

DEPARTEMENT WIJSBEGEERTE

# $\theta$ SUMMING THINGS UP $\pi$

WHAT CAN MEREOLGY TEACH US ABOUT REALITY?

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# Introduction

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**T**HIS IS an essay in metaphysics—a fascinating subject with a long and complicated history, which has known thriving episodes of extravagant speculation as well as periods of skeptical criticism and even outright rejection. Recent decades have shown a considerable revival of the subject within the tradition of analytic philosophy, with some distinctly contemporary features in both method and outcome.

Analytical metaphysics proceeds largely against the background of two giants of the early history of analytic philosophy: Rudolph Carnap and W.V. Quine. The former, working from a verificationist point of view, developed a largely deflationary stance towards metaphysical questions: as long as no difference ensues with regard to “observation statements”, we’re home free, we can introduce whatever metaphysic we like—that is, only if we don’t fall prey to the temptation of thinking that the metaphysic of our choice is the “right” metaphysic [see, e.g., Carnap 1950]. Quine, on the other hand, is often thought to have saved metaphysics from the positivists. That is not entirely true, however, since Quine’s own position is pervaded with a thorough pragmatism that compromises his seemingly robust metaphysical claims in, e.g., ‘On what there is’ [Quine 1948].<sup>1</sup> Nevertheless, Quine has introduced many ideas that have been adopted by others, who were less inclined towards pragmatism and hence reintroduced inflationary metaphysics in the landscape of 20th century analytic philosophy. Amongst the distinctly Quinean principles at work in present-day metaphysics are the following (for a detailed exploration and defense of this Quinean “meta-ontology”, see van Inwagen [1998, 2009]):

- [1] To exist is to be, there are no different senses of being or existence.
- [2] “To be is to be the value of a variable” [Quine 1948, p. 34].
- [3] A useful strategy for getting rid of apparent ontological commitments is to offer paraphrases that do not have these commitments.

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<sup>1</sup>For insightful discussion of Quinean and Carnapian influences on contemporary metaphysics, see the recently published bundle of essays *Metametaphysics* [Chalmers et al. 2009].

- [4] Ontological disputes should be approached by fleshing out what the ontological commitments of the statements accepted by the various sides are.
- [5] We should “have a taste for desert landscapes” [Quine 1948, p. 23]: strive for an ontology that is as austere as possible.

In this essay, I take issue mostly with competing positions within the camp of metaphysical realism, that is, with those standing in the neo-Quinean tradition that embraces theses like the five just given, but rejects Quine’s pragmatism as well as his distaste for modality. I will have occasion to discuss some features of neo-Carnapian views along the way, but only for purposes of comparison with various brands of realism.

My aim is not just to defend one position within the realist camp; I want to make some methodological points as well. The systematic and methodological points I wish to make are all centered around the issue as to what the proper role of mereological considerations for the metaphysician is. Anyone willing to cast just a brief glance at writings of contemporary champions of realist metaphysics will find that mereological considerations play a considerable if not crucial part, at least for some of the most prominent positions that are currently popular. I will be concerned, in particular, with metaphysical views similar to those defended by David Lewis and Ted Sider.<sup>2</sup>

Thus, it is my aim to investigate what mereology, the theory of parts and wholes, can teach us about metaphysics—in particular, about the nature of ordinary objects, such as rocks, rabbits, raisins and realists. Following one of a number of terminological habits available in the contemporary discussion, I will call such ordinary objects *continuants*.<sup>3</sup>

Many metaphysicians do remark on the role mereology plays for the metaphysical theories they are attacking or defending, usually to express like or dislike rather than to discuss that very role. Two striking examples:

It is easy to feel . . . an intellectual joy in contemplating a theory so elegant and beautiful as four-dimensionalism, and it is tempting to accept the theory simply on this basis . . .

[Sider 2001, p. 74]

An idea like that<sup>4</sup> could not even occur to one with the good fortune to be innocent of classical extensional mereology. [Wiggins 2001, p. 166]

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<sup>2</sup>Lewis and Sider are, of course, not the only philosophers defending such metaphysical views, but they are among the most prominent ones, and hence will be excellent guides for charting the relevant metaphysical shores.

<sup>3</sup>Besides the term “continuant”, the term “substance” will show up every now and again in what follows. “Substance” is always to be understood in the Aristotelian sense (more precisely, as the Aristotelian “primary substance”), never in the chemical sense (in which stuffs like gold or NaCl are substances).

<sup>4</sup>Wiggins is here talking about the idea that there are as many mountains having the same peak as there are rival determinations of boundaries around it—but this context is irrelevant here; the quote is merely meant to illustrate how philosophers remark on mereology in the course of their metaphysical inquiries.

The elegance and beauty of four-dimensionalism, we will see, derives directly from mereology—in particular, from the classical extensional mereology Wiggins so explicitly dislikes. Anyway, such remarks are usually made as an aside, the role of mereology in metaphysical theory is rarely scrutinized in-depth. There are some fortunate exceptions, two of which I mention here: Kathrin Koslicki's recent book *The Structure of Objects* [2008], which does discuss the proper role of mereology within the metaphysical discussion; and Peter Simons's remarkably thorough and lucid examination of mereological theories in his book *Parts* [1987]; however, his work is focused largely on the development of an adequate mereological theory, and less on the ways classical extensional mereology gets used by philosophers that are as enthusiastic about it as Sider (Koslicki has more to say on this).

At first sight, there are two ways of conceiving of the relation between mereology and metaphysics:

- [A] Mereology is the theory of parts of *given* wholes. In other words, there is little exciting metaphysical import.
- [B] Mereology is prior to the question as to which wholes there are, hence has something to say about this. In other words, there is considerable metaphysical import.

The approach to metaphysics I will be challenging takes [B] to be the right conception; hence it is appropriate to name the target views of my criticisms *mereologically inspired metaphysics*. Partly, my conclusions will concern the methodological keynotes that undergird such views, arguing for what I take to be the proper locus of mereology within the metaphysical discussion, and partly they will be of a systematic nature, critically assessing the tenability of mereologically inspired metaphysics. As to the former, I argue that the highly revisionary character of the metaphysical views under consideration, as well as the strategies employed by their defenders to make their views appear less radical, are suspect and require much more motivation than any philosopher has given us so far; with regard to the latter, I show that the views in question do indeed have the revisionary character I claim them to have, and present arguments that challenge some crucial aspects. Moreover, I argue that mereology is best conceived of along the lines of [A], and finds its home within a broader metaphysical theory as a chapter concerning the relations between objects of various categories (e.g., between macroscopic and microscopic objects).

The mereological theory that has shaped the contemporary metaphysical landscape in important ways, to be explored in ensuing chapters, was developed in the early decades of the twentieth century. It has come to be known as *classical extensional mereology*, and

constitutes one of the most important foundations for the metaphysical view defended by Lewis and Sider, which I will call *universalism*, for reasons that will become apparent later on.

Here is my plan for battle. In Part I, I first lay down classical extensional mereology, briefly commenting on its original motivations, then move on to develop the universalist metaphysic on its basis, and conclude with a critical discussion of that metaphysic. In Part II, I argue for the conclusions sketched above: that there is not enough motivation supplied for adopting as radical a revision in our thinking about reality as the universalist proposes, and that the proper place of mereology is not as a foundation of metaphysics, but as a mere chapter within a much broader metaphysical theory. I also reflect on what the formal features of mereology thus conceived could be, and sketch what I take to be a viable and better motivated realist metaphysic. The resulting view will diverge to some extent from the Quinean meta-ontological principles enlisted above.

The history of philosophical warfare teaches us not to enter the metaphysical battlefield without proper preparation. Or, to use a less aggressive analogy, a bit of stage setting is in order before we proceed to Part I. I suggested that one of the reasons for me to criticize the universalist view is its strongly revisionary character, but the only clue I gave as to what actually gets revised is that it concerns the continuants, the ordinary objects. Let me be more precise. Continuants are the things that occupy our world, according to our scientifically informed common-sense world view, and these things come in various different kinds. “Things”, here, is to be taken very broadly, such that it encompasses everything existing in space and time—whether microscopically small, such as quarks and electrons, or medium-sized, living or non-living, man-made or natural, such as rivers, mountains, chairs, plants and animals, or macroscopically large, such as planets, stars and galaxies. Most of these things come into being at a certain point in time, and cease to be at some later point, persisting through various kinds of change during their life careers. Hence, a continuant has what I prefer to call a “modal profile”, which includes persistence conditions, telling us what kinds of change the continuant in question can or cannot survive, and capacities or dispositions, telling us what the continuant in question is capable of. Such a modal profile is usually bound to a specific *kind* of thing—thus, rabbits have a modal profile that is rather different from the modal profile of electrons or planets. Different kinds of things are examined by different sciences.

I do not mean to suggest that scientifically informed common sense always explicitly *includes* talk of modal profiles, persistence conditions and the like, but rather that my term “modal profile” nicely captures the fact that we *do* talk about things beginning and

ceasing to be, about things undergoing change, and about things persisting through a certain period of time—both in ordinary life and in scientific practice.

Nor do I mean to suggest that we have a complete inventory of the kinds of things there are, with all the modal profiles spelled out in detail. In many cases the point is merely epistemological: there is a lot we simply don't know, and there is probably a lot we're wrong about. We just have to investigate, scientifically, to find out more about the things we are unclear about. But there are also issues that are clearly not just epistemological: there are many things about which we don't even know whether they are really there at all, even though we can seemingly investigate them and learn a lot about them (heaps, waves, holes, etc.); we are often at a loss to say, in difficult cases, whether some thing has continued to exist or not (Theseus's Ship, cases of fusion and fission, cases of considerable change of parts); and there are many kinds of things the status of which we're unclear about—especially since we seem to have some freedom as to how we classify things. The recent demotion of Pluto, depriving it of planethood, due to the official definition of what it is to be a planet installed in 2006, illustrates this freedom: had the scientists chosen the definition otherwise, Pluto might still have counted as a planet (along with several other less well-known dwarf planets). There is a certain arbitrariness in such classifications.<sup>5</sup>

Indeed, as soon as one starts thinking about the common-sense view I've been sketching, problems start popping up all over the place. A familiar one from metaphysical discussions is the issue of colocation. It seems to be a plausible principle of common-sense metaphysics that no two things can occupy the same place at the same time (i.e., colocation cannot occur); likewise, Leibniz's Law, which says that identicals share all their properties, appears to be undeniable from a common-sense point of view. Yet lumps of clay have a modal profile that is different from the modal profile of statues, hence the statue made of a certain lump of clay will, by Leibniz's Law, be distinct from that very lump, even though the lump and the statue are colocated. Considerations such as these indicate that some revision of the common-sense view is called for. Unsurprisingly, one can find proponents of universalism promote their views by referring to such metaphysical puzzles, arguing that their respective views do not suffer from such difficulties.

The important question is: what kind of revision is called for? Should we abandon the entire common-sense viewpoint and start from scratch with some alternative metaphys-

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<sup>5</sup>Usually, this arbitrariness is one of the main reasons for people to leave realist metaphysics behind and claim that the entire common-sense world view is tied closely to our conceptual scheme: this would lead to a conventionalist approach to metaphysics that finds its home in the Carnapian rather than the neo-Quinean tradition.

ical theory? Or should we rather try to make amendments from within? Universalism exemplifies the former strategy, deriving much of its inspiration from mereological considerations. I wish to attack this view: although it evades many classical metaphysical puzzles, it is troubled by problems of its own that are no less puzzling, and it presents us with a highly revisionary conception of the continuants that is exceedingly difficult to grasp without reverting to our common-sense metaphysic (if it can be grasped at all).

Some final notes: I won't be discussing metaphysical issues concerning things other than material objects, such as abstract objects, universals, tropes, and the like. More importantly, I won't have much to say on the nature of space and time either, even though these notions play a crucial role for the universalist metaphysic. Due to restrictions of both space and time, I cannot include a discussion on these topics in this essay. Luckily, the relevant metaphysical issues can be successfully discussed without delving too deeply into the philosophy of space and time, as is exemplified by the following chapters. And finally, I will not enter into discussions of vagueness.

Without further ado, let us proceed to Part I, which introduces and criticizes the universalist view.

\* \* \*

**Part I**

**Mereologically Inspired  
Metaphysics**

## Chapter 1

# Classical Extensional Mereology

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**M**ERELOGY, the theory of parts and wholes, is as old as philosophy itself. From the Presocratics onwards one can find mereological considerations playing an important role for many a philosopher's aims and concerns. Formal mereologies, not surprisingly, appeared on the scene much more recently. Despite the fact that Stanisław Leśniewski had published his *Foundations of a General Theory of Sets*, containing a worked-out formal system of mereology, already in 1916 (in Polish; see Leśniewski [1916]), credit for bringing the subject under general philosophical attention should go to Nelson Goodman's and Henry Leonard's "The Calculus of Individuals," published in 1940 [see Leonard and Goodman 1940]. In fact, they developed their system entirely independently from Leśniewski in the late twenties and thirties; it was Quine who noted the similarity—he writes in his *Autobiography*:

Goodman, Leonard, and I drove back to Cambridge, stopping in New York at the Lafayette, a French hotel off Washington Square. On the way they told of a project of theirs. . . . They were concerned with constructing a systematic theory of sense qualities, and their effort had much in common with Carnap's *Logischer Aufbau der Welt*. As an auxiliary they had developed a logic of part-whole relation, which I recognized as Leśniewski's so called mereology. [Quine 1985b, p. 122]

The differences between the formal theories proposed by Leśniewski and by Leonard and Goodman are indeed not substantial, as Peter Simons has shown in his excellent survey of these matters [see Simons 1987]. Following Simons, we may call the mereological theory they both convey *classical extensional mereology*, or, in short, CEM.

It is the aim of this chapter to provide a concise characterization of CEM—with enough formal detail to be able to discuss its bearing on metaphysical issues. The characterization I offer below derives mainly from the first three chapters of the work of Simons I just mentioned, as well as from the third chapter of Casati and Varzi's more recent work, *Parts*

and Places [see Casati and Varzi 1999]. I refrain in this chapter from critical reflection on many interesting issues that will present themselves along the way. We will have ample occasion to discuss several of them at some length in ensuing chapters. Nevertheless, I will expand a bit on the philosophical origins of CEM towards the end of the chapter, since that will be of considerable value in our further discussions.

Thus, the chapter naturally divides into two sections: a more or less systematic introduction of CEM in section 1.1, and a preliminary discussion of its philosophical and historical background in section 1.2.

## 1.1 CEM

The basic (and interdefinable) notions of CEM (proper parthood, (proper-or-improper) parthood, overlap, underlap and disjointness), including the relevant theorems, are listed below. Here I have chosen to take proper parthood as primitive, but in fact any of the given notions can be taken as primitive, given their interdefinability (however, some reason for taking proper parthood rather than parthood as primitive will emerge in due course). The underlying logical language is that of standard first-order predicate logic with identity and a definite description operator  $\iota$ ; I have adopted the notational conventions used by Casati and Varzi for the mereological notions.

Axioms for **Proper Parthood** ( $PPxy$ :  $x$  is a proper part of  $y$ )

[A.1]	$\forall x \neg PPxx$	<i>Irreflexivity</i>
[A.2]	$\forall x \forall y (PPxy \rightarrow \neg PPyx)$	<i>Asymmetry</i>
[A.3]	$\forall x \forall y \forall z ((PPxy \wedge PPyz) \rightarrow PPxz)$	<i>Transitivity</i>

**Defined Notions**

[P]	$Pxy =_{df} PPxy \vee x = y$	Parthood
[O]	$Oxy =_{df} \exists z (Pzx \wedge Pzy)$	Overlap
[U]	$Uxy =_{df} \exists z (Pxz \wedge Pyz)$	Underlap
[D]	$Dxy =_{df} \forall z (\neg Pzx \vee \neg Pzy)$	Disjointness

Theorems for **Parthood**

[P.1]	$\forall x Pxx$	<i>Reflexivity</i>
[P.2]	$\forall x \forall y ((Pxy \wedge Pyx) \rightarrow x = y)$	<i>Antisymmetry</i>
[P.3]	$\forall x \forall y \forall z ((Pxy \wedge Pyz) \rightarrow Pxz)$	<i>Transitivity</i>

Theorems for **Overlap**

[O.1]	$\forall x Oxx$	<i>Reflexivity</i>
[O.2]	$\forall x \forall y (Oxy \rightarrow Oyx)$	<i>Symmetry</i>

Theorems for **Underlap**

[U.1]	$\forall x Uxx$	<i>Reflexivity</i>
[U.2]	$\forall x \forall y (Uxy \rightarrow Uyx)$	<i>Symmetry</i>

Theorems for **Disjointness**

[D.1]	$\forall x \neg Dxx$	<i>Irreflexivity</i>
[D.2]	$\forall x \forall y (Dxy \rightarrow Dyx)$	<i>Symmetry</i>

As said, this is only the basis of a mereological theory; it specifies the proper parthood relation to be a strict partial ordering, and defines the parthood relation, a non-strict partial ordering, in its terms. Furthermore, it defines some other suitable mereological notions. The theory gets more interesting if we start adding more axioms. To begin with, if  $x$  is a proper part of  $y$ , it seems natural to suppose that there is another proper part of  $y$  that “makes up” the rest of  $y$  (that is, distinct from  $x$ ). This intuitive idea can be spelled out in different forms of *supplementation principles*. Another *prima facie* natural supposition is that if  $x$  and  $y$  have exactly the same parts, then  $x = y$ . This is the idea of *extensionality*, which will play an important role in this essay. In fact, those two ideas are tightly connected: there is a way to spell out the supplementation principle that entails extensionality (labeled “strong supplementation” by Simons). Although it would simplify matters by combining two axioms into one, I prefer here to have separate axioms for supplementation and extensionality in my characterization of CEM—it makes it easier to compare CEM with alternative non-extensional mereological theories.<sup>1</sup>

More **Axioms**

[A.4]	$\forall x \forall y (PPxy \rightarrow \exists z (Pzy \wedge Dzx))$	<i>Weak Supplementation</i>
[A.5]	$\forall x \forall y (\forall z (PPzx \leftrightarrow PPzy) \rightarrow x = y)$	<i>Extensionality</i>
[A.4']	$\forall x \forall y (\neg Pyx \rightarrow \exists z (Pzy \wedge Dzx))$	<i>Strong Supplementation</i>

We now have a basic mereological theory with extensionality. The next step is to consider *closure principles*. First, consider a case of underlap: two tea cups that are both part of the tea service. One might consider there to be a smallest whole of which both tea cups are parts, that is, a thing that completely exhausts both the tea cups, without having further parts that are not parts of either of the tea cups. This will be the unique *mereological sum* or *fusion* of the underlapping objects. Likewise, one might hold that for overlapping

<sup>1</sup>There is also a more substantial reason for preferring the weak principle over the strong one. The weak one says that, if  $x$  is a proper part of  $y$ , there is another proper part of  $y$  disjoint from  $x$ —a very plausible idea indeed (Simons takes this to be “constitutive of the meaning of ‘proper part’” [Simons 1987, p. 116]). The strong one, on the other hand, says that, if  $y$  is not part of  $x$ , then there is a part of  $y$  disjoint from  $x$ —this implies that there cannot be two objects,  $x$  and  $y$ , having exactly the same parts, because then  $y$  would not be part of  $x$  without there being a part of  $y$  disjoint of  $x$ . It seems that these matters have nothing to do with supplementation *per se* and should therefore be dealt with separately.

objects, such as two roads that intersect, there is a unique, largest thing that is part of both—in this case, the intersection. This will be the unique *mereological product* of the overlapping objects. One might then take the whole of reality, the Universe, to be the sum of everything.

In a similar vein, one might consider the *mereological difference* of, say, a car and its wheels, which will just be the car without the wheels, and the *mereological complement* of any object, which is the whole of reality except for that object. (My uses of  $\iota$  below are intended to be eliminated in context, they serve merely as a convenient way of stating the relevant definitions.)

#### Definitions

[Sum]	$x + y =_{\text{df}} \iota z \forall w (Owz \leftrightarrow (Owx \vee Ow y))$	<i>Mereological Sum</i>
[Prod]	$x \times y =_{\text{df}} \iota z \forall w (Pwz \leftrightarrow (Pwx \wedge Pwy))$	<i>Mereological Product</i>
[Diff]	$x - y =_{\text{df}} \iota z \forall w (Pwz \leftrightarrow (Pwx \wedge Dwy))$	<i>Mereological Difference</i>
[Cmpl]	$\sim x =_{\text{df}} \iota z \forall w (Pwz \leftrightarrow Dwx)$	<i>Complement</i>
[U]	$u =_{\text{df}} \iota x \forall y P y x$	<i>Universe</i>

The definitions of the several “algebraic” mereological operations just given do not all by themselves guarantee that the relevant sums, products, differences and complements are there to be picked out by the definite description operator. And, it should be noted that the uniqueness of all of these, expressed here with the help of the definite description operator  $\iota$ , is guaranteed only if Extensionality, [A.5], is assumed. Otherwise, there might be several exactly coinciding objects fulfilling the respective conditions.

Whereas Extensionality [A.5] ensures the *uniqueness* of given sums, products, and so on, adding a general axiom schema of fusion will ensure the *existence* of many of them, by allowing for the definition of a general sum-operator  $\sigma$ :

#### Axiom schema of Fusion

[A.6]	$\exists x \varphi(x) \rightarrow \exists z \forall y (Oyz \leftrightarrow \exists x (\varphi(x) \wedge Oyx))$	<i>General Fusion Axiom</i>
[ $\sigma$ ]	$\sigma x \varphi(x) =_{\text{df}} \iota z \forall y (Oyz \leftrightarrow \exists x (\varphi(x) \wedge Oyx))$	<i>General Sum</i>

[A.6] says that, if there is at least one object satisfying condition  $\varphi$ , then there is a sum of all such objects. The general sum operator  $\sigma$  designates that very sum. Now, we can use this general notion of sum to define the mereological operations in a perspicuous way:

## New Definitions

[Sum']	$x + y =_{\text{df}} \sigma z(Pzx \vee Pzy)$	<i>Mereological Sum</i>
[Prod']	$x \times y =_{\text{df}} \sigma z(Pzx \wedge Pzy)$	<i>Mereological Product</i>
[Diff']	$x - y =_{\text{df}} \sigma z(Pzx \wedge Dz y)$	<i>Mereological Difference</i>
[Cmpl']	$\sim x =_{\text{df}} \sigma z(Dzx)$	<i>Complement</i>
[U']	$u =_{\text{df}} \sigma z(z = z)$	<i>Universe</i>

Given [A.6], the general fusion axiom, the existence of the universe is guaranteed, since parthood is reflexive and there is always at least one thing (assuming standard model theory). That means that any two objects will underlap, since they will always both be part of the universe. Thus, for any two given objects, their mereological sum is also guaranteed to exist. However, the same is not true for their mereological product, because it is quite possible that there are objects that are disjoint, hence have no part in common, hence have no product. The same is true of the difference between disjoint objects. Algebraically, this is unsatisfactory, and it can be solved by assuming there to be a “null individual” which is part of everything—the opposite of the universe, of which everything is part.

Here we stumble upon a feature of CEM that is typical: from the point of view of algebra (or, more specifically, Boolean algebra), we have an interesting theory here. Adding the null individual would in fact make the theory into a Boolean algebra. But that was not the point of our theory: we wanted an adequate theory of parthood. And it is clear that the very idea of a null individual that is part of everything is outright ridiculous.<sup>2</sup>

A more sensible question is whether there are *mereological atoms*, that is, things without proper parts, or not—CEM as construed so far is consistent with both ideas. They can be added as axioms as follows:

## Atoms and Atomlessness

[At]	$\forall x \exists y (Pyx \wedge \neg \exists z PPyz)$	<i>Atomicity</i>
[A $\bar{t}$ ]	$\forall x \exists y PPyx$	<i>Atomlessness</i>

These two are obviously inconsistent; at least one of them will have to go. However, this issue will not be of much importance for the present essay, so I’ll ignore it whenever possible, assuming [At] every now and again for the sake of simplicity of exposition.

This completes our exposition of CEM, Classical Extensional Mereology. In the remainder of this chapter I offer a brief discussion of some of the philosophically interesting

<sup>2</sup>Still, some are impressed by the algebraic niceties invoked by adding the null individual to such a degree that they stipulate its existence nevertheless—see, e.g., Martin [1965]; Bunt [1985].

background motivations of CEM, starting with a brief reflection on the similarities between CEM and set theory.

