot continuously move to L*, though it can be continuously replaced by other dots located at other locations on the path from the L to L*; and likewise, the same dot gradually lose brightness until it becomes sky-blue and eventually white, though it can be replaced by other dots on the continuum from blue to white (1982: 15/1995b: 19). Thus the dot's particular blueness cannot survive the dot's loss of L-locatedness and vice versa.

An objector could certainly reject Brentano's assumptions about the identity conditions of dots as unmotivated. Intuitively, a blue dot can slowly move sideways, and it can glimmer and twinkle. Still, we may wish to distinguish four possibilities whenever a whole W has two parts P_1 and P_2 (eight for interrelations among three parts of a whole, sixteen for interrelations among four parts, and so on):

(a) Bilateral separability: P_1 and P_2 are mutually separable;
(b) Unilateral separability: P_1 is separable from P_2 but P_2 is merely distinguishable from P_1;

(c) Unilateral separability: P_1 is merely distinguishable from P_2 but P_2 is separable from P_1;
(d) Zerolateral separability: P_1 and P_2 are mutually merely distinguishable.

Brentano offers mostly psychological examples of (a)-(d). Suppose you notice a loud airplane flying overhead. An example of (a) is the relationship between your seeing and hearing the airplane: you could see without hearing or hear without seeing (Brentano 1982: 12/1995b: 15). An example of (b) or (c) is the relationship between your perceiving the airplane and your noticing it, where noticing something is perceptually attending to it: you could perceive the airplane without doing so attentively, but you could not perceive the airplane attentively (i.e., notice it) without perceiving it at all (Ibid.). An example of (d), finally, is the relationship between perceiving the airplane and being aware of your perceiving it: according to Brentano, neither is possible without the other (1982: 22, 25/1995b: 25, 27; see CHAP. 5).

Conclusion

By the end of his life, it is clear that Brentano's interest in mereology is central to his ontology and not just his philosophy of mind. As a reist, Brentano accepts only *individual things* as genuine entities (CHAP. 16). Crucially, however, for him every plurality of things is also a thing (hence his commitment to unrestricted composition). He articulates his full ontological inventory as follows:

> Among things in the strictest sense, then, are every substance, every plurality of substances, every part of a substance, and also every accident. Every accident contains its substance as a part, but the accident is not itself a second, wholly different part that is added to the substance. (Brentano 1933: 11/1981a: 19)

This passage gives voice both to Brentano's acceptance of unrestricted composition and to his rejection of supplementation. Note that this ontology is organized mereologically: the relationship between substance and accident is mereological

(see esp. 1933: 145-151/1981a: 111-5 for a mereological account of the substance/accident distinction), and all other entities in the ontology are obtained from substances mereologically (as sums or as parts).[iv] To that extent, we may say that Brentano's is a mereologically driven ontology.[v]

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[i] For more modern studies and developments, see Simons 1987, Baumgartner & Simons 1994, and Baumgartner 2013.

[ii] This pattern of ontological dependence also suggests (though does not entail) that in some sense the following holds: (i) separable parts are ontologically *prior* to the wholes they make up, but (ii) distinctional parts are ontologically *posterior* to the wholes of which they are parts. That is, the existence of a whole is grounded in that of its separable parts, but the existence of the disitncitonal parts is grounded in that of the whole.

[iii] Talk of separability and distinguishability relations among parts, and not just between parts and wholes, requires generalizing these relations so they no longer have to take an *improper* part of the whole as one relatum.

[iv] The claim that every part of a thing is also a thing is somewhat puzzling, however. For elsewhere Brentano indicates that for him *distinctional* parts are not genuine things. For example, a fragment archived at the University of Würzburg reads: "What the question of being in the proper sense is concerned with: the metaphysical parts, such as greatness, thought, etc., are not real beings in themselves, but abstract '*divisiva*'." (MS 31534, quoted in Baumgartner 2013: 236) Elsewhere Brentano speaks of 'fictive parts' (1933: 58-60/1981a: 51-2). It is possible that Brentano changed in mind on the status of distinctional parts at some point. Another possibility is that in the passage cited in the main text Brentano is being careless and has in mind only *separable* parts of things as independently deserving of the status of a thing.

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