## 1.2 Some Reflections on CEM

CEM has quite some features in common with standard set theory. First, the set-theoretical Axiom of Extensionality ensures extensionality for sets in just the same way we have it in CEM—sets with exactly the same members are identical, just as objects with exactly the same parts are. Secondly, and more interestingly, the general fusion axiom schema of CEM mirrors the (unrestricted) axiom schema of comprehension in set theory, which is, in its unrestricted form, not part of any axiomatic set theory because it leads directly to Russell’s Paradox. The reason why there is no such paradox in mereology is that the parthood relation is reflexive, whereas the proper parthood relation is irreflexive. Everything is part of itself, and thus there is no puzzle about the sum of things that satisfy the condition  $\neg Pxx$ . There just is no such thing. And since nothing is a proper part of itself, the sum of things that satisfy the condition  $\neg PPxx$  is just the sum of everything, that is, it is identical to  $u$ , the universe.

Indeed, Leśniewski liked a mereological conception of “sets” much better than standard set theory for precisely this reason: it does not lead to paradox. Moreover, it does away with the abstract objects that sets and classes are supposed to be, and puts concrete individuals in its place. Thus, he takes Russell to be wrong when he says that the class of teaspoons is not a member of itself, since it is not a teaspoon—if anything, the class of teaspoons is the sum of all teaspoons, a concrete thing which has all the teaspoons as parts (or, in Leśniewskian terms, as “members”), hence has all parts of teaspoons as parts, hence is also the sum of all arbitrary sums of teaspoons and parts of teaspoons, and hence is also “member” of itself, since it itself, too, is just a sum of teaspoons and parts of teaspoons.<sup>3</sup>

It is not of concern for us here to evaluate Leśniewski’s project. But our short excursion does convey two important and interconnected pieces of philosophical motivation and background for CEM: on the one hand, an inclination towards thorough nominalism and ontological parsimony (compare item [5] on the list of Quinean meta-ontological principles I gave in the Introduction, p. 1), and on the other hand, a concern for formal matters, like algebraical neatness and elegance, and consistency. In fact, the latter can be illustrated by the following two examples of successful applications of CEM. First, there is Lewis’s mereological approach to set theory in his *Parts of Classes* [Lewis 1991],

<sup>3</sup>See Simons’s nice discussion of these matters in his [1987], esp. pp. 101–105. Russell’s teaspoon-example, also mentioned by Simons, comes from [Russell 1919].

which takes sets to be mereological sums of their subsets, which ultimately divide up into singletons.<sup>4</sup> Furthermore, sets are extensional, as already noted, and, with due restrictions to avoid paradox, to any collection of sets there corresponds a further set that is their sum. Secondly, CEM can find a quite natural application in geometry, or more specifically, to regions of space (or time, or space-time): there are no different regions having exactly the same parts, and any arbitrary collection of regions has a sum which is itself also a region.

The geometrical applicability of CEM to regions of space points to a further interesting feature, which also relates to nominalism, the other philosophical issue we have seen to be lurking in the historical background of CEM. A very apt formulation of the idea I have in mind can be found in Quine:

A physical object, in the broad sense in which I have long used the term, is the material content of any portion of space-time, however small, large, irregular, or discontinuous.

...

[P]hysical objects are well individuated, being identical if and only if spatiotemporally coextensive. [Quine 1985a, p. 167]

If, as Quine contends, objects are just the content of regions of space-time, and, moreover, if to every such region there corresponds a unique object, it is clear that the application of CEM to regions of space-time can be extended without any friction to objects. Now, unlike Quine, who compromises his nominalism by accepting abstract objects such as sets into his ontology, Leśniewski and Goodman hope they can do away with these too. For such a purpose, substituting physical objects in Quine's sense, those paradigms of concreteness, for the notoriously abstract sets, with their problematic paradoxes, is a tempting strategy indeed.

We will have occasion to scrutinize Quine's notion of a physical object extensively in what follows—I will argue that taking CEM as a serious starting point for metaphysics inevitably leads to a conception of physical objects very much like Quine's.

Before embarking upon such investigations, I would like to finish this chapter by considering variants on CEM arrived at by rejecting one or the other axiom of CEM. One such variant, *S~~E~~M* (Simons's non-Extensional Mereology), will play an important role in the final chapter of this essay.

Concerning [A.3]: Simons discusses some apparent counterexamples to the transitivity of the proper parthood relation, but these are neither threatening for the theory nor

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<sup>4</sup>Lewis complains about the obscure notion of a singleton—the notion of a class is usually explained by talk about “gathering together certain objects” which are then “thought of together as one thing” [see Lewis 1991], but does it make sense to talk about “gathering together” one single thing?

interesting for our purposes here [see Simons 1987, pp. 105–8]. More interesting are the axioms of supplementation [A.4], of extensionality [A.5], and of general fusion [A.6].

Since the general fusion axiom [A.6] is largely independent from the other axioms, one might reject it while keeping all the rest. Someone who wants to avoid having sums of arbitrary things in her ontology might consider such a strategy. The difficulty, of course, would then be to provide some reasons as to why some sums are, and others are not, allowed. Given such reasons, a similar result could of course be achieved by simply introducing a set of criteria based on similar reasons, such that no mereological sum counts as a genuine *object* unless it satisfies those criteria—which is compatible with [A.6].

For someone who embraces a notion of objecthood like Quine’s, extensionality won’t be a problem, but if one instead follows, e.g., Wiggins [1968], Lowe [1983, 2005a], or indeed Simons himself [1987, ch. 6] in defending the possibility of two objects being in the same place at the same time (i.e., colocation), one will (presumably) require that two different objects can share exactly the same parts (at the same time). That comes down to denying extensionality. Now, I do not intend to discuss the issue of colocation right here (later in the essay, I will have to say some things about it; see especially § 3.1)—rather, I want to point out that, since the “strong” supplementation principle [A.4] and the general fusion axiom [A.6] both imply extensionality, rejecting extensionality entails rejecting these two as well, and hence yields a considerably weaker mereological theory.

Simons shows that considerations concerning colocation can lead one to make more serious amendments to CEM besides rejecting extensionality [see Simons 1987, pp. 112–7]. For consider [P.2], the theorem stating the antisymmetry of the parthood relation: it states that if  $x$  is a part of  $y$ , and  $y$  a part of  $x$ , then  $x = y$ . However, two coinciding objects (say, a door knob and a chunk of copper), if conceived of as having exactly the same parts, might be thought to have each other as improper parts. We would then have a case where  $Pxy$  and  $Pyx$  while also  $x \neq y$ . Hence our present line of thought would lead us to rejecting [P.2]—which degrades the parthood relation of CEM, a partial ordering, into a mere semi-ordering, thus reducing the algebraic power of the resulting theory. Since [P.2] is implied by [P], the definition of parthood in terms of proper parthood and identity, that definition will have to be altered. Simons proposes the following alternative definition, which indeed fails to imply [P.2]:

$$[P^*] \quad Pxy =_{\text{df}} (\exists zPPzx \rightarrow \forall z(PPzx \rightarrow PPzy)) \wedge (\neg \exists zPPzx \rightarrow (PPxy \vee x = y))$$

However, the change is not all that radical: all the other mereological notions ( $PP$ ,  $O$ ,  $U$ , and  $D$ , as defined above) retain their properties. Let us call the mereological theory

consisting of axioms [A.1], [A.2], [A.3] and [A.4] Simons's Non-Extensional Mereology, **S~~E~~M**. It leaves open in what way the proper-or-improper parthood relation should be defined, by way of [P] or by way of [P\*].<sup>5</sup>

In the next chapters, I discuss the expansion of CEM into a metaphysical theory, introducing the resulting metaphysical outlook in Chapter 2, while adding considerations on modality in Chapter 3, therewith concluding my survey of CEM-based metaphysics. I will come back to **S~~E~~M** in Part II, in the context of my discussion of metaphysics without principles of extensional mereology at its basis.

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<sup>5</sup>Here it makes a practical difference whether we take parthood or proper parthood as primitive; on both construals of the parthood relation (with or without antisymmetry) the proper parthood relation remains the same, hence for comparison it is easier to start with the proper parthood relation as a primitive and subsequently define the parthood relation as required.

## Chapter 2

# Universalism I: Perdurantism

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ASSUME CLASSICAL EXTENSIONAL MEREOLGY, CEM, to be the adequate theory for our world. What, then, is this world like? Is there any chance of keeping in touch with the ordinary objects we all know and love, that is, things like chairs, trees, people? Since chairs, trees and people all have parts, they will just be the mereological sums of those parts. And the universe, the world, is the sum of everything there is. This is exactly the way Lewis starts his famous book *On the Plurality of Worlds*:

The world we live in is a very inclusive thing. Every stick and every stone you have ever seen is part of it. And so are you and I. . . . Anything at any distance at all is to be included. Likewise the world is inclusive in time. No long-gone ancient Romans, no long-gone pterodactyls, . . . are too far in the past, nor are the dead dark stars too far in the future, to be part of this same world. [Lewis 1986a, p. 1]

Consider what Sider says in the preface to his *Four-Dimensionalism*:

I want to describe what kinds of things the material world contains and how they are related, and this at a very high level of abstraction, focusing on issues of parthood, time, and persistence. [Sider 2001, p. xiv]

Focusing on parthood, in the sense of CEM, readily yields an initial answer to the question as to “what kinds of things” there are: mereological sums and (maybe) mereological atoms. Moreover, there are very, very many of those sums, given the general fusion axiom [A.6]: the operation of summation finds universal application. That is why I have labelled the generic, CEM-based philosophical position to be discussed in this part of my essay *universalism*. The universalist endorses the claim that all those myriads of mereological sums indeed do exist.<sup>1</sup>

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<sup>1</sup>In discussions concerning the general fusion axiom, the term “universalism” is commonly used merely to denote its adherents (in contrast, *nililism* is the view that there are only mereological simples (atoms), whereas *monism* is the view that there exists only one mereologically simple thing); here, I intend to use that term to denote the broader CEM-inspired metaphysical position to be discussed in this and the following chapter.

In what follows, I will develop the universalist position, starting simply by applying CEM to the real world, and moving on to add further ingredients to the view, resulting in a broader metaphysical outlook akin to the metaphysics defended by Lewis and Sider. Not surprisingly, then, these two philosophers will be our guides in most of the philosophical areas to be broached.

Let us start this chapter, then, with a discussion of what we can say about the nature of the continuants, the ordinary objects, if they indeed are to be mereological sums, as the universalist says. The chapter will first lay out some of the metaphysical consequences of this idea (in sections 2.1–2.3), and close with some critical reflections on these consequences (section 2.4). In the next chapter I look in some detail at the universalist’s position on modality, offer some discussion of the question as to how the universalist can distinguish the continuants from all the other mereological sums she takes there to be, and conclude my critical survey of the universalist metaphysic.

## 2.1 Parthood and Time

It is best to start with an example: the table in front of me, which is a paradigm continuant. The table is the mereological sum of its top and its four legs. But what if I replace one of the legs? We would say that it is the same table still—but the table-before-replacement and the table-after-replacement differ in their parts, and hence cannot be one and the same, according to the universalist. At most, they can be understood as overlapping objects, in virtue of their having certain parts in common.

The problem we are confronted with here is that of change in parts: most continuants are able to lose and gain parts during their careers. An obvious solution would be to relativize the parthood relation to times, thus creating a temporalized version of CEM: the table  $a$  has leg  $b$  as its part at  $t$ , but does not have  $b$  as its part anymore at  $t'$ , or more formally  $P_t ba \wedge \neg P_{t'} ba$ . But how are we, then, to use the mereological criterion of identity, embodied in the Extensionality Axiom [A.5], which says that objects having exactly the same parts are identical? We need to relativize the parthood relation as it occurs in this axiom to times as well, which complicates the criterion of identity since it now require sameness of parts at all times:<sup>2</sup>

<sup>2</sup>I here ignore further technical difficulties with regard to how the temporally relativized parthood relation might apply to objects not existing at the indexed time, etc. Furthermore, I ignore the alternative possibility of also relativizing the *identity*-relation to times, although there are defenders of such an idea [Thomson 1983; Gallois 1990, 1998]. I will touch on the issue of “temporal identity” in the next chapter; see §3.1.

## Extensionality Relativized to Times

[A.5<sub>t</sub>]  $\forall x \forall y (\forall z \forall t (PP_t z x \leftrightarrow PP_t z y) \rightarrow x = y)$ *Temporal Extensionality*

It is interesting to note that, barely having started investigating the application of CEM to continuants, we immediately find ourselves tampering with its basic structure, even though we set out to investigate a metaphysic built on CEM, and not adjustments to CEM on the basis of independent metaphysical considerations. Luckily, in a moment we'll see that no tampering is needed.

Although temporalizing CEM seems an adequate solution, it does invite a further problem: in what sense can our table be said to be the mereological sum of its parts, on this temporally relativized alternative to CEM? We can't say that the table consists of all the parts it has at any time—that would make our table with the replaced leg consist of *five* legs and a top, which is clearly false. We need a different approach. Consider the table at a certain time  $t$ : *at that time  $t$* , it is the mereological sum of all its parts-at- $t$ , and at a later time  $t'$ , it is the mereological sum of all its parts-at- $t'$ . So why not focus on those different tables-at-a-certain-time as *discrete*, though short-lived, objects, and hold that the table as a whole is just the sum of all those discrete tables-at-a-certain-time? And, if we decide to do so, we might just as well drop the relativization of parthood (and the extensionality axiom) to times and talk of objects simply as sums of their *temporal parts*, or *time slices*, just as we can talk of spatially extended objects as sums of their spatial parts. (Usually, a *time slice* is taken to have zero temporal extension, time slices are “instantaneous” objects. *Temporal parts* of an object are sums of one or more time slices of that object and can therefore have nonzero temporal extension.) Our table,  $a$ , would then be such that one of its time slices,  $a_t$ , has a part  $b_t$ , a time slice of the table-leg  $b$ —and hence, by the transitivity of parthood [A.3],  $a$  itself has  $b_t$  as a part, too. Thus instead of invoking a temporally relativized parthood relation in order to be able to say  $P_t b a$ , we can simply say that  $P b_t a$ , where there is no temporal relativization at all since  $b_t$  simply denotes a definite, if short-lived, object, namely a certain temporal part of the table-leg  $b$ . No tampering with CEM is needed.

In fact, we will have to talk about objects-at-a-time as things in their own right anyway, for the following reason, which we have neglected up to this point: the fusion of some things has those things as parts, and hence exists where and when *any* of its parts does. So, if we don't insert talk of the parts of the table as objects-at-a-time, but naively keep talking about the parts of the table *simpliciter*, we will have to conclude that the table has existed for as long as *any* of its ultimate parts (atoms, electrons, whatever) has been in existence. That might easily be millions of years.

We just witnessed the move from an *endurantist*, three-dimensionalist starting point (tables that are wholly present at each moment they exist) to a *perdurantist*, four-dimensionalist conclusion, on the basis of mereological considerations. Taking the mereological notion of a fusion to be the correct tool for analysing composition forces this move upon us. The perdurantist viewpoint makes CEM applicable to objects that exist in both space and time by taking the temporal dimension to be on a par with the spatial dimensions: just as you can conceptually slice up the table from left to right in ever thinner spatial slices, you can slice it up from its coming-to-be to its ceasing-to-exist in ever thinner temporal slices. And just as you can take the table to be just the sum of those left-to-right slices, you can take it to be just the sum of all its time slices.<sup>3</sup>

To further illustrate the nature of the mereological notion of a sum, consider the following scenario: suppose there is our table, *a*, which is the sum of four legs and a top. Now I take *a* apart and make five new tables, each containing one part of *a* supplemented with new material. Our original table, *a*, is gone now, we are tempted to say, and five new tables have been created, partly by using material from *a*. But, as we saw, nothing in the concept of a mereological sum dictates that the parts that make up a sum have to be *arranged* in some particular manner—they just have to *be there*. Thus, in the case at hand, all of *a*'s parts are still there, hence their sum is too, hence *a*, which we said to be identical to the sum, is also still in existence—it is just spread out over the five new tables. By resorting to perdurantism, we can say that *a* is not the sum of the four legs and the top *simpliciter*, but instead that it is the sum of certain temporal parts of those legs and top—in particular, of those temporal parts existing at times where the legs and top are “arranged table-wise”.

The universalist thus adopts perdurantism, a view according to which things *persist*, i.e., exist through a certain period of time, by having temporal parts located at every time within that interval. Therefore, the mereological atoms (if such there be) cannot themselves persist: everything that persists exists at different times, and can only be said to do so by having distinct proper temporal parts at those times. On this line of thought, it seems that the mereological atoms have to be understood as *instantaneous* objects. But, on the other hand, one might argue that the mereological atoms do persist over a certain small period of time without having temporal parts “occupying” every distinct time in that period, by pointing out that, just like atoms might be spatially extended without being divisible into spatial parts, they might also be temporally extended without being

<sup>3</sup>Notice that you cannot *actually* slice up the table in time-slices, whereas you can (more or less, with the help of a good saw) slice it up in spatial slices. Perdurantists usually play down such differences between the temporal and the spatial dimensions—to make their point, they need indeed not claim that time and space are similar in *every* respect.

divisible into temporal parts. For our purposes, it is not important to decide which of these two alternatives the universalist should adopt—for ease of exposition, we will assume the universalist to adopt the view that persisting things divide up into instantaneous objects; that way we avoid tedious and irrelevant technical difficulties with the application of CEM to mereologically basic items that are nevertheless temporally extended.

A short remark on perdurantism is in place, since it comes in two varieties: one according to which the continuants are just the sums of their temporal parts, which makes them temporally extended (this is usually called perdurantism), and another which takes the continuants to be temporal stages of such temporally extended things—for example, when I talk about my table *now*, it is the present temporal stage of my table that I'm talking about, and not the entire, temporally rather extended thing (this is called stage theory, or exdurantism).<sup>4</sup> On the ontological level, these variants come down to the same thing: there is, ontologically speaking, a sum of certain temporal stages; for the former, this entire sum is what matters, whereas for the latter the various stages are of importance. What I have to say in this essay applies to both versions; to keep things clear I will not talk in terms of stage theory but rather in terms of perdurantism proper.

As far as I can see, the only way for the universalist to make CEM applicable to continuants that does *not* resort to some form of perdurantism is Roderick Chisholm's *mereological essentialism*: if the parts change, so does the whole [see Chisholm 1973, 1975].<sup>5</sup> This implies that the table after the replacement is just a different thing from the table before the replacement—more generally, that change in parts is impossible. But in combination with the General Fusion Axiom [A.6] this yields a very strange picture. Suppose that everything is composed, in the end, of (enduring) atoms. Then, since on this view things exist just as long as any of their parts do, all objects will continue to exist until all their constituent atoms are annihilated, because the sum of the atoms out of which they are composed is always there, no matter how utterly dispersed those atoms are (just as with the table in our previous example). So our replacing the table's leg didn't change anything in which objects there are—the table-before-replacement is still there, even though I cut the replaced leg into tiny pieces, and likewise, the table-after-replacement, which is a different object from the table-before-replacement, was already there long before the

<sup>4</sup>To say something *now* about my table *yesterday* is, according to this view, to say something about an object that is strictly distinct from, but suitably related to, my table-now. This "suitable relation" is construed similarly to the similarity relations involved in Lewis's counterpart theory of modality, which will occupy us in the next chapter (§3.1).

<sup>5</sup>There is one endurantist proponent of a theory a lot like CEM: Judith Jarvis Thomson, in her [1983]. However, she develops a temporalized and modalized version of CEM that is, in important respects, different from the original theory, and therefore I do not discuss her approach here. I will have occasion to discuss some of her views below, in §2.4.1.

replacement, even though the tree from which the new leg was going to be made was still growing. All in all, the view we have arrived at, though indeed conforming to CEM while retaining endurantism, is too bizarre to be taken seriously.<sup>6</sup> After all, a conception of objects according to which none of the things we take to be objects turn out to *be* objects, since those things either permit change of parts or have life-spans shorter than those of their proper parts, simply isn't a conception of *objects*.

Let me hasten to point out that the presented version of mereological essentialism is not the one defended by Chisholm—in fact, his views are a lot closer to the perdurantist picture, because he holds that mereological essentialism is true only of objects in the “strict, philosophical sense”, what he calls “primary objects”, whereas objects in the “loose and popular sense” (non-primary objects) are construed as *entia successiva*, series of primary objects at consecutive times [Chisholm 1973, esp. pp. 595–8]. However, he clearly denies the general fusion axiom [A.6] and, furthermore, assumes a notion of composition that is not at all purely mereological—hence, although his views are an interesting example of an application of mereological considerations to metaphysics, they diverge too much from CEM to be relevant for our discussion in the present chapter.

As an aside, let me point out that the universalist might of course simply deny the existence of continuants, following, e.g., Peter Unger's radical suggestions in his [1979a; 1979b; 1979c; 1980], based on considerations concerning vagueness and Sorites arguments—Unger goes as far as to declare that he himself does not exist.<sup>7</sup> An interesting proponent of this idea, who in fact holds that there are only “four-dimensional hunks of matter” having both their parts and their spatiotemporal location essentially, is Mark Heller [1990]. Such philosophers have a lot of explaining to do; for the moment I'll ignore them and focus on CEM-inspired metaphysics that intend to affirm the existence of continuants (if maybe construed differently than we usually think of them—exactly *how* differently will come out as we proceed). Heller's views will play an important role in the next chapter, where issues of modality and conventionalism are involved.

Let us return now to the universalist, who, as we have seen, subscribes to perdurantism. On his view, the mereological atoms out of which objects are composed by being their mereological sum do not persist, of course—all persisting things have temporal parts and hence are not mereological atoms. Thus, we are inevitably lead to Quine's notion

<sup>6</sup>I admit, to say that something is absurd is no argument. However, one may observe that no one in fact holds such a view.

<sup>7</sup>In fact, Unger does note that his radical views are to be taken as a challenge—he holds that, given the current standards of philosophy, the “nihilism” he ends up with is the only rational option. In later work, notably Unger [2005], he develops a rather surprising alternative: a fairly strong version of Cartesian substance dualism.

of a physical object already introduced in the previous chapter (see p. 14 above). Here another, more revealing quote:

Each [physical object] comprises simply the content, however heterogeneous, of some portion of space-time, however disconnected and gerrymandered. What then distinguishes material substances from other physical objects is a detail: if an object is a substance, there are relatively few atoms that lie partly in it (temporally) and partly outside. [Quine 1960, p. 171]

An even more direct assimilation of objects to space-time regions is suggested by Sider, who asks:

whether spatiotemporal objects occupy, but are distinct from, regions of spacetime, or whether they simply are regions of spacetime. There is considerable pressure to give the latter answer, for otherwise we seem to gratuitously add a category of entities to our ontology. All the properties apparently had by an occupant of spacetime can be understood as being instantiated by the region of spacetime itself. The identification of spatiotemporal objects with the regions is just crying out to be made. Given the identification, perdurance follows, since spacetime perdures. [Sider 2001, p. 110]<sup>8</sup>

We noted earlier that Quine's physical objects are individuated in such a way that CEM is guaranteed to be fully applicable, given its applicability to (regions of) space-time. Thus if, as Sider suggests, objects just *are* space-time regions, CEM automatically applies in its full strength, too.

Quine's addition, which is supposed to demarcate the "substances" (i.e., continuants) within the very broad category of physical objects, shows how unimportant this demarcation is, in Quine's eyes—it is a mere "detail" that makes the difference.<sup>9</sup> The substantial, metaphysically important notion is that of physical objects, the continuants can then just be defined as a subset of the physical objects.

Let us call physical objects in Quine's sense *sum-objects*, for ease of exposition, and let us leave the issue as to whether we should identify them with the space-time regions they occupy open—CEM is applicable either way. We may say, then, that the universalist holds there to be all the sum-objects, in accordance with the general fusion axiom [A.6], and, more importantly, she holds that continuants *just are* sum-objects; an important question is, then, how she might demarcate the class of continuants within the much

<sup>8</sup>To be sure: Sider is here discussing the *substantialist* (Newtonian) conception of space and time, according to which space and time are absolute, independently existing entities. Opposed to substantialism is *relationalism* (Leibniz's view), according to which space and time are not absolute, independently existing entities, but instead are just relations between objects. Sider goes on to explain that relationalism also leads to perdurantism [see Sider 2001, section 4.8].

<sup>9</sup>By the way, Quine must have been not at his best when writing that substances show more constancy in their composing atoms than other physical objects: for living substances, there is virtually no constancy as to which atoms make them up during their existence.

broader class of sum-objects. This question will occupy us in the next chapter (§ 3.2). Let us first have a closer look at some of the reasons for the universalist to accept the general fusion axiom in the first place.

## 2.2 Unrestricted Mereological Composition

A popular objection to unrestricted mereological composition, voiced by, e.g., Victor Lowe [1953], Chisholm [1973], van Inwagen [1990b] and Wiggins [2001], runs as follows: although there surely is a table, composed of certain legs and a top, there simply is no such thing as the entity composed by this table's legs, Plato's beard, and all the moons of Jupiter—even on a perdurantist conception. Hence unrestricted mereological composition is false.<sup>10</sup>

Here, the universalist will hasten to point out that mereology is “ontologically innocent”, that mereological sums (and products) do not really *add* anything. A few citations from different sources to illustrate the point:

[A] product *adds* nothing, and even a sum is, in a sense, nothing over and above its constituent parts. [Casati and Varzi 1999, p. 44]

Given a prior commitment to cats, say, a commitment to cat-fusions is not a *further* commitment. The fusion is nothing over and above the cats that compose it. It just *is* them. They just *are* it. Take them together or take them separately, the cats are the same portion of Reality either way. [Lewis 1991, p. 81]

Let's call [an object which exists just in case there are objects arranged “men-shaking-hands-wise”] a “handaman.” Are there any handamen? Given that there are, in fact, men who shake hands, and given that a handaman exists just in case two men shake hands, I am inclined to say that there are handamen. . . . We did not define handamen into existence; we simply invented a kind concept which enables us to pay attention to objects that already exist but to which we never previously paid any attention. [Rea 1998, p. 355]

The quote from Michael Rea shows a tendency to judge problematic questions about the relation of composite objects to their constituent parts as resulting from “category mistakes” on a par with Ryle's famous examples thereof: by buying a left glove and a matching right glove, a pair of gloves has been bought, it would be a mistake to suppose the pair of gloves to be a thing “over and above” the left and right gloves; by seeing the batallions and squadrons march past, you have seen the division march past, the division is not something distinct from the batallions and squadrons; etc. [Ryle 1949,

<sup>10</sup>I ignore a related objection: if the general fusion axiom is really meant to be universal, does that mean that we also have sums of objects of different ontological types, e.g., the sum of the color yellow, the number 13 and Norway?

pp. 17–24]. The strategy is simply generalized to cover not only such spurious “things” as divisions, pairs of gloves, universities and team spirits, but also more down-to-earth continuants like cars, trees, and people. As a result, it becomes unproblematic to talk of ever more bizarre sum-objects: they are just as unproblematic, given the existence of their constituent parts, as is a pair of gloves, given a left and right glove.<sup>11</sup>

The quote from Lewis suggests a straightforward answer to the question what, then, the relation between a composite object and its constituent atoms exactly is: *identity* (“it just *is* them”). Such one-many statements of identity seem very odd at first sight, but they become more intelligible when we consider Lewis’s mereologically inspired conception of identity (which has its precedents in work of Donald Baxter [1988] and David Armstrong [1978]):

[T]he real opposite of identity is distinctness: not distinctness in the sense of non-identity, but rather distinctness in the sense of non-overlap [i.e., disjointness] . . . We have a spectrum of cases. At one end, we find the complete identity of a thing with itself . . . . At the opposite end we find the case of two things that are entirely distinct . . . . In between we find all the cases of partial overlap. [Lewis 1993, p. 177]

This suggests equating identity with complete overlap, and since (to pick up his own example) the sum of all cats does completely overlap all and only the cats, the many-one statement of identity “it just *is* them” seems appropriate after all. Note, by the way, that Lewis’s remark that the fusion and the cats are “the same portion of Reality” again makes salient the close tie between objects and regions of space-time (assuming, as Lewis does, that space-time encompasses the whole of reality).

The thesis we have arrived at is that of *composition as identity* (CI). It implies the general fusion axiom [A.6]: if the sum is *identical* to its parts, we cannot allow existence of the parts while denying existence of the sum. Hence every arbitrary selection of objects has a sum. Moreover, the thesis implies perdurantism: given that the whole is identical to the parts, and assuming endurantism, it cannot at different times consist of different parts—which is just mereological essentialism, and we have seen in the previous section that mereological essentialism is absurd and that the only alternative is perdurantism.

CI, composition as identity, is a thesis that meshes very nicely with CEM, and makes sense of all the “nothing over and above”-rhetoric one finds in universalists. But, besides the problems one might have with many-one identity statements, there is also another worry, which again has to do with mereological essentialism. Thanks to perdurantism, we don’t have to worry about objects’ not being able to lose and gain parts. But mereological essentialism is not just a doctrine about change over time and persistence,

<sup>11</sup>To be sure, Ryle himself did not intend such an application of his idea of a “category mistake”.

it also concerns the metaphysical modalities proper. It recurs as soon as we ask: could this four-dimensional, perduring object *a* have been composed out of different (spatial *and* temporal/spatiotemporal) parts than it actually is? Since *a* just *is* those parts, this is tantamount to asking whether *these parts* could have been identical to different things from the things they actually are, and this question has, on first sight, to be answered with a firm “no”. Hence, mereological essentialism follows if one assumes CI.<sup>12</sup>

This is an absurd result.<sup>13</sup> It implies that Plato could not have died any later than he actually did, that Hume could not have become any more corpulent than he actually was, that Schopenhauer could not have had any more hairs than he actually had, etc. However, the conclusion rests on the assumption that identity is necessary, and there is an alternative to this—contingent identity. Supposing identity to be contingent, it makes sense to say that a certain sum-object could have been identical to different collections of parts, and hence CI does not entail mereological essentialism anymore.

Let us relegate discussion of these modal issues to the next chapter. Before moving on to the final section of this chapter, which offers some critical reflections on the aspects of the universalist metaphysic offered so far, some remarks on the status of CI are in place. Some people just refuse to take CI seriously, but I take CI to be of vital importance to the universalist project. For example, Kathrin Koslicki says:

[R]hetoric aside, no one—not even Lewis, Baxter or Armstrong themselves—would disavow the claim that mereological sums are *not identical* to their parts, when this claim is properly disambiguated to involve “identity” in the strict and numerical sense. [Koslicki 2008, pp. 41–2]

Koslicki intends to cast doubt on the universalist’s claim that mereological sums are ontologically innocent by pointing out that *in the end*, CI is not *really* about identity. At the moment, I’m interested rather in finding out exactly what the universalist is saying when he urges us to adopt CI. Consider an example of Koslicki’s, which involves a very small world containing two atomic objects, *a* and *b*: the universalist would say that there is, then, a *third* object, *c*, numerically distinct from *a* and from *b*, which is the sum of *a* and *b*. This seems to imply that there then *also* is a world containing *a* and *b* but *not* *c*. Now, I think that taking CI seriously amounts to saying that there is, in the end, no dispute about the existence of *c* in the given scenario: a world containing *a* and *b* but not *c* is simply impossible since *a* and *b*, when taken together, *just are* *c*. I think it is best to take CI seriously in this way, and not merely as a piece of rhetoric—only then can

<sup>12</sup>My discussion of CI here has been inspired largely by van Inwagen [1994] and Merricks [2001, pp. 20–8], both strongly opposed to the general fusion axiom [A.6], and hence to CI.

<sup>13</sup>Though not absurd enough for some philosophers to not accept it—as I mentioned earlier, Heller [1990] does accept it.

we understand CI to undergird the universalist's claim that mereological sums are an "ontological free lunch".

To put it differently: although, as Lewis himself acknowledges<sup>14</sup>, there are differences between the identity that holds many-one between parts and whole on the one hand, and the strict, numerical identity that deserves to be called the "traditional" notion of identity on the other hand, this difference arises merely because we choose to *describe* things differently, and has nothing much to do with the ontological level. To see this, start with Lewis's contention that the cats and their fusion are "the same portion of Reality". This portion of Reality is the same thing, no matter how we decide to talk of it—as one thing, or as many things. Compare Lewis [1991, p. 87], where he writes "It does matter how you slice it—not to the character of what's described, of course, but to the form of the description." In this way, the rather peculiar many-one identity statements that CI offers simply derive from the (strict) self-identity of the "portions of Reality" in question. Notice how this way of making sense of CI again draws heavily on an analogy between "Reality" and space-time. Notice also that Lewis's move here relegates what some take to be deep metaphysical problems to mere features of the way we describe things—which fits an anti-realist, Carnapian picture more than the realist, neo-Quinean outlook Lewis advocates (see the Introduction, p. 1).

### 2.3 Humean Supervenience

Reality, according to the universalist, is an enormous, spatially as well as temporally extended thing. Moreover, it can be divided up in any way one likes—in two halves, for example, on any of its dimensions, or in very many tiny objects. Maybe the division stops when we get to the mereological atoms, maybe division goes on indefinitely, because the world consists of atomless gunk (and maybe there are both atoms and atomless gunk. I will continue to talk as if atomism were true; nothing much hinges on that). The idea is, presumably, that everything one might say about the world is made true—if it is true—by how things are with respect to some part(s) of reality as divided up in a certain way. For example, we say that there are teaspoons in the world. This would then be made true by the fact that certain sum-objects have certain properties in common, have parts that are interrelated in certain ways, and stand in certain relations to various things.

More specifically, properties had by a certain whole must be dependent on the properties of its parts (and relations that hold amongst the parts or between the parts and

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<sup>14</sup>See Lewis [1991, p. 87].

other things). Thus, this teaspoon's being made out of metal comes down to (say) all its ultimate parts being metal atoms<sup>15</sup>, that is, all its ultimate parts having certain properties in common, and its having a mass of 12 grams comes down to all its ultimate (and nonoverlapping) parts having specific masses which add up to 12 grams. If this dependency of properties of wholes on how things are with respect to their parts did not hold, the whole, which *just is* its parts, as we have seen, would nevertheless have some feature that does not correspond to the properties of the parts. Then the whole would surely be "something over and above" its parts, contrary to what the universalist claims.<sup>16</sup>

So, everything we can truly say about some part of reality is ultimately made true by the way things are with respect to the properties of and relations among its smallest parts (barring ascriptions of modal properties and the like, for reasons to be explored in the next chapter). This is, in very rough outline, the idea Lewis defends under the heading *Humean supervenience*. Here is his own, quite straightforward, characterization of that doctrine:

Humean supervenience . . . is the doctrine that all there is to the world is a vast mosaic of local matters of particular fact, just one little thing and then another. . . . We have geometry: a system of external relations of spatiotemporal distance between points. Maybe points of spacetime itself, maybe point-sized bits of matter or aether or fields, maybe both. And at those points we have local qualities: perfectly natural intrinsic properties which need nothing bigger than a point at which to be instantiated.<sup>17</sup> For short: we have an arrangement of qualities. And that is all. There is no difference without difference in the arrangement of qualities. All else supervenes on that. [Lewis 1986b, pp. ix–x]

Notice that Lewis makes reference to "perfectly natural properties": the question which, among all the properties (taken very broadly so as to include queer ones like *grue* and *bleen* [see Goodman 1955]), are the natural ones is not unlike the question which among all the sum-objects are the continuants.

<sup>15</sup>This is just by way of example. Metal atoms cannot be ultimate parts because they last too long; moreover, teaspoons consist of metal atoms only for the most part, not entirely.

<sup>16</sup>Here we have trouble for the atomless gunk: the properties of an object made of atomless gunk would have to be explained by the properties of its proper parts, but the same would hold for the properties of those proper parts, and so on *ad infinitum*. One might say that there is some level at which there are "irreducible" properties. Or there might be other options. It's not my problem, luckily, so I won't attempt to solve it here.

<sup>17</sup>We should not misunderstand Lewis here: he's not defending the physics that seems to be presupposed by his present formulation. In a later article he makes explicit that he defends "the *philosophical* tenability of Humean Supervenience," and that his defense "can doubtless be adapted to whatever better supervenience thesis may emerge from better physics" [Lewis 1994, p. 226].

Typically philosophical issues that can be approached with the help of Humean supervenience are: causality, laws of nature, the mind/body-problem, intentionality, the nature of various special properties (such as aesthetic properties), etc. Indeed, the thesis of Humean supervenience grounds an entire philosophical research programme, to which Lewis himself has made ample contributions. In the Introduction to a volume of his collected essays, he writes that “[m]any of the papers . . . seem to me in hindsight to fall into place within a prolonged campaign on behalf of the thesis I call “Humean supervenience” ” [Lewis 1986b, p. ix].

Thus, Humean supervenience is a thesis that expands the universalist view in crucial ways. For now, we need just one more thing: an example of how Humean supervenience works in the case of causation and laws of nature. Sider defends the view that causality involves laws of nature, and that such laws do not concern just any old sum-object, but primarily the continuants. He writes:

Laws of dynamics do not hold of arbitrary sums of stages (e.g. the sum of my stages to date plus all future stages of a distant star), and must therefore be restricted to physical continuants. [Sider 2001, p. 228]

Since the continuants can only be singled out, according to Sider, by reference to exactly those laws, we’d better not delineate the continuants by reference to laws, nor define laws by reference to continuants, on pain of circularity. To avoid such circularity, Sider makes clever use of the “best system”-theory of laws developed, on the basis of work by Frank Ramsey and J.S. Mill, by Lewis (see, e.g., his [1986c, Postscript C] and [1994]). The idea here is to bestow the status of being a law of nature on those and only those true, universal generalizations that figure, either as theorems or as axioms, in “some integrated system of truths that combines simplicity with strength in the best way possible” [Lewis 1986c, p. 122]. Sider concisely indicates what strength and simplicity in this context amount to as follows:

Strength is a measure of how much is said about the contingent world; simplicity is determined by how simply the set may be axiomatized in a language whose predicates express natural properties and relations. [Sider 2001, p. 230]

Now the idea is to use this strategy to *simultaneously* determine what the laws of nature are *and* which sums of stages are the continuants. Here’s the recipe, in Sider’s own words:

Consider various ways of grouping stages together into physical continuants. Relative to any such way, there are candidate laws of dynamics. The correct grouping into physical continuants is that grouping that results in the best candidate set of laws of dynamics; the correct laws are the members of this candidate set. [*ibid.*]

The next chapter contains a more thorough discussion of the issue of picking out the continuants from among all the sum-objects (§ 3.2); I'll come back to Sider's views on laws and causation in that context.

## 2.4 Critical Reflections

Up until now, we have seen what the basic features of a CEM-inspired metaphysic are: instead of the common-sense, endurantist framework, according to which things are wholly present at every moment at which they exist, we have a perdurantist framework, according to which things existing through time do so by having temporal parts at every time at which they exist. Hence the mereological atoms out of which things are composed are instantaneous things, points in space-time (or something similar). By the general fusion axiom [A.6], any collection of such atoms composes a further thing, which is their sum, hence every region of space-time, however discontinuous and gerrymandered, is occupied by exactly one object. Moreover, the best way to think of the relation of these sum-objects to their parts is in terms of identity, where identity is mereologically construed as complete overlap. This we labeled CI, the thesis of composition as identity. Finally, Humean supervenience was added to the picture: the idea that all there is to the world is a vast mosaic of local matters of particular fact, all else supervenes on the arrangement of local qualities.

Three themes for critical reflection have emerged: perdurantism, the nature of composition, and Humean supervenience. We'll have a look at them in turn in the following subsections.

### 2.4.1 Perdurantism

Judith Jarvis Thomson writes, concerning the metaphysic of temporal parts:

It seems to me to be a crazy metaphysic—obviously false. But it seems to me also that there is no such thing as a *proof* that it is false. [Thomson 1983, p. 210]

[It] yields that if I have had exactly one bit of chalk in my hand for the last hour, then there is something in my hand which is white, roughly cylindrical in shape, and dusty . . . , which was not in my hand three minutes ago, and indeed, such that no part of it was in my hand three minutes ago. As I hold the bit of chalk in my hand, new stuff, new chalk keeps constantly coming into existence *ex nihilo*. [*ibid.*, p. 213]

Let us call this the Ex Nihilo-objection. What could the perdurantist say to counter it? Well, Sider has given an answer, and it reads as follows:

in saying that temporal parts come into existence *ex nihilo*, Thomson makes it sound as if a *miracle* is constantly occurring. That isn't right. The sensible four-dimensionalist will

claim that current temporal parts are caused to exist by previous temporal parts. The laws that govern this process are none other than the familiar laws of motion. A law of motion *just is* a law which guarantees the future existence of temporal parts given previous temporal parts. [Sider 2001, p. 217]

I wonder whether any contemporary physicist will accept Sider's contention that laws of motion have anything to do with causation of later temporal parts by previous ones, but anyway, let us see whether sense can be made of Sider's reply.

We've seen what Sider's account of causation and laws looks like: we consider the entire Humean mosaic of local qualities, and consider various possible ways of grouping stages into continuants (there are very many such possibilities!); any such way of grouping will yield different candidate laws of motion. We should, then, settle for the best candidate set of laws.<sup>18</sup>

Now, the trouble is this: *first* there is the entire distribution of local qualities, which are distributed over point-sized *and instantaneous* mereological atoms (maybe points in space-time, maybe the material contents of such points, maybe something else). Laws of dynamics, and hence also facts of causation between stages, are to supervene on this distribution of local qualities.<sup>19</sup> Hence we cannot explain the *existence* of the later temporal part of Thomson's piece of chalk by holding that it is caused by its earlier temporal part. At best, we can say that the latter causes the former *because* they stand in certain spatiotemporal relations and relations of similarity to one another (say); something along those lines will make up the supervenience base for Sider's facts of causation.

From a universalist perspective, the "vast mosaic of local matters of particular fact" is, to use a notion Thomson finds "dark", ontologically *prior* to everything else. The thesis of Humean supervenience makes this explicit—something supervenient is ontologically dependent on whatever its supervenience base is. Hence it is dubious, to say the least, to explain the existence of an ontologically basic thing by use of something that is supposed to supervene on (features and relations of) that very thing.<sup>20</sup>

<sup>18</sup>Here I am assuming, with Sider, that we should understand causation in terms of laws of nature. However, Lewis considers a counterfactual analysis of causation [see, e.g., Lewis 1973]—my criticisms here might not apply given such a view, since it invokes modal considerations. But see my criticisms of the universalist position on modality in the next chapter—especially, in §3.3.2.1.

<sup>19</sup>A modal ingredient might be involved in such accounts of laws and causation. No matter; as we'll see in the next chapter the universalist's account of modality does not add anything of substance to the distribution of qualities.

<sup>20</sup>My objection here should not be confused with a similar one, namely the objection that on the perdurantist view temporal parts are ontologically prior to the temporally extended whole they're parts of—that is an obscure objection, especially given CI. After all, if the parts, together, *just are* the whole, then there can be no difference between them in terms of ontological priority. But there can be, and according to

Thus, at the ground level, we simply have a succession of very many short-lived pieces of chalk, the sum of which is what we ordinarily call a piece of chalk, according to the universalist. That we have all these short-lived pieces is just a brute fact. Hence Thomson's Ex Nihilo-objection does have considerable force: why should we accept an ontology according to which something as simple as a piece of chalk gets divided up into myriads of short-lived objects, that *just happen to be* spatiotemporally located in such a way that they together form the spatiotemporally connected sum-object we call a piece of chalk?

One can frequently find defenders of the perdurantist view arguing that if there is a problem for their view along these lines at all, there is a similar problem that affects the endurantist view, too. Consider the following quote from Heller:

It might still be metaphysically interesting to ask how it is that temporal parts go together to compose a whole, but there will be similar interesting questions for any ontology. For instance, an ontology of three-dimensional enduring objects that does not allow for temporal parts must be prepared to explain how it is that I am identical with the person who was called 'Heller' yesterday. Any explanation that might be offered can easily be adapted to serve as an explanation of the corresponding phenomenon on the ontology of four-dimensional objects. For instance, if the professed identity is founded upon some sort of causal flow, then that same causal flow could serve as the glue for my temporal parts. If the supposed identity is founded on the continuity of consciousness, then such a continuity could also explain the unity of my four-dimensional people. Even if identity is held to be an unexplainable, brute property, the four-dimensionalist can equally well hold that the relation between temporal parts that makes them parts of a single person is brute. [Heller 1990, p. 22–3]

Things go badly wrong here. First, note that the endurantist holds the piece of chalk to be *numerically the same* piece, existing at different times because it persists through time. What Heller seems to suggest is that we first identify the piece-now and the piece-yesterday as two distinct things (which actually presupposes perdurantism), and then go on to ask what makes it the case that they are identical. This is confused: if they *are* distinct, nothing can ground their identity, because they are not identical. At best, there can be an *epistemological* question as to whether the piece of chalk I saw yesterday is the same as the piece I'm holding in my hand today, but our ways of answering this question have nothing to do with "grounding identity". In fact, it is a bad idea to try to *explain* numerical identity in terms of causation or anything else, since the notions used in the explanans will inevitably involve identity themselves. Secondly, although the question as to what *makes it the case* that the piece of chalk now is the same as the piece of chalk

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Humean supervenience there is, a difference between the Humean mosaic and whatever supervenes on it—for example, facts about causation.

a moment ago is ill-formed, the question as to how it has come about that the piece of chalk is still around now has a very natural answer from an endurantist point of view: nothing fatal has happened to it, it did not get destroyed. And finally, *this* answer is *not* available to the perdurantist, contrary to what Heller claims.

Implicit in Heller's words, one can discern an interesting argument for perdurantism based on a linguistic approach. The perdurantist might say that the following two sentences indicate that her theory is true:

- [a] The poker was hot yesterday.
- [b] The poker is cold today.

because they are best read as tenseless predications of temporally indexed objects, as follows:

- [a\*] The poker-yesterday /is/ hot.
- [b\*] The poker-today /is/ cold.

The sentences turn out to be about different temporal parts of the poker, hence we should accept that things have temporal parts. But, as van Inwagen has argued, such reasoning would also lead to rephrasing the following two sentences:

- [a'] The poker is hot according to Jim.
- [b'] The poker is cold according to Frank.

to yield these:

- [a'\*] The poker-according-to-Jim is hot.
- [b'\*] The poker-according-to-Frank is cold.

whereas no one, presumably, would say that the poker consisted of different observer-related parts. The perdurantist rephrasing of [a] and [b] to [a\*] and [b\*] is not obligatory. In its stead, one should construe the temporal modifiers in [a] and [b] as modifying not the subject but the predicate, or the copula, or the entire proposition. All three of these cohere with an endurantist metaphysic.

Let us move on to another consideration in favor of the perdurantist view. There is a famous argument, by Lewis, to the effect that persons are sums of person-stages (the point generalizes quickly to all other things). Here is an extensive quote:

Some would protest that they do not know what I mean by "more or less momentary person-stages, or time-slices of continuant persons, or persons-at-times." Others do know what I mean, but don't believe there are any such things.

The first objection is easy to answer, especially in the case where the stages are less momentary rather than more. Let me consider that case only . . . . A person-stage is a

physical object, just as a person is. . . . It does many of the same things that a person does: it talks and walks and thinks, it has beliefs and desires, it has a size and shape and location. It even has a temporal duration. But only a brief one, for it does not last long. . . . It begins to exist abruptly, and it abruptly ceases to exist soon after. Hence a stage cannot do everything that a person can do, for it cannot do those things that a person does over a longish interval.

That is what I mean by a person-stage. Now to argue for my claim that they exist, and that they are related to persons as part to whole. I do not suppose the doubters will accept my premises, but it will be instructive to find out which they choose to deny.

First: it is possible that a person-stage might exist. Suppose it to appear out of thin air, then vanish again. Never mind whether it is a stage *of* any person (though in fact I think it is). My point is that it is the right sort of thing.

Second: it is possible that two person-stages might exist in succession, one right after the other but without overlap. Further, the qualities and location of the second at its appearance might exactly match those of the first at its disappearance. . . .

Third: extending the previous point, it is possible that there might be a world of stages that is exactly like our own world in its point-by-point distribution of intrinsic local qualities over space and time.

Fourth: further, such a world of stages might also be exactly like our own in its causal relations between local matters of particular fact. For nothing but the distribution of local qualities constrains the pattern of causal relations. . . .

Fifth: then such a world of stages would be exactly like our own simpliciter. There are no features of our world except those that supervene on the distribution of local qualities and their causal relations.

Sixth: then our own world is a world of stages. . . . [Lewis 1976, p. 76–7]

There is a host of issues to discuss here, some of which will receive proper treatment later on (e.g., in §§ 2.4.3, 3.3.2.1, and 3.3.3); for now, some sketchy notes will suffice. For a start, concerning (1), it is questionable whether it is really possible for persons to miraculously come into existence out of thin air—maybe the natural kind *human being* does not allow such miracles.<sup>21</sup> With respect to (2), as van Inwagen notes in his discussion of this argument [see van Inwagen 2000, esp. pp. 128–133], it seems that if, miraculously, there could come into existence a person-like thing at  $t_1$ , which then lasts for, say, two hours, why should this be *two* things existing consecutively, each for one hour? After all, nothing fatal has happened to the thing that popped into existence, it did not stop existing after the first hour. The point is that the story about consecutive temporal stages only makes sense if we *presuppose* the perdurantist metaphysic. Concerning (3) and (4), it is questionable whether Humean supervenience (which is clearly playing a

<sup>21</sup>There are many theories of natural kinds according to which biological species are *historical* kinds; on such views a human-like thing appearing miraculously out of thin air (e.g., Davidson's "swampman"; see his [1987] and see also Millikan [2010]) would not *be* a human being, since it fails to be embedded in the right kind of historical circumstances. See Millikan [2000] and Elder [2005] for such views. Later in this essay I will allude to such theories again (§ 4.3.3).

major role here) is acceptable from an endurantist point of view. But more on this below (§ 2.4.3). With regard to (5) and (6): even if a world of stages exactly like ours is possible (which can be doubted—for example, what does “like” ours actually mean?), it still does not follow that our own world therefore *is* a world of stages. On the contrary, from a common-sense point of view, since our world is populated by enduring objects, our world is obviously different from that allegedly possible world.

To conclude, as Lewis himself admits, the doubters will indeed reject the premises—in fact, they’re likely not to reject just one premise, but all of them. They will suggest that Lewis confuses persons, which do not have temporal parts, with their life histories, which do have such parts.

So much for an initial discussion of the character of perduring objects, of how they differ from the enduring objects that populate our world, and of alleged reasons for adopting the perdurantist framework. The differences and discrepancies will get even more interesting when we consider modality in the next chapter. But first, let us scrutinize the notion of composition embodied in CEM and hence in the universalist metaphysic.

### 2.4.2 Composition

At the very beginning of our exposition of universalism we ran into problems: applying CEM to the objects of our world seemed to require adjustments to CEM. We also saw that the universalist chooses not to adjust the mereological theory to fit the things, but rather to adjust the things to fit the mereology, that is, to fit CEM. The main reason for this move is the notion of composition inherent in CEM: for some things to compose a further object, their sum, is just for those things to exist. They don’t have to satisfy any constraint.

Moreover, there is an assumption at work to the effect that CEM-style composition is the only composition there is. After all, if there were more than one way for some things to compose a further object, the possibility of those things composing into more than one object arises—which clearly contradicts Extensionality [A.5]. However, this assumption can be challenged. Kit Fine has a nice paper where he argues that, besides the notion of composition embodied in CEM, which he calls “aggregation”, another unconstrained notion of composition is possible, which he calls “compounding” [Fine 1994a].<sup>22</sup> We saw that aggregation requires only that the parts all exist—they don’t have to exist in places that are close together (there are utterly scattered sum-objects), nor do they have

<sup>22</sup>In fact, Fine concludes his article by saying that we’d better do away with aggregation entirely, and keep compounding as the primary notion of composition.

to exist simultaneously (the different time slices of an object don't exist at the same time), not even at an uninterrupted time-interval (there are objects scattered throughout time as well).

Compounding, on the other hand, also requires merely that the parts all exist, but it does not view existence at certain times on a par with existence at certain places: it understands the mere requirement that the parts all exist to mean that they all exist *at a certain time*. Hence, this notion of composition assumes there to be important differences between space and time. For this reason, compounding promises to suit the endurantist view.

An example will make things clearer: suppose there are two quantities of gold,  $a$  and  $b$ , which through some process come into existence simultaneously at  $t_1$ . Suppose that  $a$  lasts until  $t_2$ , when it gets annihilated, and that  $b$  continues to exist for a bit longer, until  $t_3$ . The aggregate  $a + b$ , consisting of  $a$  and  $b$ , which is just their mereological sum in the sense of CEM, is temporally located at the interval between  $t_1$  and  $t_3$ , but  $a * b$ , the compound of  $a$  and  $b$ , exists only from  $t_1$  until  $t_2$ . Although  $a + b$  is a rather strange object, the compound,  $a * b$ , is simply a quantity of gold—a larger quantity than either  $a$  or  $b$ —which ceases to exist at  $t_2$  because part of it gets destroyed at that point in time. Fine writes:

[C]ompounds of familiar things are familiar things—a cup and saucer, some apples, a quantity of gold. On the other hand, aggregates of familiar things, if they exist, are not familiar things; and in that respect, their existence is open to doubt. [Fine 1994a, p. 157]

Compounding is a notion of composition, of fusing many things into a whole: the compound  $a * b$  has  $a$  and  $b$  as proper parts. But wait, how can that be, since  $b$  itself exists longer than  $a * b$  does? Recall our table: if we destroy its top and three of its legs, we have destroyed the table, but the last leg survives—a thing's parts can outlive the thing itself, hence there is no problem here.

Compounding is as unconstrained a notion of composition as is aggregation: both do not require putative parts to be arranged in any special way for them to compose a further thing. Given that we have two different and equally coherent notions of unconstrained composition, there is no way to argue from the assumption that only one of them is legitimate to a certain view of time, hence to perdurantism. If we accept perdurantism, we'll have to apply aggregation in order to fuse time slices into temporally extended things, of course, but we cannot argue that, since aggregation is the only notion of composition, we have to adopt perdurantism. Compounding is a viable alternative which not only matches the endurantist metaphysic but also, as Fine notes, yields results that are far more acceptable than the aggregative notion of composition.

Fine's work makes very clear that the usual interpretation of CEM, on which the universalist metaphysics is built, involves a serious bias towards the aggregative conception of composition: CEM-parts and CEM-wholes are taken to be aggregative parts and wholes. Whereas to the compounding conception of composition there correspond different kinds of parts and wholes (consider the compound whole  $a * b$ , which has  $b$  as a part, despite the fact that  $b$  outlasts the compound  $a * b$ ). In fact, however, CEM does not *require* this interpretation; one might just as well construe CEM as a theory about enduring objects and their compounds, without having to relativize the parthood relation to times—but, some amendments need to be made: the universal fusion axiom [A.6] has to go, since objects existing at non-overlapping times do not compose anything; and the resulting theory is of no use when applied to most continuants, since they typically have different parts at different times. In short, the resulting mereology will not be interesting as a *foundation* for metaphysical theories.

Fine identifies the following two factors as the main ones supporting the usual, aggregative interpretation of CEM:

What has made aggregation so attractive . . . are two main factors . . . . The first, and most important, is the identification of a thing with the content of its spatio-temporal extension. The second is the identification of a thing with the fusion of its time-slices. Both of these forms of identification require that the objects fuse in the manner of aggregation. [Fine 1994a, p. 138]

The first factor, I would suggest, already includes the second factor, since it is the inclusion of *temporal* extension that makes aggregation requisite. It is, then, the idea of identifying objects with (the contents of) regions of space-time, favored by many, following Quine, because of its algebraical and metaphysical perspicuity, its ontological austerity, and its extensional, anti-essentialistic implications, that invites the adoption of the aggregative conception of composition. As I said earlier (see §1.2, p. 14 and §2.1, p. 23), the way to apply CEM to real material objects emerges when we take a detour via the application of CEM to regions of space-time. The idea of identifying physical objects with the contents of their spatiotemporal extensions is the leading thought of the universalist metaphysics; it ensures applicability of CEM to such objects and hence makes it suitable as the foundation of metaphysical theorizing (or so it seems).

### 2.4.3 Humean Supervenience and Change

In this subsection, I will make two points concerning Humean supervenience. One is very general and is mainly meant to cast doubt on the very idea of Humean supervenience, of properties (or whatever) supervening on the local arrangement of qualities;

the other is more substantive and specific, it concerns the universalist's conception of change.

Consider, for a start, the following quote from Lewis, which concerns the way the property of beauty might supervene in a Humean fashion:

One might wish to say that in some sense the beauty of statues is nothing over and above the shape and size and colour that beholders appreciate, but without denying that there is such a thing as beauty, without claiming that beauty exists only in some less-than-fundamental way, and without undertaking to paraphrase ascriptions of beauty in terms of shape etc. . . .

If supervenience succeeds, . . . then some correct scheme [of translation] must exist; the remaining question is whether there exists a correct scheme that is less than infinitely complex. If beauty is supervenient on shape etc., the worst that can happen is that an ascription of beauty is equivalent to an uncountably infinite disjunction of maximally specific descriptions of shape etc., which descriptions might themselves involve infinite conjunctions. [Lewis 1983a, pp. 29–30]

Suppose that Lewis is right, and that we've got the worst-case scenario. Then beauty supervenes on the local arrangement of qualities by way of Lewis's uncountably infinite disjunction. But such a disjunction is, of course, simply a list describing, without mentioning the property of beauty, all the statues there were, are, and ever will or could be that we would call beautiful. I protest to such an analysis of beauty, because, even if the disjunction is indeed equivalent with ascriptions of beauty, it does not explain anything at all. The only thing we have achieved is extensional adequacy, but that's not very special: no one would accept an account of, say, what monotremes are which just consisted of a very long list of precise descriptions of spatiotemporal regions, even if this list succeeds in picking out all and only those regions which are in fact occupied by monotremes. By contrast, simply saying that monotremes are mammals that lay eggs does tell us something about what they are.

My point is that extensional adequacy, although sometimes interesting, is usually not enough to be explanatory. Hence I'm skeptical about many supervenience claims—I do think many things might successfully be accounted for on the basis of some sort of supervenience claim, but I have considerable doubts when it comes to metaphysically interesting issues. The defender of Humean supervenience might object that I've forgotten to include the modal dimension in my supposedly absurd example—that is, extensional adequacy would require inclusion not only of all the actual monotremes in the list but also of all *possible* monotremes. I cannot delve into this suggestion here, because that would require having a thorough look at modality first—that will be our topic in the next chapter. However, let me make one short remark: if *possibilia* are

construed in the universalist way (see next chapter), my objection will have the same force. A mere list of all the actual and possible monotremes does not yield an account of what monotremes are, just as a mere list of all beautiful objects does not tell us what beauty is.

Now to my next topic: change. We say that a thing has changed if it has, at a certain time  $t_1$ , a certain property which it does not have anymore at a later time  $t_2$  (or *vice versa*). However, this is not enough, for it includes cases of so-called “Cambridge change”; e.g., my table at this moment has the (relational) property of being thought about by me, but did not have that property a moment ago. Let us have another go at it: a thing changes if there is an *intrinsic*<sup>23</sup> property which it lacks at one time but has at another time. So far for a short sketch of what change is.

How does the universalist account for change? She will hold that change supervenes on the arrangement of local, intrinsic qualities: a temporally extended object changes with respect to some intrinsic property,  $P$ , just when it has a temporal part exemplifying  $P$  and another temporal part lacking  $P$ .<sup>24</sup>

Is this adequate? In our original formulation, it was *the same* object having a property at one time, and lacking it at another time. On the perdurantist view, we have *different* objects having and lacking the property in question—as Sider puts it:

Change is qualitative variation between the distinct temporal parts of an object. [Sider 2001, p. 212]

A traditional argument against such an account of change derives from McTaggart’s famous book *The Nature of Existence*, vol. II [1927]. Consider the Greenwich meridian: at some latitude, it is inside England, at another latitude, it lies outside of England. Yet no one would suppose that this spatial variation in properties constitutes change. Similarly, consider a poker which is hot at one end and cold at another end. By having different *spatial* parts exemplifying conflicting properties, the poker cannot be said to change; so how can the analogous case of a poker having different *temporal* parts exemplifying conflicting properties (e.g., the poker-at-Monday being hot, the poker-at-Tuesday being cold) constitute change?

<sup>23</sup>There is considerable discussion about the question what intrinsicness amounts to. For my purposes, an intuitive understanding will do: a property is had intrinsically by an object just if its having that property depends solely on the object itself—thus, being round is intrinsic, but being two miles from Amsterdam is not.

<sup>24</sup>If  $P$  is not a property exemplified by something mereologically basic, we might go on to say that the former temporal part exemplifies  $P$  by virtue of having mereologically basic parts that exemplify certain intrinsic properties; that is, the temporal part’s exemplifying  $P$  itself supervenes on the arrangement of local qualities among its parts. Similarly for lacking  $P$ .

Interestingly, Sider writes in reply to this argument:

there is no reply making use of elaborate distinctions or theory. The [objection] may simply be met head-on. Change *is* analogous to spatial variation. Change *does* occur in virtue of unchanging facts about temporal parts. There are no good arguments to the contrary. [Sider 2001, p. 214]

I would suggest that there *is* a good argument to the contrary, despite Sider's remark. It is simply this: on the established, endurantist view, it is *numerically the same thing* that first has and later lacks a certain property—that's what change consists in; hence change is *not* analogous to spatial variation. The perdurantist account fails to capture these features of change. Hence the perdurantist account is inadequate. Again, instead of adjusting the metaphysical theory to account for change, change itself gets changed so as to make it compatible with the metaphysical theory.

A short note on stage theory, the variant on perdurantism that takes the continuants to be not temporally extended sum-objects but rather stages of such objects (see above, p. 21): the stage theorist can say that change is *not* analogous to spatial variation because if we truly say that *this* table has changed from being brown to being red, we're talking about the current stage of the table, which is red and has no earlier temporal part that is brown—rather, the current stage is suitably related to a *different*, earlier stage which is (tenselessly) brown. Although this indeed is an alternative conception of change that avoids some of the problems I sketched, it replaces all cases of real change with something very much like Cambridge change: change is a matter of having non-intrinsic, relational properties (in our case, of the present table-stage to the earlier table-stage).

As a final remark, notice that the point about change covers a very broad spectrum of cases—motion, for example, is change of position; on the perdurantist view change of position *just is* having temporal parts at different locations.<sup>25</sup> Thus there is nothing actually *moving* from one location to the next; rather, there are, to use terminology borrowed from Thomson, temporal parts popping into existence *ex nihilo* and immediately vanishing into thin air again, at different locations at consecutive times. In fact, the notion of persistence becomes difficult to understand from a perdurantist point of view. Consider some object: the whole space-time worm which is the object does not persist from one moment to the next, since it occupies the entire temporal interval through which we'd say that the object persists. But nor do its time slices persist, because they are instantaneous. Again, the perdurantist will say that persistence *just is* having time slices at consecutive times.

<sup>25</sup>Compare Russell's so-called "at-at" theory of motion—he writes: "Motion consists *merely* in the occupation of different places at different times" [Russell 1903, 447].

The critical question to ask is: are we still talking about change, motion, persistence? The perdurantist uses the same *words*, to be sure, but is her account of change, motion, and persistence really an account of those very phenomena, or rather a surrogate, a replacement, for what change, motion, and persistence really are? If so, what reason do we have to think that our ordinary and scientific understanding of these phenomena need to be revised thus drastically? This is an important methodological issue; I will come back to it later on (see §3.3.5, and the entire Part II).

#### 2.4.4 Concluding Remarks

I've extensively discussed problems with the perdurantist metaphysic and the notion of composition that lies at the basis of CEM-inspired metaphysics, and I've offered some remarks on Humean supervenience and the nature of change, motion and persistence. The next chapter will show how the universalist metaphysic gets enriched by adding a compatible strand of metaphysical theory concerning modality. The accordingly deepened universalist notion of objects will receive critical reflection in subsequent sections, which will pick up some of the themes touched upon here—most importantly: the fact that the continuants are just sum-objects among many less familiar such sum-objects; the difficulty in understanding the perdurantist conception of objects as sums of time-slices; and the strategy of resorting to Humean supervenience in order to solve certain problems.

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## Chapter 3

# Universalism II: Modality

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**A**T THE END of our exploration of the universalist's notion of composition, and her defense of the universal fusion axiom [A.6] on the grounds that mereological sums are ontologically innocent, "nothing over and above" their parts, we encountered the thesis of Composition as Identity (CI; see §2.2). We noted that we require some way of accepting that identity is contingent lest we end up with undesirable consequences, in particular, the consequence that all sum-objects have their parts necessarily—in other words, mereological essentialism.

This chapter is focused mainly on modality, which is a topic of crucial importance for my assessment of the universalist metaphysic. Section 3.1 below discusses the universalist's views on modality, making extensive use of considerations concerning colocation. Section 3.2 concerns the question how the universalist may distinguish the continuants from all other sum-objects, and argues that such a distinction is best made not on the ontological level but rather on the level of our concepts, our conventions for picking out only a few from among the entire array of sum-objects. The last section 3.3 then offers critical reflections on the universalist's approach to modality, on the resulting notion of physical objects in general, and on the universalist's account of continuants in particular.

### 3.1 Contingent Identity and Counterparts

Let us approach the modal issues we encountered in our discussions of CI from a different perspective, starting with a short discussion of colocation.<sup>1</sup> Consider a door knob, Karl,

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<sup>1</sup>In fact, the question as to the relation between some thing and its composing parts is just a question of colocation, that is, of two things (purportedly) being in the same place at the same time—in this case it is the thing and its parts that are occupying the same place at the same time.

which is made out of a piece of copper, Cissy, by melting Cissy and pouring it into a casting mould of the right shape. If Karl is not identical with Cissy, we then have two objects occupying the same place at the same time. But Karl cannot be identical with Cissy, since Cissy existed before Karl did. The universalist has an easy answer to such problems of colocation: the door knob, Karl, is not identical to the piece of copper, Cissy, because the former is a proper temporal part of the latter—Cissy has temporal parts that Karl lacks (let's say that Cissy gets molten into a candlestick: that will be the end of Karl, but not of Cissy). Hence, their occupying the same place at the same time is just a matter of their overlapping at that time. So the perdurantist can admit that Karl and Cissy are distinct entities without having to hold that there are two material objects occupying the same place at the same time. Karl and Cissy occupy the same time in the same way me and my arm occupy the same space. That's something the endurantist, who holds that persisting things are wholly present at every moment they exist, cannot claim.

But now consider Allan Gibbard's example of Goliath, the statue, and Lump1, the lump of clay, which are simultaneously created at some point in time, and simultaneously annihilated at some later point in time [see Gibbard 1975]. Here's the story of the creation: two smaller lumps of clay got modelled into two half-statues; the moment the one half was connected to the other half the existence of both Goliath and Lump1 began. The annihilation was effected by means of explosives, resulting in the clay being scattered all over the place. Here, the perdurantist will have to say that Goliath = Lump1: neither is a proper temporal part of the other, they occupy the exact same spatiotemporal region, hence they are identical. However, Gibbard could have come along to squeeze the clay into a ball, thereby destroying Goliath but not Lump1, before the explosion was triggered. Hence Goliath and Lump1 have different modal properties.<sup>2</sup>

Given Leibniz's Law, having different modal properties entails being distinct, and, since the universalist holds that objects cannot have all the same parts, in accord with extensionality [A.5], this is a serious problem. That is, unless some special story about modal properties/predicates can be told that precludes this entailment. Harold Noonan offers just such a story [see Noonan 1991, 1993], according to which modal predicates are what he calls "Abelardian predicates". Here's the basic idea, in his own words:

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<sup>2</sup>A quite peculiar approach to purported cases of colocation can be found in the work of Michael Burke [e.g., 1994b; 1994a], who holds that in cases of purported colocation of entities falling under different sortals, the "dominant" sortal "wins"—thus, in the case of Karl, the door knob, and Cissy, the piece of copper, he would hold that there is just one thing, which is a door knob and also a piece of copper, but answers only to the persistence conditions of door knobs (supposing "door knob" to be the dominant sortal here), and hence only has the modal properties of the door knob. This view has big problems—for a nice statement and discussion of these problems, see Hawley [2002, esp. pp. 151–4].

[T]he reference of a modal predicate is dependent on the linguistic context in which it occurs, and in particular is dependent on the meaning of the singular term or phrase of restricted quantification to which it is attached. [Noonan 1991, p. 188]

Traditionally, a distinction has been made between modality *de re* and modality *de dicto*, the former being considered more problematic than the latter. *De re* modality concerns objects independently from the way they are specified, while *de dicto* modality is about objects as described a certain way. To use a famous example from Quine, the sentence “The number of planets is necessarily even” might express a truth when read *de re*<sup>3</sup>, since it then predicates necessary evenness of a certain object, the number 8, which is picked out in the sentence by the definite description “the number of planets”. This is the kind of modality we have been discussing up until now. On a *de dicto* reading, the sentence is false, since it does seem possible that there are, say, 9 planets (indeed, until recently, that seemed to be the case). Since we are mainly interested in the universalist’s conception of objects, *de re* modality is our main topic here.

Let us go back to Goliath, the statue, and Lump1, the lump of clay that composes it. The universalist concludes that Goliath = Lump1, since they occupy the exact same spatiotemporal region. The issue that Noonan hopes to resolve with his theory is the fact that “Goliath could have been reshaped into a ball” is false while “Lump1 could have been reshaped into a ball” is true—which conflicts with Leibniz’s Law. Instead of concluding that Goliath and Lump1 must be different, Noonan holds that “could have been reshaped into a ball” is simply an Abelardian predicate, hence the two sentences do not involve the same property, hence the apparent difference in modal properties between Goliath and Lump1 is not a real difference and does not really conflict with Leibniz’s Law.

What kinds of properties might then really be involved in such apparent attributions of modal properties? And how might they differ depending on the way the object of which they are predicated gets picked out? Lewis’s counterpart theory of modality offers a straightforward way of giving this sketchy proposal some meat. Suppose that there are many, many possible worlds.<sup>4</sup> Depending on how we compare our this-worldly statue/lump, which we call Goliath and Lump1, with objects in some other possible world, we may say that such objects are better or worse candidates for being

<sup>3</sup>The original example was “The number of planets is necessarily odd”, it predated the discussion concerning Pluto which resulted in its losing its status as a planet, leaving our solar system with a mere 8 planets. I have adapted the example correspondingly.

<sup>4</sup>Lewis famously argues that all these worlds really exists, thus inviting what he calls the “incredulous stare”. Never mind his modal realism for the moment; a less ontologically extravagant construal of possible worlds, as fictions or otherwise, will do as well for our present purposes. It is the treatment of predications of modal properties that interests us here.

a *counterpart* of the statue/lump. The best candidate is the otherworldly object that resembles our statue/lump the most—but which one that is depends on how we are comparing them. In our situation, then, the two different properties picked out by the phrase “could have been reshaped into a ball” when attached to “Goliath” or “Lumpl” are *has a counterpart under the statue counterpart relation which has been reshaped into a ball* and *has a counterpart under the piece-of-matter counterpart relation which has been reshaped into a ball*, respectively [see Lewis 1986a]. Here’s a characterization of the relevant aspects of counterpart relations in Lewis’s own words:

The inconstancy of *de re* representation can easily be explained in counterpart theory. We have many and varied relations of comparative similarity. Some differ from others because they put different weights or priorities on different respects of (intrinsic or extrinsic) qualitative similarity; and even if they are alike in the respects of comparison they stress, they can still differ because one is more stringent than another. [*ibid.*, p. 254]

(The “inconstancy of *de re* representation” is, of course, just the phenomenon we illustrated by way of the divergence of Goliath and Lumpl in their respective modal properties.) In this way, contingent identity is possible—despite the fact that in this world, Goliath = Lumpl, there are worlds where Goliath’s counterpart is distinct from Lumpl’s. Although this reeks of replacing the *de re* with the *de dicto*, it is not, according to Lewis: here’s Goliath/Lumpl, and we can say of *it*, independently of the way we describe it, that it resembles, all by itself, some but not other otherworldly objects in varying respects, hence that it has different counterparts depending on which counterpart relation we invoke. Using the name “Goliath” invokes the statue counterpart relation, since we named this *statue* “Goliath” (similarly for “Lumpl”).

Counterpart theory reduces statements involving *de re* necessity and possibility to non-modal statements involving similarity relations between objects across worlds. But it also offers a reductive story about the *de dicto*: a statement is true by *de dicto* necessity just if it is true at every possible world (and *de dicto* possibly true just if true at one or more possible worlds). The most straightforward way of making sense of these reductions of modality is by adopting Lewis’s modal realism, which says that all the possible worlds really exist (but only one of them is *actual*—our world). There is an entire discussion on whether any less ontologically lavish way of “constructing” possible worlds might suffice for the reductive programme to succeed<sup>5</sup>—I will not enter this discussion here; what I have to say about the counterpart theory of modality will be framed in terms of Lewis’s modal realism but it will easily carry over to any such alternative reductive programme.

<sup>5</sup>See, e.g., Adams [1974]; Stalnaker [1976]; Plantinga [1974]; Armstrong [1989].

Counterpart theory is not the only theory which can accommodate contingent identity. There are other options: André Gallois's theory of temporary identity, which concerns primarily the case of identity over time [see Gallois 1990, 1998] and Terence Parsons's theory of indeterminate identity [Parsons 2000], among others. It can be shown that they all involve the view that modal predicates are Abelardian, in Noonan's phrase: they can only maintain their views by blocking the inference from possible distinctness to actual distinctness via Leibniz's Law, and this in turn can only be achieved by holding that certain predicates can be excluded from the scope of Leibniz's Law because they merely *seem* to denote properties but do not *really* do so—in other words, because they are Abelardian.<sup>6</sup> Hence, as Noonan rightly notes:

... it is only to the skeletal idea that modal predicates are Abelardian and not to its counterpart-theoretic interpretation that the defender of contingent identity is committed. [Noonan 1991, p. 190]

The core idea here, which will be of crucial importance in what follows, is that a thing can appear to have different modal properties depending on how we “approach” it—having statues in mind, so to speak, yields different results from having lumps of clay in mind. A more linguistic way of putting the same point is this: modal predicates are Abelardian predicates, and these are not *really* predicates, they are incomplete predicates—they contain an ellipsis to be filled in by some sortal (statue, lump-of-clay, etc.).

What makes this idea attractive, whatever the exact application, is the fact that it is a *reductive* account of the modalities: it reduces the truth and falsity of modal statements to the truth and falsity of non-modal statements—in the case of counterpart theory, to statements about a certain kind of similarity between objects across possible worlds. An interesting feature of this reduction is that it in fact makes the traditionally problematic kind of necessity—*de re* necessity, which depends on how things are with respect to the objects themselves—look very much like the traditionally unproblematic kind of necessity—*de dicto* necessity, which is necessity in virtue of the way the objects are specified. I will come back to this issue below, in the context of my critical reflections on the matter. I will continue as if the universalist adopts counterpart theory, for ease of exposition, even though any other theory of modality that respects Noonan's points will do as well. Nothing will hinge on this. (And, as a matter of fact, our two paradigm universalists, Lewis and Sider, both accept counterpart theory.)

A final note: we encountered difficulties with modality in the context of our discussion of CI, in the previous chapter. But that the universalist needs a theory of modality along the lines sketched here does not depend on CI: even if the universalist rejects

<sup>6</sup>For a very insightful discussion of a number of such theories, see Koslicki [2008, ch. III].

CI, there are still cases of identity the perdurantist would want to be contingent—e.g., Gibbard’s example of Goliath and Lump. So the move to viewing modal predicates as Abelardian does not depend solely on CI, it is required anyway (in fact, it is required by the extensionality axiom [A.5]: this axiom excludes the possibility of colocation, so if there seem to be different things occupying the same spatiotemporal region, they are identical; any apparent discrepancies in their properties have to be resolved via Noonan’s Abelardian strategy). However, CI is a very natural thesis for the universalist, who believes in unrestricted mereological composition—if all those mereological sums are not identical to their parts as CI says, some serious explaining needs to be done as to why we should accept their existence.<sup>7</sup> Moreover, CI surely does point to the most natural way to conceive of the relation between a region of space-time and its parts; and since (as we saw in §2.1) the sum-objects of the universalist are either individuated through the space-time regions they occupy or are said to be *identical* to them, CI is the most natural stance to adopt towards those sum-objects as well.

### 3.2 Sum-Objects and Continuants

Let us now contemplate the question as to what the difference between the continuants we all know and love, and their more exotic, gerrymandered cousins, amounts to. We have seen that the universalist takes continuants to *be* sum-objects, so one possible answer is this: it is just our conventions of picking out certain things and not others that makes the difference; on the ontological level, all sum-objects are on a par. This position I wish to label *continuant conventionalism*. The label is a bit misleading, because the crucial thing here is not that it’s *conventions* we are talking about, but rather that what makes the continuants stand out from the whole croud of sum-objects lies with us, our ways of thinking and talking, rather than with the continuants themselves. In other words, if we talked differently, other sum-objects would be elevated to the lofty status of continuants. But it is compatible with this view that we can’t help but talking and thinking the way we do, contrary to what the label “conventionalism” suggests.

For purposes of illustration, consider the following example of a rather exotic sum-object, offered by Ned Markosian: Tud is an object that comes into existence exactly when Hud Hudson does and overlaps Hud up until the time Ted Sider starts to exist, then alternates daily between overlapping Hud and Ted until one of them dies, and then overlaps the surviving one until he too ceases to exist [Markosian 2004, pp. 667–8]. Now, does Tud

<sup>7</sup>Ted Sider has developed a nice argument for unrestricted composition on the basis of considerations of vagueness [see his 2001; 2004a]—if successful, such an argument could save the general fusion axiom for someone not inclined to adopt CI. However, Sider’s argument fails—see Koslicki [2003] for convincing criticism.

think? Does he (supposing it is a “he”) sometimes feel pain? Sider has the following reply:

I am now thinking of philosophy. Tud is not, since ‘think’, like most predicates, applies only to objects satisfying ordinary sortal predicates. Yet Tud is doing something a lot like thinking. . . . Let us invent a predicate, “thinking\*”, for the thing that Tud *does* do. Thinking\* is thinking minus the restriction to things satisfying ordinary sortal concepts. . . . [A] language that expressed thinking\* instead [of thinking] would be a perfectly reasonable language to speak (though counting might be difficult). [Sider 2004b, p. 683]

That is, according to Sider, what singles out the continuants from the whole range of sum-objects available is just that they satisfy ordinary sortal predicates—sortals, we may suppose, incorporate a certain modal profile, dictating what will count as the coming to be and ceasing to be of the objects falling under them (see Introduction, p. 4). And, moreover, there is no reason to suppose that the sortals we in fact use are the “right” ones—using a radically different language, with different sortals, could result in singling out radically different objects—objects like Tud, for example. In other words, it is just our conventions of having the sortals we in fact have that makes the continuants stand out from the host of sum-objects; nothing in the objects themselves makes for such difference. And that is what I call *continuant conventionalism*.

Like many aspects of Sider’s views, this one too finds its antecedent in Lewis. Consider, again, what the latter says in defense of CI:

It does matter how you slice it—not to the character of what’s described, of course, but to the form of the description. [Lewis 1991, p. 87]

Now, let us apply this idea to the whole of Reality, that big, inclusive, perduring thing we started our survey of universalism with: whether we single out those parts of it that are our continuants, and contrast them with all other sum-objects, or, alternatively, single out a radically different set of objects to be contrasted with all the others—it only matters to the form of the description, not to what’s described; we are describing Reality either way. Hence there is no reason to suppose that the objects we in fact single out as the ones we ordinarily acknowledge, the continuants, are *in themselves* any different from all the other sum-objects—and that is, again, *continuant conventionalism*.

In a concise article on these matters, Achille Varzi reaches the same conclusion I’m trying to establish here. Having observed that the perdurantist has to concede that there are, besides the tenors we all know, such as Pavarotti, also tenors which have once been turnips, he concludes:

Normally—the [universalist] must say—when we assert that no tenor has ever been a turnip we are not speaking with our quantifiers wide open. Really there have been and

there are such tenors. But they are not the tenors that would first come to mind. They are not the ones we call by name. They are tenors that we normally tend to ignore. [Varzi 2003, p. 214]

The sum-object we call Pavarotti has a temporal part which is tenor (he was not a tenor yet when a little child); in virtue of this temporal part Pavarotti can in his temporal entirety be called a tenor. But that temporal part is also part of countless other sum-objects, which therefore have equal right to be called tenors. As Varzi says, we don't speak with our quantifiers wide open when we say that no tenor has ever been a turnip; with Sider we may say that we restrict our quantifiers to the sum-objects that satisfy ordinary sortal predicates.

There is a direct link between the sortals we tacitly use to restrict our quantifiers and the modal properties of things, on the universalist's counterpart theory of modality: the sortals we have in mind determine which of the sum-objects we talk about *and* which counterpart relations are relevant. Sometimes one and the same thing can be subsumed under two different sortals (Goliath and Lump), giving rise to apparent divergencies in modal properties and hence to the illusion that there are two rather than one objects there. Analogously, given CI, approaching one and the same object with one sortal in mind which applies to the thing as a whole (say, human being), or with a collection of different sortals in mind which apply to some division of it into parts (say, various body parts, or cells, or molecules), gives rise to differences in modal properties.

According to the universalist, then, our ordinary sortal predicates pick out a certain class of sum-objects, the continuants, which then, *qua* falling under some sortal, satisfy or fail to satisfy certain modal predicates (the sortal in question filling the ellipsis in the Abelardian modal predicates). A sortal, *f*, is best construed as a set of criteria which inform us that nothing *counts* as an *f* unless it satisfies these criteria. No *f* could possibly *fail* to satisfy those criteria, hence the sortal *f* determines (or at least helps to determine) which modal predicates a thing can satisfy. But considering the same *f*-thing not as an *f* but as a *g* (supposing it also satisfies the criteria for *g*-hood) yields a different modal profile.

This is all nice and good, purely logically speaking. But it does not square very well with the realist aspirations of most universalist philosophers (which include Sider and Lewis). Recall the two strands of metaphysical thought I mentioned in the Introduction (p. 1), those deriving, on the one hand, from a non-pragmatist reading of Quine, and on the other hand, from Carnap's empiricism: instead of being Quinean in spirit, deriving our ontological commitments from our quantified statements (which involve quantification over a domain that includes, say, tenors, but not tenors that have once been turnips), the

conventionalist view we have been sketching is more in line with a Carnapian approach: we can choose our set of sortals any way we like—for example, we may accept the existence of Ted but not of Tud, or rather *vice versa*—as long as we don't think that the choice we make reflects how things really are. The only difference with a thoroughly Carnapian approach is that the universalist thinks herself entitled to claim that reality *in fact* contains *all* the sum-objects, no matter what sortals we choose, whereas the true Carnapian will reject such metaphysical realism outright as confused.

One uneasy consequence of continuant conventionalism, for the universalist, is that he cannot allow there to be real natural kinds: with different choices of sortals there correspond different classes of continuants, which of course get sorted into different kinds. Continuant conventionalism entails kind conventionalism. There is exactly one kind of thing that escapes this conventionalist fate for the universalist: it is the kind that corresponds to my term-of-art “sum-object” (considering mereological atoms—if they exist—to be the limiting case of sum-objects, i.e., an atom is the sum of itself).<sup>8</sup>

Below, I will discuss some attempts of universalists to salvage their realism, one based on causal considerations, proposed by Sider, and one founded on “non-supervenient relations,” put forth by Katherine Hawley.

### 3.3 Critical Reflections

I have already examined the universalist's conception of material objects to some extent in the previous chapter. I have offered reasons to doubt the plausibility of the perdurantist conception of objects adopted by the universalist, complaining with Thomson that we have to accept as a brute fact, e.g., the succession of very many, very short-lived pieces of chalk, which simply pop into and out of existence without there being a reason for it, whereas the endurantist can talk about just one enduring piece of chalk (§ 2.4.1). Relatedly, I offered some critical remarks about the notions of change, motion and persistence as these are explained by the universalist: change, whether it is qualitative change or change of position, is not analogous to variation among the spatial parts of a thing, because in the latter case it is *different* parts having different properties/being differently located, whereas in the former case we have the *same* thing being first here, then there—or first thus, then so (§ 2.4.3). Finally, I looked, with the help of ideas borrowed from Fine, at the “aggregative” notion of composition underlying the universalist

<sup>8</sup>Alternatively, the universalist might claim that to every class of sum-objects there corresponds a natural kind. That would completely trivialize the concept of a natural kind—analogously, claiming that every sum-object is a continuant would trivialize the notion of a continuant, and claiming that every class of objects (or possibilia) identifies a natural property would trivialize the notion of a natural property, for the universalist.

metaphysic, noted that there is an alternative to this, even at a suitably abstract level, which fits an endurantist perspective, and concluded that the universalist's choice for the aggregative conception results from the idea of assimilating objects to regions of space-time, which is thus shown to lie at the heart of her project. What follows concerns largely the difference, both metaphysically speaking and in their respective theoretical roles, between objects understood as the contents of spatiotemporal regions and objects considered otherwise (i.e., as one or another type of continuant).

Physical objects, according to the universalist, are sum-objects, the material contents of the respective spatiotemporal regions they occupy (or they are identical to those very spatiotemporal regions). They are individuated by their spatiotemporal extent, as we saw, hence we may say: same region, same object. But as soon as we say this, it seems that we should also say that a certain object,  $a$ , occupying a region  $R_a$ , could not have occupied a different region,  $R_b$ , because then it would have been  $b$  rather than  $a$ . That is, if physical objects are individuated solely by reference to their spatiotemporal extent, they seem to have their spatiotemporal extent essentially; they are, as van Inwagen says, "modally inductile" [see van Inwagen 1990a, 2000]. (The issue is analogous to the problem of mereological essentialism we encountered in the context of CI—see § 2.2.)

There is one "non-standard" universalist who in fact defends this position: Mark Heller. He writes:

A given four-dimensional object goes out of existence at the time that it does because the object's boundaries are its defining characteristics. The material content of either a temporally larger or temporally smaller region of spacetime is, by definition, a different four-dimensional hunk of matter. It is because of the nature of a four-dimensional object that it has just those spatiotemporal boundaries and no others. A four-dimensional hunk that is now one cubic meter, could not have now been any other size. Any hunk of a different size at this time would have had different spatiotemporal boundaries, and, hence, would have been a different hunk. Therefore, a four-dimensional hunk of matter, by its very nature, has its spatiotemporal boundaries essentially. [Heller 1990, p. 53]

If Heller is right about this, then the standard universalist has to admit that her sum-objects live a double modal life: on the one hand, they have their spatiotemporal boundaries essentially; on the other hand, their modal properties depend on the counterpart relations we invoke, and hence they can have the modal properties associated with, e.g., statues or lumps of clay, rather than those associated with "four-dimensional hunks of matter". Let us call the modal profile an object has in virtue of being a four-dimensional hunk of matter its *Heller-profile* and let us call the modal profile we can associate with a given object by evoking a certain counterpart relation its *Lewis-profile* (thus, one object may have many different Lewis-profiles). At first sight, the universalist has the following two options:

- [1] Accept Heller's point, which implies that objects have a Heller-profile which is entirely distinct from the Lewis-profiles it has;
- [2] Insist that a Heller-profile *just is* a Lewis-profile, hence asserting that objects have only Lewis-profiles.

The most natural development of (1) is to take objects to have their Lewis-profiles merely by convention, while they have their Heller-profiles independently of us, of the way we talk and think. This position can properly be called essentialist: it holds that, out there, the objects that exist have certain essential properties, namely their spatiotemporal boundaries. I will come back to this option below. But first, I wish to show that option (2) leads to serious difficulties for the universalist. To see this, we first need to cast a brief look at a truly conventionalist account of modality.

### 3.3.1 Modal Conventionalism

Consider the following quotes from Alan Sidelle and Amie Thomasson, both self-proclaimed conventionalists about modality:

What, in what is merely *actual*, could make it the case that some things are necessary, while others are merely contingent? What could it *be* for some state of affairs to be necessary, or for some property to be essential? ... Insofar as these questions seem ... deeply puzzling, we have some reason to think that modality does not find its home in the mind-independent world, but rather in us, in our ways of speaking and thinking ... [Sidelle 1989, pp. 1–2]

[T]he most basic conditions of existence, identity, and persistence for the objects we refer to are discoverable by a kind of conceptual analysis, and the most basic claims about these conditions are analytic. [Thomasson 2007, p. 54]

Let me very briefly introduce Sidelle's views. His book is, largely, an attempt to show that even necessary a posteriori truths, famous since their introduction by Kripke and Putnam [see Kripke 1972; Putnam 1975], are best explained by a conventionalist account—that is, by a combination of conventionally established general analytic principles and empirical, a posteriori truths. For example, “water is necessarily H<sub>2</sub>O” is true because we have adopted a general rule concerning chemical-kind terms, such as “water”, roughly as follows: “whatever chemical microstructure most (enough) of the instances to which we apply ‘water’ actually have, nothing in any possible situation will count as water if it does not have that microstructure” [Sidelle 1989, p. 48]. Empirically, we find out that water is H<sub>2</sub>O—that's an a posteriori truth; the general principle then makes it a necessary truth. Thus, the sortals we use come with certain analytical principles, and these make for the necessity of certain truths.<sup>9</sup>

<sup>9</sup>Sidelle does not restrict such analytical principles to sortals; we may associate such principles with other terms as well, if we like. However, Sidelle's discussions almost always involve sortal terms (water,

Sidelle has a quite robust thesis in mind when he says that modality finds its home in our ways of speaking and thinking: he holds that the whole notion of an *object* is already infected with modal aspects, and hence that, in reality, there are no objects. What there is, he likes to say, is just *stuff* [Sidelle 1989, p. 54]. He writes:

... *stuff looking*, of course, just as the world looks, but devoid of modal properties, identity conditions, and all that imports. For a slogan, one might say that stuff is preobjectual. [*ibid.*, p. 54, n. 11]

According to Sidelle, we “carve out” objects from the preobjectual stuff by means of our linguistic conventions, our ways of speaking and thinking, our ordinary sortals. Let us adopt one of his examples, for illustration. Suppose, for the moment, that all material objects have their origins essentially. I point to a chair and say: “I hereby name this chair Ralph.” Ralph will then have whatever origin it has essentially. But, on Sidelle’s story, I cannot have been ostending an actual *chair* when introducing the name “Ralph”, for there is no chair. There’s only chairish stuff, *stuff looking* chair-like. Sidelle writes:

[W]hat we are pointing at is in the first instance a lump or bunch of stuff, with no ‘built-in’ identity conditions or modal features, so that we cannot even clearly speak of some *thing* to which we are pointing. However, we can point in the relevant direction, and if we do so with ‘chairish’ intentions, we can then trace back to see when we first encounter chairishness, and consider that the origin of the chair. [*ibid.*, p. 54, n. 10]

We may ignore the details (and difficulties) of Sidelle’s account of ostension and reference-fixing here; relevant for present purposes is how he characterizes what the modally flat stuff is like before we “articulate” it into objects with certain modal profiles: all there really is out there is stuff displaying an array of properties. This picture is strikingly similar to the “vast mosaic of local matters of particular fact”, which, according to the universalist’s thesis of Humean supervenience, underlies (subvenes) everything else. However, the stuff *cannot* be regarded as a whole which divides into parts according to CEM (or any other mereological theory), since the whole as well as the parts would then be full-fledged objects, whereas the stuff is supposed to be preobjectual.

We can characterize the workings of sortals for the conventionalist in a way that is strikingly similar to our earlier characterization of the universalist’s (see p. 49): a sortal, *f*, is best construed as a set of criteria which inform us that nothing *counts* as an *f* unless it satisfies these criteria. No *f* could possibly *fail* to satisfy those criteria, hence the sortal *f* determines which modal predicates a thing can satisfy. So far, the universalist and the conventionalist agree. For the universalist, I went on to say that “considering the same *f*-thing not as an *f* but as a *g* yields a different modal profile”—but for Sidelle, this is problematic: in what sense can we say that it is the *same* object which we first considered chair, etc.), and for purposes of comparison the sortals are the most interesting case anyway.

as an *f* and then as a *g*? We can't even say that there is an *object* out there which we can consider to be an *f* as well as a *g*. Hence there is no problem about ascribing to *one and the same thing* conflicting modal properties, because the sortals we use to single out first an *f* and then a *g* are different, implying that we have carved out different things.<sup>10</sup>

For the universalist, then, we *can* talk about the sum-object that is out there, available for us to be thought of as an *f* or as a *g*, whereas for the conventionalist we *cannot* talk thus: there are no mind-independent objects out there, there's only stuff. This difference is what makes Sidelle's conventionalism truly Carnapian in character<sup>11</sup>, whereas the universalist aims to position her views within the realist, neo-Quinean camp. Compare what Sidelle himself writes in the Introduction to his book:

If . . . the conventionalist is right, facts about essence and necessity have no more metaphysical depth than facts about what our conventions are (although, according to the conventionalist, this turns out to be the extent of the depth of metaphysics). . . . Metaphysical debate, then, for the conventionalist, is not a matter of trying to see deeply into the structure of mind-independent reality, but is rather a matter of trying to clarify the way we actually speak and think, and perhaps of negotiating which ways of doing this would be to our best advantage. [Sidelle 1989, p. 16–7]

This exactly matches what I said about Carnapian metaphysics in the Introduction (see p. 1).

### 3.3.2 Does Universalism Collapse to Conventionalism?

Is it open to the universalist to take option (2), that is, to hold that Heller-profiles can be assimilated to Lewis-profiles, simply by claiming that they reduce to the “four-dimensional hunk of matter”-counterpart relation which requires exact overlap in spatiotemporal extent? Ignoring difficulties concerning the identity of regions of space-time across worlds, the idea promises to fit nicely into the universalist's account of modality. But let us be careful here: we just saw that the universalist's counterpart theory proceeds by *assuming* there to be the objects we wish to say modally involved things about, which then are compared to their candidate counterparts in other worlds. That is, the objects need to be individuated *before* we start comparing them with their candidate counterparts.

Thus, the individuation of objects in terms of their spatiotemporal extent has a certain special status: we can single out such a sum-object *as* (say) a cat, and say cat-counterpart-involving things about it, or we can single out *that very same* sum-object *as* a lump of

<sup>10</sup>An important detail: this concerns pairs of sortals *f* and *g* that confer *different* modal profiles. If they encompass the *same* modal profile (as might be with, e.g., “boy” and “human being”), we can claim that one and the same thing is both *f* and *g*, of course. But in that case, no conflicting modal properties ensue.

<sup>11</sup>Sidelle explicitly puts his conventionalism in the Carnapian tradition; see Sidelle [1989, p. 17, n. 28].

cat-tissue, and say lump-of-cat-tissue-counterpart-involving things about it. We cannot conclude on this basis that the cat is distinct from the lump of cat-tissue, according to the universalist: the object we singled out as a cat is *in fact* individuated by its spatiotemporal extent, as is the object we singled out as a lump of cat-tissue; and since they spatiotemporally coincide, they are one and the same. It is *impossible* for two objects to occupy exactly the same portion of space-time. (Note that the fact that the sum-objects are all individuated independently of how we approach them, is what makes the universalist metaphysic a *realist* metaphysic, as opposed to the conventionalist we just introduced, according to which the world does not contain any mind-independently individuated *things*. But the realism is very thin: if Sidelle allowed his stuff to be divided into spatiotemporal parcels, he would already have arrived at an ontology of sum-objects.)

Why is it *impossible* for two things to occupy the same portion of space-time? Let us consider an example: could my coffee mug, Mary, have been spatiotemporally coincident with Peter, the piece of porcelain that decorates a small part of my kitchen wall? Well, Peter, which in fact is a tile, could have had any shape—such is the nature of the piece-of-porcelain counterpart relation. On the other hand, Mary necessarily has a mug-like shape (say). Presumably, then, there is a possible world in which a Peter-counterpart exists that looks remarkably like Mary, hence in that world the Peter-counterpart and the Mary-counterpart occupy the same spatiotemporal region. But then, at that world, Peter = Mary. Why is this so? Because of the way sum-objects are individuated: by the spatiotemporal region they occupy. —Could the universalist assert that there also is a possible world at which Peter and Mary spatiotemporally coincide *without* being identical? If so, there should be two distinct possible worlds, exactly alike, except for the fact that at the one, there are two objects occupying the spatiotemporal region in question, while at the other, there is only one such thing. But then, to use an argumentative strategy Lewis appreciates, these two worlds would be qualitatively indistinguishable, hence they would really be just one world (compare the way Lewis proceeds in the argument I presented in § 2.4.1 on p. 34).

What I would like to claim is that the individuation of sum-objects in terms of spatiotemporal extent grounds a kind of modality that is entirely different from Lewis-style reduced modality. I do so by first arguing that a Lewis-style reduction of modality is inadequate, and then arguing that we can reintroduce real modality by way of looking at the nature of what is supposed to ground Lewis-style reduced modality.

### 3.3.2.1 What Price Modal Reductionism?

I intend to argue against the reductive account of modality proposed by the universalist, which reduces modal truths to non-modal ones involving similarity relations (in the case of *de re* modality), or to non-modal truths concerning all (or some) possible worlds (in the case of *de dicto* modality).

Assuming a Lewis-style modal realist account of modality, we have a huge multiverse containing all the possible worlds. Suppose that God created the entire multiverse: could He instead have created a multiverse containing just two worlds—ours, and a world exactly like ours except that David Lewis was in that world called Louis Davis? If so, it might be that this in fact *is* the entire multiverse—in which case the only true non-trivial statement stating a non-actualized possibility would be “David Lewis might have been called Louis Davis”.

My speculation on the multiverse aims to bring out two points. The first is that we *can* talk about what would be the case if the multiverse were different—but it surely is ridiculous to propose a further account of “supermodality” according to which modal facts about our multiverse are to be reduced to non-supermodal facts about all “possible multiverses”.<sup>12</sup> Hence there is intelligible modality even when there is no reduction. The second, related point is an objection to Lewis’s theory which has been developed by Scott Shalkowski. He writes:

Modality is not truth in all worlds that there just happen to be. At best it is truth in all worlds *that there could be*. [Shalkowski 1994, p. 680]

The point is that, in order for the reductive account to be successful, the set of possible worlds must not include any world that is *in fact* impossible, nor can it be the case that there are worlds *missing* which are *in fact* possible. But if what worlds exist depends on what is possible, the account is no longer reductive—it is circular.

The reductionist might reply that the existence or non-existence of worlds does not depend on these modally involved criteria: the worlds that exist are just the ones that there happen to be. But if this is so, we have no reason to suppose that these worlds ground precisely the modal truths the reductionist takes them to be grounding—if they in fact did, that would be a coincidence of enormous measure, a cosmic fluke. With Shalkowski, I conclude that Lewis’s reductionism is either circular or arbitrary.

Some of Lewis’s reasons for endorsing his modal realism are inspired by Quine’s reasons for accepting sets in his ontology: our successful theories (physics) quantify over real

<sup>12</sup>Consider: we could then go on to say things about what would be the case if the “supermultiverse” (containing all the possible multiverses) were different . . . etc.

numbers, hence these exist<sup>13</sup>; analogously, our modal discourse quantifies over possibilities, hence these exist too. Real numbers can subsequently be construed as sets in a suitable way; analogously, possibilities can be construed as inhabitants of distinct possible worlds in a suitable way [see Lewis 1986a, ch. 1]. *First objection*: the cases are not analogous, since in the case of modality we can intelligibly construe our modal talk as reflecting the modal features of the objects of our actual world (this is what Shalkowski proposes, he calls it a combination of actualism with modal primitivism), whereas no such alternative is available in the case of sets.<sup>14</sup> *Second objection*: both moves are suspicious, because (if successful) they merely tell us what we are committed to by what we say, but do not tell us anything about how we should conceive of the items in question. They can only be the starting point, not the endpoint, of philosophical inquiry into sets and possibilities. Hence, in the case of possibilities, asserting their existence by way of this Quinean argument does not give us Lewis's reductionism—the reductionism comes in as a *further* step.

Kripke's famous criticism of counterpart theory, the "Humphrey objection", says that Humphrey, who in fact lost the presidential elections, "could not care less whether someone else, no matter how much resembling him, would have been victorious in another possible world" [Kripke 1972, p. 45 n. 13], whereas he does take interest in the fact that *he himself* could have won the elections, if only he had done thus-and-so. I think Kripke here means to express a worry which is very similar to Shalkowski's: if the fate of the otherworldly Humphrey is to be of any significance to Humphrey himself, that would only be because that fate *depended* on what was in fact possible for Humphrey—which makes the reduction of the relevant modal statement about Humphrey to a non-modal statement concerning the otherworldly Humphrey patently circular, since the facts about the otherworldly Humphrey would then depend on what was (irreducibly) possible for Humphrey.

Let me make one short remark on alternatives to Lewisian modal realism. Any *reductive* theory that attempts to replace the "concrete" Lewisian possible worlds with something else—be it in terms of properties [Stalnaker 1976], states of affairs [Plantinga 1974], propositions [Adams 1974] or by a combinatorial strategy [Armstrong 1989]—inevitably falls prey to the same criticisms: either the construction of such ersatz worlds is guided by modal constraints, in which case it is circular, or it is not, in which case it is arbitrary.<sup>15</sup>

<sup>13</sup>Compare principles [2] and [4] from the list of neo-Quinean meta-ontological principles I listed in the Introduction (p. 1).

<sup>14</sup>And if there were such an alternative for sets, there would presumably be reason to adopt that alternative.

<sup>15</sup>Of course, such theories might still be useful if they are not intended to deliver a *reductive* analysis of modality.

### 3.3.2.2 Real Modality

Back to our sum-objects and their different modal profiles. If my criticisms in the previous subsection are correct, counterpart modality is not real modality, it is merely *apparent* modality. But we can easily rediscover real modality within the universalist framework. Consider my example of the “modal properties” of Lewis’s entire multiverse (assuming it indeed exists): it is reasonable to say that the multiverse *could not* contain more or less worlds than it in fact does, because what makes the multiverse what it is, what *individuates* the multiverse, is the criterion that it include everything that is possible—nothing more, nothing less.

Likewise, what makes a sum-object what it is, what *individuates* that sum-object, is the criterion that it occupy exactly such-and-such spatiotemporal region. This, then, provides a basis for real modality—and, unsurprisingly, the resulting modal properties of sum-objects are exactly what makes up their Heller-profile.

The very *nature* of sum-objects requires that they obey the individuating criterion in terms of spatiotemporal extent, even at other possible worlds. Sum-objects have a nature of their own, independently of any counterpart relation; thus, to repeat what Heller says: “a four-dimensional hunk of matter, by its very nature, has its spatiotemporal boundaries essentially” [Heller 1990, p. 53]. If we try to assimilate the Heller-profile of sum-objects to just another variant of a Lewis-profile while also holding on to the universalist’s basic ontology of sum-objects, we still end up with a different layer of modality for sum-objects, according to which they have their spatiotemporal extent essentially—which is what I called the Heller-profile.

Can the universalist alleviate the problem by holding that the individuation of sum-objects simply results from our ways of thinking and talking about sum-objects, instead of being inherent in the sum-objects themselves? I claim that such a move would collapse the entire universalist metaphysics into a conventionalism not unlike Sidelle’s. To see this, recall first that the universalist is a continuant conventionalist (as I argued above, in § 3.2, and defend further below, in § 3.3.3). The only kind of things there really is, is *sum-objects*. Our partitioning all the sum-objects into a class of continuants, which is to be our ordinary domain of quantification, and a class containing all the others, depends on there being all those sum-objects to begin with, which in turn depends on their being appropriately individuated. If *this* individuation is also to be effected by our conventions, we have to say that there is only pre-individuated stuff out there, which we ourselves have to individuate into sum-objects before we can talk about them *as* sum-objects. That would extend the continuant conventionalism to which the universalist is

already committed to the much stronger, all-inclusive version of conventionalism Sidelle espouses.

In effect, I have set up a dilemma for the universalist who wishes to embrace option (2) above (see p. 52; the claim that Heller-profiles *just are* Lewis-profiles). It either leads us back to option (1): the sum-objects that make up reality do after all have a Heller-profile (which consists of their necessarily having the spatiotemporal extent that they in fact have) that is not a Lewis-profile; or it leads us straight to a Sidelle-like conventionalism, which strongly conflicts with the metaphysical realism the universalist aims for.

### 3.3.2.3 Different Layers of Modality

We have not assessed option (1) yet: that will be our next task. The Heller-profile—if it is not to be a Lewis-profile—involves a kind of modality that is entirely different from the kind of modality involved in the Lewis-profiles one may associate with sum-objects: Lewis-profiles depend on facts of similarity between given sum-objects in our world and their potential counterparts in other possible worlds, whereas the Heller-profile depends on the nature, the essence, of sum-objects, and does not depend in any way on how things are with respect to the other possible worlds. We may say that objects have a real essence (which underlies their Heller-profiles), and in addition they may have several (or even countless) nominal essences (which constitute their Lewis-profiles). The first level is the metaphysically real level, the second is, so to speak, conventional—not because Lewis-profiles are conventional (they are not, since they depend solely on objective similarities between objects across worlds), but because *we* acknowledge a merely conventionally delineated bunch of them, determined by our scheme of sortals.

Things would be good for the universalist if there were a real difference between the continuants and other sum-objects: in that case, the universalist could distinguish *three* levels of things: (a) the ontological level, where there are just the many, many sum-objects with their Heller-profiles, instantiating the vast mosaic of local matters of particular fact; (b) the continuants-level, which comprises all the continuants with whatever it is that distinguishes them from the other sum-objects and hence also dictates which sortal concepts we should employ, thereby selecting a number of Lewis-profiles for these continuants; and (c) the conventions-level, which comprises all the objects considered in all possible ways, according to any conceivable scheme of sortals, together with all the Lewis-profiles that correspond to these.

Is there a way out for the universalist who does not like the conventionalism associated with the two-level view, hence would prefer the three-level picture? In what follows,

I will first present a short argument to the effect that, given a universalist metaphysic roughly as developed here, continuant conventionalism is inevitable, and then I will discuss two attempts to locate a real feature of continuants that separates them from all the other sum-objects: Sider's causation-based theory, which tries to keep within the confines of Lewis's Humean supervenience thesis, and Hawley's non-supervenient relations account, which, as the name suggests, rejects Humean supervenience.

### 3.3.3 Avoiding Continuant Conventionalism?

In the literature, the perdurantist's framing of the problem of distinguishing the continuants from all other sum-objects is as follows. There are all the sum-objects, a small subset of which contains the continuants. Subsequent time-slices of such continuants are not strictly identical to one another, of course, but they are related differently than the time-slices of non-ordinary objects—one might say, by a relation of cross-temporal identity. This special relation is usually called *genidentity*. Notice that genidentity is a purely perdurantist notion: endurantists will say that the relation of cross-temporal identity *just is* the relation of numerical identity, hence they do not need an account of genidentity.

A considerable part of the recent debate on genidentity has been focused on a thought experiment involving qualitatively indistinguishable worlds containing a homogeneous disc or sphere that is either rotating or not rotating, the issue being whether a difference between these two possibilities can be ensured by various proposed accounts of genidentity [Armstrong 1980; Lewis 1999b; Zimmerman 1998, 1999; Hawley 2002, ch. 3]. I will not adopt this way of approaching the issue, since I think it is better discussed directly, instead of by a detour involving such remote scenarios.

My argument to the effect that there is no way out for the universalist, that she is forced to take a conventionalist stance towards the distinction between continuants and other sum-objects, runs as follows. First, recall that, on the ontological level, there simply is the whole plethora of sum-objects and their parts (which might include atoms). Observe that simply *listing* all and only the continuants from among all the sum-objects will not do—because then *any* list of objects would be ontologically on a par with that special list, leaving the choice between all the available lists to us, and that is simply a peculiar way of stating continuant conventionalism.

The universalist will here call to his aid Humean supervenience, and hold that the relation of genidentity supervenes in some way on locally manifested properties. All right. Suppose that we find in all and only the continuants among the sum-objects some

peculiar feature, *F*. We can then say: “Look, there’s a real difference: the continuants are distinguished from all the other sum-objects by having feature *F*!” Unfortunately, that will not do either. Assuming there to be some diversity amongst the features and qualities instantiated in our world, there will undoubtedly be many alternative qualities and features instantiated by highly different classes of sum-objects. So what makes *F*, amongst all these features and qualities, so special? The point is the same as with the list-objection: using a feature or quality to pick out a list of objects does nothing to weaken that challenge.<sup>16</sup>

Here a suspicion arises. More elaborate ways of picking out the desired class of continuants will, in effect, just amount to more complex (and maybe more elegant) ways of picking out that class. But for all such ways we will be able to construct alternative ways yielding different results, and hence conclude that it is not the features of the world that dictate which are to be the “real” objects of our ordinary ontology, but rather our conventions—maybe it is our choice of what feature or set of features is crucial, or our choice of more complex principles that determine what are continuants and what are not. Or maybe it’s not our *choice* of such principles, maybe these are rather built into us in some way, maybe we cannot but view *these* objects as the continuants. Either way, we have continuant conventionalism.

The point is that extensional adequacy is just not enough. A mere list of all and only the continuants is extensionally adequate, of course, but does not give an ontological difference between the objects on the list and the ones not on the list. Moreover, using features or qualities or relations of or among sum-objects to demarcate the right class of objects, if at all extensionally adequate, will not do either, since (presumably) many different classes of sum-objects can be singled out using features or qualities or relations of or among them.<sup>17</sup> By letting the continuants fade into the ontological background of all those many, many sum-objects, the universalist has lost his ontological grip on them and has to revert to conventionalism in order to bring them out again. The quote from Sider concerning the Tud-example I gave in the previous section above (p. 48) is a striking illustration of this point.

Nor does it matter whether we hold completely fixed exactly which objects are the continuants. We may even allow for some revision of our ordinary judgments in these

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<sup>16</sup>The universalist might hope to evade such difficulties by calling to his aid the distinction between natural and non-natural properties. However, see below (§3.3.3.1) for criticism of this very move.

<sup>17</sup>The universalist might point here to a distinction between perfectly natural properties and non-natural properties, and argue that this distinction will come to his aid in determining which sum-objects are the continuants. I discuss this idea below (in the next subsection), in the context of my criticism of Sider’s solution.

matters by the universalist, if he succeeds in showing that, *in fact*, the continuants are such-and-such. But he won't succeed, for the reasons given.

I take considerations much like these to be conclusive, they will lead one to accept that universalism implies continuant conventionalism. Nevertheless, it will be instructive to cast a brief look at the mentioned proposals for grounding the distinction between continuants and other sum-objects in reality instead of in us. My remarks on these proposals will be rather condensed, since they involve reference to sophisticated philosophical positions on issues such as universals, laws of nature, and causality, that are not the proper theme of the present essay.

### 3.3.3.1 Causality and Laws of Nature

Sider's solution tries to save Humean supervenience, by taking into account considerations concerning causality and natural laws. I described his views on the matter in the previous chapter, § 2.3: the continuants are the ones to which our laws of nature (specifically, laws of dynamics) apply, and the laws of nature apply only to the continuants; thus Sider defines both at once with the help of a "best system"-theory of laws: the delineation of the class of continuants that results in the best candidate set of laws of nature is the *correct* delineation of continuants.

For a start, we don't know at all whether this procedure will be extensionally adequate, whether it will in fact yield the "physical continuants" we expect it to yield—but, Sider might say, so much the worse for our bias towards common-sense ontology. No matter: there are other, bigger, problems with this proposal.

First of all, as the quotes from Lewis and Sider I gave earlier (see p. 28f.) show, the notion of a "perfectly natural property" plays a crucial role for the thesis of Humean supervenience in general, and for Sider's best system theory in particular. Initially, one might think that a metaphysically thin notion of properties according to which they are simply classes of things would fit the general outlook of universalism. However, as Lewis says (he uses the word "property" here in exactly this sense):

Because properties are so abundant, they are indiscriminating. Any two things share infinitely<sup>18</sup> many properties, and fail to share infinitely many others. That is so whether the two things are perfect duplicates or utterly dissimilar. Thus properties do nothing to capture facts of resemblance [Lewis 1983a, p. 13].

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<sup>18</sup>Lewis here considers properties to be sets of *possibilia*, of which he believes there to be at least infinitely many. Hence the occurrence of "infinitely" here. For my purposes, it does not matter whether we invoke *possibilia* or not.

Thus, Lewis is dissatisfied by such a liberal notion of properties, because it does not enable us to account for what he calls (following Armstrong) “Moorean facts of sameness of type” (e.g., that two lumps of gold are of the same type). Moorean facts are very basic facts of common sense; any philosophical theory that denies a purportedly Moorean fact is *ipso facto* suspect. To account for such facts, Lewis says, we need to be able to distinguish the properties that are *natural* from those that are not. Things would then resemble one another if they shared at least some natural properties, and they would be perfect duplicates if they shared all their natural properties.

I was surprised to find Lewis arguing as follows in this context:

A system that takes certain Moorean facts as primitive, as unanalysed, cannot be accused of failing to make a place for them. . . .

An adequate Nominalism<sup>19</sup>, of course, is a theory that takes Moorean facts of apparent sameness of type as primitive. It predicates mutual resemblance of the things which are apparently of the same type; or it predicates naturalness of some property that they all share, *i.e.* that has them all as members; and it declines to analyse these predications any further. [Lewis 1983a, pp. 20–1]

It strikes me as a rather dubious move to simply take the natural/unnatural distinction as primitive. Not because having primitive, unanalysed notions is to be forbidden—that’s true of CEM, too; in our formulation of it, the proper parthood relation was taken as primitive. But compare Lewis’s way of taking naturalness as primitive with the primitiveness of the notion of parthood embodied in CEM. When it comes to applying CEM to metaphysics, we do take this notion metaphysically seriously. It structures the ensuing ontology, as is apparent from everything we’ve seen so far concerning the universalist metaphysic. However, a primitive notion of naturalness that can be employed by Lewis’s Nominalist is precisely adopted as a way of *eschewing* further metaphysical consequences. After all, nothing in the ontological nature of the sets thus elevated to be the natural properties is changed. In short, I disagree with Lewis on whether a “system that takes certain Moorean facts as primitive” can be “accused of failing to make a place for them”. I don’t think one can save a system that is clearly at odds with certain Moorean facts by just *stipulating* them to hold. In fact, with regard to the distinction between natural and other properties, the universalist is in much the same position as with regard to the distinction between continuants and sum-objects; one might argue that she has to subscribe to a kind of natural property conventionalism similar to the continuant conventionalism she is committed to—or so I argue.<sup>20</sup>

<sup>19</sup>Lewis is not here defending such Nominalism—he’s merely pointing out what an “adequate” Nominalism would be. He himself would be just as happy with real universals. By the way, Lewis capitalizes “Nominalism” here for reasons of disambiguation that don’t matter for our purposes.

<sup>20</sup>Sider might try to broaden the scope of his best systems approach by claiming that it not only yields

A similar point, aimed more specifically at Sider's best systems account, is the following. As Lewis himself notes, the standards of strength and simplicity involved in that account are *our* standards—what if different folks have different standards?

The standards of simplicity, of strength, and of balance between them are to be those that guide us in assessing the credibility of rival hypotheses as to what the laws are. In a way, that makes lawhood depend on us—a feature of the approach that I do not at all welcome! [Lewis 1986c, p. 123]

Lewis is right in feeling uneasy about this feature: assuming metaphysical realism, it seems rather odd that what the laws of nature are should depend on how we like our theories.

Furthermore, requiring our account of laws of nature to be *also* an account of what continuants there in fact are seems to be too demanding: the laws of nature do indeed *govern* those continuants, but they do not *constitute* them—or, at least, that is how we normally understand laws of nature, and, I contend, that is the way such laws are understood in the sciences.

Finally, and most importantly, Sider's way out is no different from the strategies I criticised earlier: it's a quite elaborate and complex procedure for demarcating a certain class of sum-objects, which are to be the continuants. However, there surely are alternative, equally complex procedures for demarcating different classes of sum-objects (maybe based on standards different from simplicity and strength, or on a different way of applying these standards, or on different choices of what the "natural" properties and relations are, etc.)—what makes it the case that Sider's is the "right" procedure?

Sider's strategy, though certainly ingenious, is not convincing—it is, at root, no different from the strategies we dismissed earlier. Below we will take a look at a strategy that is different: Hawley's non-supervenient relations account.

One last remark on Sider's theory: his account of genidentity is at odds with the way in which laws of dynamics are understood in physics, hence it shows yet another unattractive feature of (his version of) the universalist metaphysic. For consider Newton's first law of motion: *every body will remain at rest, or in a uniform state of motion, unless acted upon by a force.*<sup>21</sup> This law tells us something about *enduring* bodies, it is not a (perdurantist) recipe for picking out only sequences of momentary objects that yield sums that in fact

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what are the continuants *and* what are the laws of dynamics, but *also* what are the natural properties. However, this approach is doomed to failure: given that *any* set of objects corresponds to a putative natural property, and that *any* sum-object classifies as a putative continuant, there will be no way to distinguish better from worse systems. We would, as it were, have an equation with too many unknowns.

<sup>21</sup>For ease of exposition, I pick an example from classical mechanics.

obey this law, as Sider suggests. The difference between these conceptions comes out nicely when we look at explanation: why is this body still in the same uniform state of motion? The endurantist (and the physicist) answers: because no forces acted upon it. The perdurantist answers: because it is a sum of time-slices that was selected to answer Newton's first law. The endurantist's answer is explanatory, the perdurantist's answer is trivial.<sup>22</sup> The perdurantist's account makes it difficult for us to *discover* laws of nature, we lack the necessary epistemic grip on things if the laws are not merely *obeyed* by the things (which we can check in experiments) but are in fact *constitutive* of those very things. I return to this issue later, in § 4.1.

### 3.3.3.2 Non-Supervenient Relations

Katherine Hawley is very explicit about her project of arguing for non-supervenient relations. She says:

To deny endurance theory is not to believe that all series of stages are on a par, nor that facts about persistence reduce to or supervene upon intrinsic features of stages. [Hawley 2002, p. 98]

[T]here are objective differences between series of stages which correspond to ordinary objects [continuants, JM], and those which do not. [*ibid.*, p. 90]

I claim that there are relations between the distinct stages of a persisting object [a continuant, JM] which are not determined by the intrinsic properties of those stages. . . .

What are these non-supervenient relations? They are the relations, whatever they are, which underpin the relation of 'immanent causation' which holds between stages of the same object . . . [*ibid.*, p. 85–6]

That is, non-supervenient relations obtain between the stages of a continuant, and that is what distinguishes the continuants from other sum-objects. I will not here get into a discussion as to what Hawley exactly means with "immanent causation"—suffice it to say that she uses the term mainly to distinguish the causing of a later stage by an earlier one from other kinds of causation, so that she can go on accounting for such immanent causation in terms of her non-supervenient relations whilst leaving open what the correct account of causation in general is.

Hawley is clear about why she thinks non-supervenient relations are needed:

The later stage depends for its state upon that of the earlier *because* they are stages of the same object [i.e., continuant, JM]; because, according to me, they stand in a nonsupervenient relation to one another. [*ibid.*, p. 87]

<sup>22</sup>I rely here on an intuitive notion of explanation, the one I take to be at work in scientific practice. It would be interesting to look at different accounts of explanation in this context—I'm sure there is one according to which the universalist trivial explanation still counts as an explanation; in that case I would argue that the universalist has, once again, *replaced* a phenomenon, in this case explanation, in order to make things work for her metaphysics. However, I cannot dive into this issue here, for reasons of space.

So, the qualitative similarity among stages of the same object is itself explained by their being stages *of the same object*, instead of *vice versa*. This makes Hawley's non-supervenient relations have a genuine metaphysical import—they add something new at the ontological level. Hence her account is not easily refuted by my arguments against Humean supervenience-based accounts of genidentity: we cannot just look for different relations that would yield a different class of sum-objects, since we're dealing with relations unique in kind (if they were not, the position would of course fall prey to my earlier criticisms).

I'm inclined to admit that Hawley's solution solves the problem—she expands the ontology in such a way that an objective, ontological distinction between continuants and other sum-objects becomes possible. But I do have three worries. First: aren't these non-supervenient relations very mysterious indeed, and, relatedly, isn't the move to assert their existence rather *ad hoc*? Secondly: isn't it very suspicious that those non-supervenient relations just happen to hold between stages that we, on our ordinary, endurantist understanding of reality, would call one enduring continuant—that is, doesn't Hawley's solution sneak in endurantism by the back door? And thirdly: if we're being metaphysically bold by invoking such a metaphysically substantial, new type of relation, why not simply fall back to the more intuitive option, endurantism? Consider: we are asking what makes some classes of stages (the ones corresponding to continuants) stand out from others. Why not simply say that the former classes of stages are the classes of stages *of enduring continuants*, thus returning to endurantism? Then we would not need any mysterious non-supervenient relations. Moreover, Hawley's claim that "the later stage depends for its state upon that of the earlier *because* they are stages of the same object" makes straightforward sense if we give it an endurantist reading: "the later state depends on the earlier state *because* they are states of the same object."

Hawley is aware of the worries that I have just sketched, but still, she sees reasons to prefer her version of perdurantism to an endurantist outlook. According to her, the endurantist has to make the existence of an object an all-or-nothing affair: either there *is* a certain enduring object here, or there is *not*. Hawley does not like such a view, she prefers an account that makes room for a certain degree of vagueness in these matters: it can be indeterminate whether some thing has persisted or not. On an endurantist picture, such indeterminacy would have to be construed as indeterminacy *in identity*, whereas on Hawley's approach such indeterminacy would be construed as indeterminacy as to whether a certain *relation* (her non-supervenient relation) holds between certain stages. And most people agree that vagueness in identity is very problematic indeed, while vagueness in whether some relation obtains or not is less problematic.

I will not here discuss this issue—that requires having a thorough look at vagueness. Let me conclude that, insofar as Hawley’s account seems promising, it invites the question: why not endurantism? And even if we don’t move to endurantism, it is still clear that we have almost left the fields of CEM-inspired metaphysics if we adopt Hawley’s theory. For it is quite plausible to take her non-supervenient relations to ground a type of composition that is different from the operation of mereological summation. Consequently we have, besides all the sum-objects, an additional class of composite objects that are composed in this special new way—those would be the continuants. But then, the continuants’ being composed of certain parts is no longer a purely mereological matter, and hence CEM does not apply to them (or at least not straightforwardly). In any event, the non-supervenient relations do remain problematic and *ad hoc*.

### 3.3.4 How Much Revision?

Let us return to our dilemma. The universalist can choose from among two options (see p. 52): (1) accept that every object has a Heller-profile that is entirely distinct from the Lewis-profiles it has, and (2) insist that a Heller-profile *just is* a Lewis-profile.

Option (1) amounts to accepting that every sum-object has two distinct layers of modal profile, its Heller-profile and its Lewis-profiles—the first involves real modality and depends on the very nature of sum-objects (their spatiotemporal extent), the second involves apparent modality and depends on similarity relations between objects across worlds.

With regard to option (2) I have argued that it is, after all, unavailable for the universalist, since it either leads to a full-blooded conventionalism incompatible with the universalist’s metaphysical realism, or else straight back to option (1). Furthermore, I have argued that a certain extension of (1), according to which there is a real, non-conventional difference between continuants and other sum-objects and hence a real difference between some Lewis-profiles (those corresponding to ordinary sortals) and others, is also unavailable to the universalist, because no real difference between continuants and other sum-objects is to be had.

We have to conclude, then, that the universalist is stuck with option (1) as it stands: objects have a real essence, they are sum-objects having their spatiotemporal extent essentially (Heller-profile); and they have a host of nominal essences (Lewis-profiles), from among which our conventions, our ways of talking and thinking, pick out a certain class. Those sum-objects that have a Lewis-profile recognized by our conventionally determined sortals are the continuants.

The first thing to say is: if this is indeed the metaphysical theory proposed by the universalist, then it should also be presented as such. The only universalist I am aware of who actually does so is, to repeat, Mark Heller. All others, Lewis and Sider included, write as if things were different, as if all there is to modality is captured by counterpart theory, as if we can unproblematically talk about continuants and pretend to be realists about them.

I have identified two different factors which make it difficult for the universalist to maintain his realism about continuants. At first sight, he seems to be home free, since he equates the continuants with sum-objects, and these, he stresses, are surely real. The first factor undermining this picture consists in the difficulties he encounters when trying to distinguish the continuants from the other sum-objects. The second factor consists in the fact that, although he seems at first sight to have a robustly realist theory of modality—the similarity-relations which allegedly ground the modal aspects of things are as objective and real as could be!—that theory turns out to be not a theory of *real* modality but only of *apparent* modality. The only real modality is embodied in the Heller-profiles of things.

Let me make a suggestion. In philosophy, one may try to account for some difficult phenomenon or fact by offering a conception of it that fits one's general philosophical outlook or project. But there is a point at which one might start wondering: is the proposed conception still a conception *of* the very phenomenon or fact we set out to capture? Or have we, rather, changed the subject? In the previous chapter, I suggested that the perdurantist conception of physical objects is not merely a different conception of the same thing, but rather a *replacement* of enduring objects by perduring sum-objects. I also suggested that the perdurantist conception of change is not merely a different conception of change, but rather a *replacement* of what we take to be change by something else, namely, perdurantist change. Here, I have suggested that the universalist conception of modality does not really account for *modality*, but replaces it by something else, namely, *apparent* modality, relations of comparative similarity. Insofar as real modality can be recovered, it is only in the form of the Heller-profiles of things.

With the help of these replacements, the universalist is able to say everything anyone could want to: that there are various kinds of things in the world, that these things can change, that they might have been different in various ways, etc. But do these sentences, on a universalist reading, really express what we want them to express? I don't think so.

Consider the following analogy. I propose an ontology consisting of just the real numbers—real numbers and their properties and relations, that’s all there is. Then I go on to construct ingenious theories that allow me to say all the things anyone could want to: that there are various kinds of things in the world (which comes down to the fact that there are several real numbers having certain properties), that these things can change (which comes down to the fact that some numbers are related in some fashion), and that they might have been different in various ways (which comes down to these numbers being related to others in some other fashion). Clearly, no one would take such a theory seriously: it’s just outrageous to say that the only things there really are, are the real numbers. You and I, for example, are not real numbers.

But consider the thesis that objects *are* regions of space-time. If we consider space-time a four-dimensionally extended thing, we can represent every mereologically simple part of it (i.e., every space-time point) by a quadruple of real numbers, hence all the regions there are can be represented by the powerset of quadruples of reals. If we take any class with the same cardinality as this powerset ( $\beth_2$ ) as our ontological starting point, and find a suitable way to construe our ordinary talk as talk about properties and relations elements of this set have by standing in certain mathematical relations to one another, we arrive at a result not at all unlike our “real numbers”-ontology. But it is not unlike Heller’s ontology of four-dimensional hunks of matter either—we just have to add an extra “dimension” which assigns to every four-dimensional point a further real number representing the “content” of that region (that would also be enough to describe a four-dimensional Humean mosaic of local qualities). —What I mean to suggest is this: it is of no particular interest that someone could show how to construe everything we would like to be able to say about reality in such a way that it all turns out to be about the real numbers. Likewise, it is of no particular interest that the universalist can construe our talk about continuants, change, modality and the like in such a way that it fits her radically revisionary ontology. As we have seen, this ontology is largely the work of GEM.

If my criticisms are correct, the universalist metaphysic just is Heller’s metaphysic, with a lot of extra theory to cover up the discrepancies it shows with our common-sense world view: all there really is, is four-dimensional hunks of matter having their spatiotemporal extent essentially; all else is but frills added by our conventions, by the way we talk and think. Hence many of the problems and paradoxes associated with our ordinary, endurantist ontology of continuants (I sketched some of them in the Introduction; see p. 5) can be dealt with easily by the universalist. This is often praised as a virtue of the universalist metaphysic—however, in this context, I fully agree with Wiggins when he writes:

Solving problems by making them disappear can be an excellent strategy in philosophy. But it cannot minister to all needs or the great generality of questions. [Wiggins 2001, p. 182]

Only philosophers thoroughly in the grip of a preference for desert landscapes, ontological parsimony and nominalism, and for formal/algebraical clarity and perspicuity could come up with a metaphysic like universalism. Of course, such philosophers will be attracted by CEM as the correct mereological foundation for a realist metaphysic, since CEM, as we saw already in § 1.2, convincingly displays precisely these virtues. But with Russell, I would like to stress the importance of a robust sense of reality in matters metaphysical: we engage in metaphysical inquiry in order to discover the most basic truths about reality—about *reality*, that is, and not about some constructed, idealized picture. More on this in the final chapter of this essay.

### 3.3.5 A Methodological Remark

I wish to close this chapter by pointing out what I take to be the most important methodological lesson to be drawn from my discussions. The universalist tries to offer a metaphysic that is compatible with CEM, the hallmark of austere, nominalist ontology, but at the same time disguises the true nature of her proposal by adopting the strategy I outlined above: offering alternative conceptions of apparently difficult phenomena (enduring objects, change, modality, status of continuants, etc.) that in effect *replace* these phenomena by some surrogate (perduring objects, properties of distinct time-slices, relations of comparative similarity, conventionally chosen sortals, etc.).

The contemporary debate, e.g., between endurantists and perdurantists, is almost entirely focused on which theory has the best solution for certain problems, a nice example being the extensive literature on the possibility of worlds containing qualitatively identical disks that rotate or fail to rotate (I alluded to this discussion earlier, see p. 60). Unsurprisingly, then, the situation is sometimes described as an impasse<sup>23</sup>: neither side seems to be able to offer conclusive arguments. I said earlier that whether or not some metaphysical theory can account for certain phenomena (such as change, persistence, modality) is of no particular interest—with enough imagination, our ordinary talk concerning change, persistence and modality can be construed to fit any ontology. What matters is, rather, whether we should accept the new ontology or not. I contend, therefore, that metaphysical discussions such as the one between endurantists and perdurantists should proceed by trying to decide whether there is enough reason to *abandon*

<sup>23</sup>Michael Della Rocca opened his recent unpublished ZENO-lecture at Leiden University on September 24, 2009, entitled “Primitive Persistence and the Impasse between Three-Dimensionalism and Four-Dimensionalism”, by saying: “An impasse, that’s what we have.”

the established, endurantist ontology of continuants in favor of the *proposed*, perdurantist view.

My criticisms of the universalist metaphysic can now be seen to serve a double purpose: on the one hand, they have aimed to contribute to a systematic assessment of the view; on the other hand, they were meant to help establish the conclusion that universalism indeed *is* not merely a proposal to think slightly differently about reality, but rather a radical *revision* of our entire world view. For only if we are clear about this fact can the discussion as to whether we should thus revise our world view unfold in a fruitful manner. In what follows, Part II of this essay, I use the results of my discussions in this first part to argue that we do not have enough reason to change our metaphysical ways thus radically—not by far.

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## **Part II**

# **Metaphysically Inspired Mereology**

## Chapter 4

# On Doing Metaphysics

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**I**N THE PREVIOUS PART, I have developed the universalist metaphysic from its mereological starting-point, which lead to a series of metaphysical moves that I have extensively criticized. Let me list the most important results of my discussion:

- (1) CEM-inspired metaphysics requires perdurantism, which comes down to a radical revision of our ordinary, endurantist framework: instead of having the *same* object first here-such, then there-so, we get a succession of *different* short-lived objects which appear *ex nihilo* constantly, and vanish equally inexplicably.
- (2) The perdurantist account of change makes it be analogous to spatial variation, which it isn't—again a radical revision, here of our ordinary conception of change (and thereby of motion and persistence).
- (3) CEM requires acceptance of unrestricted mereological composition, which adds to the continuants a very crowded realm of sum-objects, which are ontologically on a par with the continuants (the continuants are themselves construed as sum-objects); this raises the question as to how the universalist distinguishes the continuants from all the other sum-objects (see (9) below).
- (4) Unrestricted mereological composition strongly suggests that composition be construed as identity (CI); this has implications for modality as well as for issues concerning conventionalism (see (7)–(9) below).
- (5) Universalist-style composition is aggregative, but, as Fine argues, there is an alternative equally general and unrestricted notion of composition, compounding, which however does not fit the universalist outlook—hence there is no argument from the nature of composition to perdurantism.
- (6) Since the whole conglomerate of sum-objects constitutes the ontologically basic level (Reality *just is* the sum of all the sum-objects), the thesis of Humean supervenience, according to which the vast mosaic of local matters of particular fact subvenes everything

else, can be regarded as a natural expansion of the universalist view.

- (7) The universalist is committed to something like a counterpart theory of modality, which is reductive in spirit, and makes the modal profile of things dependent on which counterpart relations are involved, where these in turn are determined by the sortals we invoke. This reductive theory of modality fails: to avoid circularity, it has to accept a certain arbitrariness—again, we have a radical revision, here of our ordinary conception of modality.
- (8) Given the individuation of sum-objects as (the contents of) regions of space-time, we can recover a notion of (non-reductive) real modality, which tells us that sum-objects have their spatiotemporal boundaries essentially (Heller’s view), hence sum-objects lead a modally double life.
- (9) The universalist can only distinguish between continuants and other sum-objects in a conventionalist vein, which is at odds with her metaphysical realism. Consequently, the universalist is also committed to conventionalism concerning natural kinds and natural properties, and (given Sider’s view on natural laws) also a conventionalism concerning laws of nature.
- (10) In effect, the universalist presents us with a two-layered picture of reality along the lines of Heller’s position: reality is an all-inclusive four-dimensionally extended thing, every region of which contains exactly one sum-object having its spatiotemporal extent essentially. The continuants, including their specific modal profiles and the natural properties they exemplify, can only be singled out by convention, the modality involved is not real modality, and our endurantist conception of things is just wrong.

Should we accept the universalist metaphysic? I have argued that *if* we accept it, we are accepting a radical revision of the established view. The question is, therefore, whether we have enough reason to accept such extensive revision.

In this chapter, I start by arguing that we do not have such reasons—on the contrary, we have strong reasons to reject such revision. Moreover, I will give a diagnosis of the role of mereology (in particular, of CEM) for the universalist’s approach, hence giving a partial answer to the question that is central to this essay: what does mereology teach us about reality? Recall that, in the Introduction, I said mereology could be understood either [A] as being about the parts of *given* wholes, or [B] as being of importance for deciding what there is (see p. 3): [B] lies at the basis of CEM and of universalism; I argue that it is mistaken. Finally, I will sketch an alternative view, which rests on [A], does not involve as radical a revision as [B], and hence contributes to my answer to the question what the proper role of mereology is within the metaphysical enterprise. Although mereology, on this alternative conception, will not be a purely formal theory, I will have something to

say about the formal properties of my metaphysically modest conception of mereology (which comes close to *S~~Z~~M*; see § 1.2, esp. p. 15).

The aim of this chapter is not to present a fully fledged realist metaphysical theory, nor is it to establish a fully developed, substantial mereological theory. Rather, the aim is to find out what mereology might teach us about metaphysics, how we should go about in constructing viable mereological and metaphysical theories—my conclusion will be that they should be developed in tandem. Although I will sometimes touch upon contentious or controversial metaphysical views, I will not defend (nor attack) such specific metaphysical doctrines but rather use them to illustrate what the proper approach to realist metaphysics and to mereology is, and to indicate the general direction in which a viable realist metaphysic that is not as revisionary as universalism might be developed.

## 4.1 Against Revision

In the Introduction I gave a brief characterization of the scientifically informed, common-sense view of the world that has been present in the background of every bit of criticism I have aimed at the universalist metaphysic, thus showing to which extent the latter view departs from the former. On the common-sense view, the *prima facie* answer to the question “What is there?” would consist of a list of examples of the diverse kinds of continuants that inhabit the world: trees, cars, human beings, atoms, stars, etc. The way we understand these is as enduring things being capable of undergoing certain sorts of change—that is, having certain modal profiles.

The first thing to stress in this context is that this is not just a convenient way for us to think about the world, as, e.g., the decimal system is just a convenient way for us to think about numbers, while any other base (octonary, senary, hexadecimal or whatever) would do just as fine.<sup>1</sup> Our very grasp of reality depends on it, we make sense of things around us, both in ordinary life and in scientific contexts, in terms of the common-sense view. Hence we should not take its replacement lightly; any alternative should be well-motivated, and should hand us the conceptual tools to make sense of reality in at least as good a way as we can now.

For someone inclined to adopt a Carnapian, anti-realist/conventionalist kind of view, considerations such as these will not have much force. However, my concern is with universalism, which purports to be a realist metaphysic (I will have more to say on the relation between universalism and Carnapian anti-realism below, in § 4.2). For such a

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<sup>1</sup>Which is not to deny that it takes considerable effort to get used to a different scale.

view, I contend, they do matter—that is why I presented result (9) above as a *criticism* of universalism. Let us have a closer look at what kinds of problems the universalist faces, in this respect.

Consider, for a start, scientific experiments. The experimentators put the necessary equipment in place, they set the initial conditions in the way thought to yield the expected results without too much interference from external factors, etc. All of this involves manipulating objects, continuants, which have to be understood as enduring things lest the whole endeavour becomes incomprehensible: on a perdurantist view there can be no real moving around objects or changing their features as required by the experiment, since there is no real motion nor change (result (2) above); indeed, even the very idea of manipulating an object in any way at all becomes problematic if we consider Thomson's point about perdurantist persistence: the object divides into time-slices, and time-slices cannot be manipulated—they don't last long enough (result (1) above).

The point can be illustrated by appeal to the recently developed and highly popular interventionist accounts of causality, which (very roughly) take *a* to be a cause of *b* just if various interventions on *a* would produce variations on *b* in some systematic way [see, e.g., Woodward 2003]. For purposes of scientific experiments, we may think of the manipulations of objects involved in them as paradigms of interventions; I maintain that it is precisely this aspect that makes the interventionist account so acceptable from a scientific point of view. Moreover, the interventionist view, based as it is on a counterfactual understanding, shares crucial features with Lewis's classic counterfactual analysis of causality [see Lewis 1973], in particular, it has a certain modal aspect: it considers what would have happened to *b* if *a* had been different in certain ways. This makes sense from the (philosophically developed) common-sense point of view: the things involved in the experiment have certain modal profiles, certain capacities, which means that they allow certain manipulations (changes) but not others and are capable of producing certain further changes themselves; the experiment typically yields knowledge about the objects in question in these respects. The difficulties I found in the universalist conception of modality (results (7)–(8)), make it very hard for the universalist to subscribe to such a (quite plausible) understanding of causality and intervention within the context of scientific experiments.<sup>2</sup>

A related issue, which we have had the opportunity to discuss in some detail earlier, concerns laws of nature, as these are determined and used by scientists. I noted earlier

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<sup>2</sup>I realize that this paragraph consists of mere handwaiving; I do not intend to provide precise, balanced remarks on interventionism here. The point was, to repeat, merely to illustrate the incompatibility of universalism with scientific practice by way of a recent example drawn from the philosophical discussion.

that there probably are no scientists who would accept Sider's way of construing the laws of dynamics—as the net result of a “best system”-approach, yielding both an answer to what the continuants are and an answer to what the laws of dynamics are. The objects to which the laws apply are *given*, the physicist is not busy determining which amongst an indefinite amount of sum-objects are the continuants to which his candidate laws are to apply. Prospects for other kinds of laws of nature (laws of physics, but also laws of chemistry, biology, and of further sciences, if they have laws) are similar: given the difficulty universalists have with delineating the continuants (result (9) above) and the unusual nature of perdurantist objects in general (result (1)) such laws cannot be understood as they are by present-day science.

The point I am trying to make here does not allude solely to scientific *theory*, but points also to scientific *practice* and the way scientists understand their theories. Even if, with some effort, scientific *theory* can be made to match the universalist metaphysic (witness Sider's way of incorporating the laws of dynamics into his views: not a single word in the formulation of these laws needs to be changed in order for him to be able to do this), we still have to point out that, in doing so, the universalist abandons the scientist's understanding of his own theory as well as our understanding of the practice of scientific experiments.

Further doubts about the adequacy of universalism appear once we consider *ourselves*: we place ourselves as rational living beings amongst the various things that inhabit our world, beings that can perform free actions, can be held responsible for what they do, etc. If, on the universalist view, we are but a bunch of sum-objects, ultimately not much different from any other sum-objects (given that the delineation of the continuants from the whole plethora of sum-objects is a matter of conventions; see result (9)), and, moreover, our identity over time is understood in a perdurantist way, it becomes very difficult to even approach this common-sense view. Why hold a later time-slice responsible for actions performed by entirely distinct earlier time-slices, especially if the later time-slice is part of many sum-objects that do not even include those earlier time-slices?

It might seem that I am assuming the scientifically informed common-sense view to be the *right* view. However, I do not mean to suggest that this is so (nor that it isn't). Rather, my point is methodological: if we want to be metaphysical realists, our starting point should be precisely the common-sense picture—we start, so to speak, *in medias res*.<sup>3</sup> It might be that philosophical reflection on that picture (as well as further scientific inquiry) reveals certain flaws or inadequacies in it, or compels us to judge parts of it

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<sup>3</sup>Compare the famous parable from Neurath: we can only rebuild our boat little by little while staying afloat in it, we cannot build a new one from scratch.

to be wholly mistaken. The history of human thought offers ample illustrations of just such changes. Nor is there any reason to allow only small, local revisions of our views: for all we know, we might be on the wrong track on a large scale, and then there will be good reason to revise our views drastically.

Various metaphysical problems and puzzles concerning the common-sense ontology of continuants have been identified, and continue to inspire lively debate amongst metaphysicians today—among those are questions concerning colocation, vagueness, identity, and modality which indeed pose considerable challenges for the common-sense view. Careful reflection on such problems might show that, in the end, certain very central aspects of that view will have to go. However, when faced with conclusions to this effect, there are usually two options available: one might start implementing such revisions, or one might question those conclusions and continue looking for ways of solving the puzzles and problems.

If someone is convinced that there are insurmountable problems with the common-sense view, she will have to offer some alternative, of course—merely stating a negative conclusion will not do. This alternative will have to be not merely coherent and devoid of the kind of problems that lead to abandoning the common-sense view in the first place, but also *viable* as an alternative to it, which involves offering a general understanding of reality just as good as the old view as well as applicability in ordinary and scientific practice. This is exactly the point at which I have been expressing doubts concerning universalism in earlier chapters and in the current section. I hope my review of the universalist position has made clear that, at best, a lot needs to be done for it to be viable in this sense.

Why does the universalist view enjoy such popularity? Part of the answer, I think, lies in the history of analytic philosophy, and in particular, in its roots in the anti-metaphysical, empiricist tenets of logical positivism. Another, related part of the answer lies in the neo-Quinean meta-ontological principles I listed at the beginning of this essay, in the Introduction (see p. 1). And these, in turn, constitute a considerable motivation for taking CEM as the starting point for metaphysical theorizing.<sup>4</sup> So let us focus once more on mereology, in particular on CEM, to determine to what extent mereological considerations speak in favor of the universalist view, and, more importantly, whether the virtues CEM exemplifies are indeed the ones we should care about. It will prove helpful to touch upon the historical background of CEM as well.

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<sup>4</sup>Here I wholeheartedly agree with Koslicki, who says that if we see “just how blatantly ordinary material objects diverge from standard mereological sums with respect to their conditions of existence, location and part-whole structure, one wonders how the standard conception could ever have had such a powerful hold on the minds of so many philosophers” [Koslicki 2008, p. 72].

## 4.2 Should We Blame Mereology?

I have tried to organize my discussion of the universalist metaphysic in such a way that the bearing of mereological principles on the view becomes evident. Therefore, past chapters support the thesis that the most natural development of metaphysics on the basis of CEM yields some view similar to universalism: *if* we should find ourselves compelled to accept CEM, *then* universalism stands out as the most promising metaphysical view to adopt.

But should we? In §1.2 I claimed that the two main virtues of CEM, for which it was historically found interesting, are (1) ontological parsimony and (2) mathematical perspicuity or algebraical elegance. Concerning (2), it is obvious that we should prefer our formal theories, considered as such, to be elegant and perspicuous. However, when constructing a formal theory for some specific purpose, the theory should first and foremost be adequate to that purpose. Much hinges, therefore, on what one takes such adequacy to consist in—a distinctly metaphysical question, in the case of mereological theories. Thus, (2) may count in favor of accepting CEM only if we have reason to believe that the world answers to such mathematically elegant theories in the relevant (mereological) respects—in other words, if we take the world itself to be “mathematically perspicuous” (in the specific sense of CEM).

Something similar can be said concerning (1): parsimony may count in favor of accepting CEM only if we have reason to believe that our ontology should indeed be parsimonious, if we think that the world is ontologically not very complex. As if it were a mere platitude, Sider writes the following (illustrating, by the way, his adherence to the neo-Quinean meta-ontological principles listed in the Introduction, p. 1):

The metaphysician prefers desert landscapes when she can get them; when it is possible to reduce, we should. Of course the reduction might fail; parsimony gives us reason to search but does not guarantee success.<sup>5</sup> [Sider 2003, p. 185]

Making this the prime objective of metaphysical theorizing leads to absurd results—recall the “real numbers”-ontology I presented earlier (see p. 69): surely an ontology which included nothing but the reals would be a “desert landscape”, but that does not change the fact that it is obviously false. What guides the metaphysical discussion is not parsimony as such but, obviously but uninformatively, our search for the *truth* (at least, for the metaphysical realist it is).<sup>6</sup> Parsimony is good just insofar as it helps us to find

<sup>5</sup>The quote occurs in the context of a discussion of reductive approaches to modality (i.e., counterpart theory); see for critical reflection on such reduction §3.3.2.1.

<sup>6</sup>Here I speak informally, I don’t mean to broach the difficult issue of what truth consists in.

the truth. The difficulty, of course, is to assess to what extent it does; let us see what we can say about this question.

How do we go about in deciding whether a particular metaphysical theory is viable? Consistency and coherence are important necessary conditions for a theory to be worth consideration in the first place. Now there seems to be no incoherence in our “real numbers”-ontology either, so why does no one defend such a theory? It is, I contend, because it blatantly contradicts everything we *know* about reality—know, that is, by way of our scientifically informed, common-sense world view. But if that is so, then we do have considerable reason to be very cautious about universalism, too: the common-sense world view does not include an austere ontology, and, as we have seen, many aspects of the universalist metaphysic are highly problematic from a common-sense point of view. Parsimony as a virtue in metaphysical reasoning should be understood, I contend, not as demanding as austere an ontology as possible, but rather as requiring that, when given some difficult issue, we *first* try to understand it on the basis of what *we already know and accept*, before resorting to introducing new things into our ontology.

Past decades have displayed a surge of interest in realist metaphysics. However, this surge has sprung from peculiar sources—the approach to reality with which this recent brand of realist metaphysics has started derives, as I indicated in the Introduction, at least partly from a list of Quinean principles, which in turn exemplify a certain similarity to, say, Carnap’s approach to reality as exemplified in his *Logischer Aufbau der Welt* [Carnap 1928], or Goodman’s way of constructing a phenomenalistic system in his *Structure of Appearances* [Goodman 1951]: for these latter philosophical projects it did not matter much what metaphysical assumptions undergird the common-sense world view, because they were meant to yield systems that were by and large alien to that view. These systems were supposed to *ground* the scientific enterprise, to place it on firm foundations entirely distinct from common-sense ontology—in Goodman’s case, the foundations sought were phenomenalistic (although he stresses that this is just one of many possible ways of understanding the world); in Carnap’s case, the foundations sought were meant to be neutral with respect to metaphysical questions. Given such a project, the approach of simply starting to construct a system completely independently from the common-sense world view is fully justified. But retaining such an approach of unconstrained system-construction within the project of realist metaphysics, while hardly surprising from a historical point of view, cannot be accepted, for the simple reason that realist metaphysics is not primarily about *constructing* anything at all, but rather about finding out the truth about reality; the construction of metaphysical theory aims for that truth. For Carnap and Goodman, pluralism with respect to the constructions is to be welcomed rather than avoided, hence unconstrained construction makes sense.

But for the metaphysical realist such pluralism is out of the question, the construction of metaphysical theory should be constrained by reality—that’s why she should start with what we know about reality, with the scientifically informed common-sense world view.

Let us have a brief look, again, at the Quinean meta-ontological principles I presented in the Introduction:

- [1] To exist is to be, there are no different senses of being or existence.
- [2] “To be is to be the value of a variable” [Quine 1948, p. 34].
- [3] A useful strategy for getting rid of apparent ontological commitments is to offer paraphrases that do not have these commitments.
- [4] Ontological disputes should be approached by fleshing out what the ontological commitments of the statements accepted by the various sides are.
- [5] We should “have a taste for desert landscapes” [*ibid.*, p. 23]: strive for an ontology that is as austere as possible.

It would be interesting to see how these principles relate to aspects of the older, phenomenalist and positivistic projects, but even without delving deeper into the matter it is clear that there is a strong link: [3], for example, constitutes a very important strategy for Carnap, who repeatedly offers ways of paraphrasing statements about certain kinds of objects in such a way that they avoid reference to those objects, and instead concern different, more basic objects. Which in turn is a nice illustration of [5]—see also the quote from Sider I gave above (p. 79). All in all, these principles offer ample support for projects of unconstrained system-construction. But for the metaphysical realist who wishes to take her realism seriously, hence distances herself from the anti-realist, Carnapian tradition of system-construction that is hostile to such metaphysical views, every one of these principles (or, better, every implementation of one of them) will have to be argued for anew. For example, given that we start *in medias res*, and given that, as far as we know, the world contains more than deserts, [5] stands under considerable pressure. Given that we do, on the common-sense view, ascribe modal profiles to enduring things, offering paraphrases (e.g., in terms of relations of similarity) will not do as a way of avoiding commitment to real modality, as we have seen—that is, [3] stands under pressure, too.<sup>7</sup>

<sup>7</sup>The other three principles are closely related, and more difficult to evaluate. Here are some programmatic remarks—with regard to [2]: although it can be a useful criterion for spelling out ontological commitments, I don’t think everything worth saying about ontological issues can be gathered merely from facts about what our quantifiers range over. And with regard to [1]: I am not convinced that there cannot be some interesting differentiation between the very existence of different kinds of things (say, societies as opposed to humans, or stuffs as opposed to atoms, or abstracta as opposed to concreta—a differentiation that might have consequences for the countability of certain kinds of things or for questions about (real, metaphysical) vagueness).

Admittedly, these reflections are rather sketchy, they oversimplify matters greatly. Nevertheless, they do indicate what I take to be the proper historical background against which we can better understand CEM. CEM was developed with a view towards providing a convenient framework for the purposes of those who developed it, purposes of unconstrained system-construction like Carnap's and Goodman's: Leśniewski's thorough nominalism (as indicated in §1.2), and Leonard and Goodman's interest in pursuing the development of various different systems, different "ways of worldmaking" (see, for example, Goodman [1951, 1978]; see also Rossberg [2009], and other papers in the collection by Ernst et al. [2009]). Thus, it was not developed to be a contribution to, nor a challenge for, our common-sense world view, but rather to facilitate a *replacement* of that very world view. Hence there was no hesitation to include in CEM not only axioms characterizing the various mereological relations, but also axioms asserting the *existence* of various things (especially the general fusion axiom [A.6]) and axioms concerning the *individuation* of material objects in general (especially extensionality [A.5]).

Given that CEM has this background, it is not surprising that the metaphysical view it undergirds, universalism, is as revisionary in character as I have claimed it to be. And, against this background we can see where the conventionalist tenets we discovered in the universalist view come from. Thus, it is reasonable to conclude that we should indeed blame CEM for the inadequacies of universalism. CEM incorporates the very approach to metaphysics I have been arguing against all along. Recall the two conceptions of mereology in its relation to metaphysics I presented in the Introduction (p. 3):

- [A] Mereology is the theory of parts of *given* wholes. In other words, there is no exciting metaphysical import.
- [B] Mereology is prior to the question as to which wholes there are, hence has something to say about this. In other words, there is considerable metaphysical import.

It is [B] which lies at the heart of CEM, as is obvious given extensionality [A.5] and the general fusion axiom [A.6]. And it is [B] which informs much of the universalist view, as we have seen.<sup>8</sup> Yet by taking the stance voiced by [B], which just is the stance inherited from the anti-realist, Carnapian approach that lies at the roots of CEM, the universalist fails to take account of the fact that in realist metaphysics we do not and should not

<sup>8</sup>I have been concerned with universalism, in this essay. But there are also other, equally revisionary metaphysical views around—consider, e.g., the eliminativist position defended by van Inwagen [1980] and Merricks [2001], which denies the existence of very many continuants, or the monism ("bobjectivism") defended by Horgan and Potrč [2008], which asserts that there is only one object which does not have any parts. The general criticisms of the universalist view I am discussing here could, with due alterations, be extended to apply to these views as well; however, in-depth scrutiny of these views would be required to bring out the distinctive ways in which they are revisionary and to determine to what extent they rely on distinctly mereological assumptions. Such scrutiny will have to await another occasion.

start from scratch, but rather *in medias res*, as I said earlier—it is only because we already have a thorough grasp on what the world is like, because we have a considerable body of ordinary and scientific knowledge about the world, that we can raise interesting metaphysical questions in the first place.

We don't have to abandon CEM entirely, if we wish not to adopt [B] but rather [A] as our approach to mereology: we only have to reject extensionality [A.5] and the general fusion axiom [A.6] in order to purge it of any metaphysical import that is too strong. The only existential commitment left then lies in the weak supplementation principle [A.4], which says that if an object has a proper part *a*, then it also has a further proper part that is disjoint from *a*—which indeed is a very plausible principle of mereology. The mereology we get when we pursue this course is just the one I called **S~~E~~M**, Simons's Non-Extensional Mereology, at the end of § 1.2: its axioms include only [A.1]–[A.4]. The next section sketches an approach to mereology and realist metaphysics informed by [A], and provides some reasons for accepting, as the formal backbone of a mereological theory, something along the lines of **S~~E~~M**.

### 4.3 An Alternative View

Let us start in the middle of things, then, taking what we presently know about the world at face value. First and foremost, the metaphysical realist has to justify taking this stance, that is, she has to defend her position against anti-realist charges. However, that is not the topic of the present essay, so I will not embark upon that difficult task here (see the papers in Chalmers et al. [2009] for engaged, recent discussion; see Elder [2005, ch. 1] for a bold attack on anti-realism; see also Putnam [1981, 1983] for heavy charges against metaphysical realism). Setting aside this task for the moment, the next thing to do is to scrutinize the scientifically informed, common-sense view, precisifying and elaborating it to meet standards of philosophical theory—and also discovering inadequacies, loose ends, ambiguities, etc. that bear on metaphysical questions. If insurmountable difficulties are discovered, alternative approaches will have to be developed, possibly leading to considerable revision of the view we start with.

In a way, then, the metaphysical realist embarks on a project of what Strawson calls *descriptive metaphysics*. Only in a way: it is indeed the starting point of the metaphysical realist to “describe the actual structure of our thought about the world”, but on the other hand, if need be, she will not eschew attempts to “produce a better structure” [see Strawson 1959, p. 9].

What can we say about mereology, given this approach? We may start with a preliminary inventory of kinds of things, continuants, that inhabit the material world: there are microscopically small things, such as electrons<sup>9</sup>, atoms, molecules; there are sundry living and non-living medium-sized things, such as cells, stones, trees, cars, houses, human beings and strawberry pies; there are large things such as continents, planets, stars and galaxies. And then there are various more elusive kinds of things, such as waves on the sea, wrinkles in the carpet, clouds in the sky, heaps of sand, eco-systems, cities, societies and economies. For each and every one of these things one may ask whether they really exist, or whether our ordinary talk of such things is merely a convenient way of speaking about other, less elusive things. More interestingly, once we have decided which things should really be on the list, having given some special treatment to the others, we may observe that almost all the things on the list are composite objects, and, moreover, that their parts are on the list too—a human being has proper parts, e.g., a brain; brains have proper parts too, e.g., the cerebellum; the cerebellum has parts as well, e.g., neurons; neurons in turn have as proper parts, e.g., their plasma membranes; such membranes have as proper parts certain types of lipid molecules, which in turn contain carbon atoms, that have electrons as proper parts. And maybe the chain continues (although at present electrons are thought to be mereologically simple).

What is the relation of parts to their wholes? Presumably, subatomic particles combine so as to compose an atom in ways rather different from the way in which organs, limbs etc. make up a human body. Moreover, it does not seem likely that, on any level, we might view the whole simply as the mereological sum of its parts—given that (almost) all the wholes in question are capable of changing (some of) their parts, and given that we work within an endurantist framework, no reasonable construal of wholes as mereological sums is possible. And there are other reasons for rejecting such a construal as well: the continuants, we said, belong to kinds—diverse kinds, with diverse modal profiles. But mereological sums, we have seen, are all of one kind—of the kind *sum-object*, which has only one type of modal profile: a Heller-profile (see results (8)–(10), listed at the beginning of this chapter).

Mereology now becomes the theory of parts and wholes, understood as applying to *given* parts and wholes—which just is the conception I labeled [A] earlier. Abstracting from differences between, e.g., the relations between atoms and molecules on the one hand, and the relations between animals and their organs on the other, we get a theory which concerns parts and wholes in general. What can such a mereological theory

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<sup>9</sup>Good reasons can be given for denying electrons (as well as other subatomic particles) to be continuants—they are very different from medium-sized physical objects. Still, they belong to the *entities* alleged to exist according to our scientifically informed common-sense starting point.

teach us about metaphysics? Not as much as CEM, obviously—but it is not devoid of metaphysical consequences either. An adequate mereological theory might be useful for solving difficulties surrounding the metaphysics of enduring continuants; it could help in finding out what differentiates several kinds of things, several categories of continuants (say, on the basis of diverging ways in which general mereological principles are instantiated); it might even shed light on questions as to whether particular kinds of things really exist or not (say, by discovering whether they have or lack a place in the mereological order of things).

Obviously, mereology, thus understood, will not be a purely formal theory, like CEM. It will consist of a core of formal principles to which we have to add further, more substantive bits of theory that interact with the broader metaphysical theory of which it constitutes a part. I will have something to say about both the formal and the substantial aspects of mereology in what follows. We can immediately make one informative observation: any metaphysical import this alternative mereology might have will derive not from its *formal* principles but rather from the substantive, metaphysically involved bits—unlike CEM.

On the basis of what I have said so far, the following principle, voiced by Jonathan Lowe, appears to be very plausible:

In my view, the only genuine parts that a substance may have are *substantial* parts—that is, *other substances*. [Lowe 2005a, p. 44]

(Lowe uses the Aristotelian term “substance” to denote what I have been calling “continuants”.) Thus, what is sometimes called the *doctrine of arbitrary undetached parts*<sup>10</sup> is false: although I have an ear as proper part, all the carbon atoms residing within the boundaries of my body right now do not compose something that is a proper part of me—in fact, they don’t compose anything at all.<sup>11</sup> More generally, the Quinean view of physical objects as the contents of the regions they occupy, which lies at the heart of the universalist conception of objects as sum-objects, is false: it implies both extensionality [A.5] and the general fusion axiom [A.6], both of which have to go. Along with it goes, of course, the view of composition as identity (CI): given that objects of different categories might relate to their parts in different ways, the question as to what composition is cannot have such an easy answer.

<sup>10</sup>Van Inwagen defines this doctrine as follows: “For every material object M, if R is the region of space occupied by M at time *t*, and if sub-R is *any* occupiable sub-region of R *whatever*, there exists a material object that occupies the region sub-R at *t*” [van Inwagen 1981, p. 123].

<sup>11</sup>It is rather surprising that, in the contemporary discussion among analytic metaphysicians, the positions defended on this issue are usually either like the universalist position in that they defend the existence of arbitrary undetached parts, or else deny the existence of composite parts altogether. There are only few people who defend Lowe’s more common-sense view.

In fact, a case might still be made for extensionality, not understood as *individuating* objects (that is plausible only when we *identify* objects with the contents of the regions they occupy), but rather as the mereological reflection of a plausible common-sense principle that forbids colocation: no two physical objects can ever occupy the same space at the same time. Reflection on familiar puzzles concerning, e.g., statues and lumps of clay (see § 3.1), put this proposal under considerable pressure—here we have, then, a case where some revision of the common-sense view might turn out to be necessary (see, e.g., Wiggins [1968]; Lowe [1983, 2005a] for proposals of such revision, and Burke [1994b,a]; Elder [1998] for defences of the common-sense principle).

### 4.3.1 Realist Modality

A short excursion to questions concerning modality will prove useful. Some of the most difficult questions, metaphysically speaking, for the common-sense metaphysic of continuants arise when we consider modality and identity. We don't have to wonder how a whole, which just is the sum of its parts, can have modal properties that do not seem to rely on its parts—after all, we decided that the whole is (usually) *not* “just the sum of its parts”, it is, at least at the point of departure for realist metaphysics, an object among many, no less real or substantial than other objects (smaller or bigger ones).

For the metaphysical realist, the most natural way to explain the modal profiles of things is by appeal to the notion of *essence*; in particular, we may regard things as belonging to their natural kinds essentially. Such a brand of essentialism has been spelled out in considerable detail by David Wiggins in his *Sameness and Substance Renewed* [2001], and the corresponding explanation of modal properties by reference to the essence of things can be found in the work of Kit Fine [see, e.g., Fine 1994b, 2005b]. In general, the view would be a neo-Aristotelian one, according to which what exists in the world are substances (continuants) which have essences, exemplify natural properties, and obey the laws of nature. Other contemporary proponents of this view are Jonathan Lowe [see, e.g., his 1998; 2003; 2005b; 2008] and Crawford Elder [see his 2005]. To repeat: I don't mean to say that the particular versions of realism espoused by, say, Wiggins, Elder, or Lowe, are *correct* (nor, for that matter, that they aren't); my aim here is not to settle which is the right metaphysical theory but rather what kind of *approach* fits the point of departure we identified for the metaphysical realist. That is why I allow myself to offer only very programmatic and sketchy remarks on their views.

What is peculiar about modality is that we seem to have some freedom as to what the essential properties of some thing are. To use an example from Stephen Yablo [1987]: consider the Shroud of Turin, which is a particular piece of cloth that is said to have

enshrouded Jesus Christ. Assuming this to be correct, it seems that having enshrouded Jesus Christ is *essential* to the Shroud of Turin—it would not be the Shroud of Turin had it not enshrouded Jesus Christ. But for the Cloth of Turin, which is just that same piece of cloth, it surely seems possible that it had not enshrouded Jesus Christ. Should that lead us to conclude that there are two things there, because we have divergence in modal properties? The answer is clearly “no”, for such examples are easily multiplied. Here’s another one: where we have snowballs, which are essentially round-ish, we also have “snowdiscballs”, which can have any shape between round and disc-shaped (the example comes from Sosa [1993])—etc. Notice that this is an excellent point for the metaphysical anti-realist to criticize metaphysical realism—compare, for instance, Sidelle’s conventionalist account of modality, briefly summarized in § 3.3.1. Interestingly, this “inconstancy of *de re* representation”, to use Lewis’s terminology, which appears to speak in favor of some kind of Carnapian, anti-realist view, also plays a major role in motivating Lewis’s own counterpart theory of modality, as we saw in § 3.1.

The first thing to note is that most of the examples, and in any case the most convincing ones, concern artifacts, things made by human effort. These are notorious for the metaphysical problems they give rise to: consider the ancient puzzle of Theseus’s Ship, for instance. Thus it is open to the realist to hold that, although the charge of arbitrariness does indeed have some force when it comes to artifacts, it does not threaten his entire view. And, he might continue, this local challenge might be dealt with in a number of ways, for example by reference to the *intentions* of the people who created the artifact in question, or by reference to the *function* the artifact in question is meant to perform: if I intend to make a snowball, and succeed in doing so, the object I have created is a snowball, complete with the corresponding modal profile. If, on the other hand, I intend to make a snowdiscball, and succeed in doing so, the object will be a snowdiscball with the corresponding modal profile. Or, in the case of the Shroud of Turin, the realist might hold that *in fact* there is simply a piece of cloth (with the corresponding modal profile), but that *we* happen to attach great value to one of its accidental properties, which easily results in confusion over what its “real” essential properties are. Or several such approaches might be combined, depending on the case at hand.<sup>12</sup> For living organisms, it will be easier to defend their having a real essence that is not vulnerable to charges of arbitrariness (although there certainly are problematic cases here too); for at least some non-living non-artifacts like stones, mountains and planets the issue is less clear.

In general, the strategy of the realist will be to allow for a certain degree of arbitrariness when it comes to determinations of essential properties, without compromising his view

<sup>12</sup>Nevertheless, the issue is rather tricky; see for example Wiggins’s thoughtful discussion of artifact identity in Wiggins [2001, ch. 3]. Much work needs to be done here.

that objects do have a *real* essence, independently of how we like to think of things. With these sketchy remarks in mind, let us return to mereology.

### 4.3.2 An Alternative Mereological Theory

It is time to consider some of the basic formal axioms governing the mereological notions in more detail (recall the axioms of CEM given in § 1.1). Recall the “mereological chain” I gave earlier, going from human being via brain, cerebellum, etc. all the way down to subatomic particles. If proper parthood is transitive, some particular electron is a proper part of the whole human being. Is that true? Since we are construing mereology to be about relations between parts and wholes on a suitably general and abstract level, there is nothing wrong with this proposal—that is, there is nothing wrong with the idea that proper parthood is transitive.<sup>13</sup> However, this is only so on a suitably abstract level: for almost all purposes, a more restricted notion of proper parthood will prove useful—if I want to know what parts a human body consists of, the proper answer is not that it consists of electrons, quarks and the like, but rather that it consists of a heart, a liver, bones, a brain, etc. We can, on the formal level, define suitable notions of *direct proper part* and *indirect proper part* as follows:

$$\begin{array}{ll} \text{[DPP]} & DPPxy =_{df} PPxy \wedge \neg \exists z (PPzy \wedge PPxz) & \text{Direct Proper Part} \\ \text{[IPP]} & IPPxy =_{df} PPxy \wedge \exists z (PPzy \wedge PPxz) & \text{Indirect Proper Part} \end{array}$$

Thus, the axiom of transitivity [A.1] is acceptable; anyone in need for a more strict, non-transitive conception of proper parts can make use of notions such as DPP and IPP to make the necessary distinctions (DPP is obviously intransitive).<sup>14</sup> Furthermore, proper parthood is surely asymmetrical and hence irreflexive, nothing much needs to be said to justify the corresponding axioms. In fact, these two cooperate nicely with the weak supplementation principle [A.4], which we can take to be constitutive of the very meaning of the term “proper part”: if *a* is a proper part of *b*, there has to be more to *b* than just *a*—no whole is ever identical to any of its proper parts. Likewise, no whole can be a proper part of one of its own proper parts.

We may thus adopt axioms [A.1], [A.2] and [A.3], that characterize the proper parthood relation, from CEM; together with the weak supplementation principle, [A.4], they form the core formal part of our alternative mereological theory, which corresponds

<sup>13</sup>If the mereological theory is to apply to pieces or lumps or quantities of stuff as well, transitivity is surely required—even the smallest droplet of water in the lake is part of the water in the lake.

<sup>14</sup>For some purposes a less strict notion of direct proper parthood might be required—e.g., allowing among the genuine proper parts of a human being his brain, cerebellum, and neurons, but not the molecules and atoms that make up these. In that case, a less formal way of characterizing the relevant restriction should be provided (say, admitting among the direct parts of human beings only biological items).

to what I have called *S~~Z~~M*. It is not a very strong theory; however, we can say more about mereology than just that by adding more substantial, metaphysically involved principles—of which Lowe’s principle that objects only have parts that are themselves genuine objects is one.

To illustrate in which direction such a further development of mereology might proceed, I will now briefly discuss one recent proposal for a more substantive mereological theory, presented by Kathrin Koslicki in her recent book *The Structure of Objects* [2008]. Although I do not agree with her particular proposal, the approach she seeks to develop fits very nicely into the general outlook I have sketched so far.

### 4.3.3 Koslicki’s Structure-Based Mereology

That Koslicki approaches mereology from more or less the viewpoint I have been arguing for can be gathered from the following quote:

I take the mereologist’s job to be to devise an appropriate conception of parthood and composition which accurately reflects the conditions of existence, spatio-temporal location and part/whole structure of those objects to which we take ourselves to be already committed as part of the presupposed scientifically informed, commonsense ontology. [Koslicki 2008, p. 171]

According to Koslicki, the main flaw of classical mereology is that it neglects the *structure* of things.<sup>15</sup> The notion of a mereological sum, we saw, requires only that the putative parts exist for them to compose a whole. No particular structure is required. But, says Koslicki, a heap of disassembled motorcycle parts is rather different from a fully functional motorcycle. Apparently, then, it matters how the parts are arranged.

Based on an exploration of the metaphysical and mereological insights of Plato and especially Aristotle, Koslicki proposes a different, broadly Aristotelian way of looking at parts and wholes: she argues that what we usually regard to be the parts of the motorcycle are only its *material* parts. In addition, the motorcycle also has *formal* parts—which specify its structure. Here’s the general idea, in her own words:

We may thus think of an object’s formal components as a sort of *recipe* for how to build wholes of that particular kind. An object’s *material components* or *matter*, on the other hand, may be thought of as the *ingredients* that are called for in the recipe: they are the objects which, in a successful case of composition, in fact satisfy the conditions dictated by the formal components. [*ibid.*, p. 172]

It is important that this mereological theory be understood in the context of a *given* ontology of continuants; otherwise, it will be as problematic as CEM itself, since it will

<sup>15</sup>Here she follows an early criticism of Leśniewski’s mereology by Nicholas Rescher; see his [1955].

allow wholes composed according to *any* conceivable recipe involving *any* collection of putative parts, yielding an overload of composite objects even more impressive than the universalist's realm of sum-objects.<sup>16</sup>

The "recipe" may specify the kind(s) of objects required, their number, and the way they are required to be related, geometrically or topologically speaking (e.g., a motorcycle has to have two wheels positioned and oriented in the right way, etc.). However, the recipe, the formal components, are quite literally to be understood as parts—thus, the table does not only have four legs and a top as proper parts, but has an additional proper part which is not material but formal: the "recipe" corresponding to objects of its kind, i.e., to tables. This is the aspect of Koslicki's views with which I disagree; let me briefly explain why.

One surprising consequence of her idea is that, given the transitivity of proper part-hood, the formal parts of proper parts of a thing have to be judged parts of the thing themselves—which seems wrong: the "recipe" of a particular type of cellulose molecule found within a certain table is surely not part of that table itself. After all, the table might have not contained any such molecule.

Taking formal parts to be genuine parts surely is a strange view (as Koslicki herself admits): how are we to understand it? Maybe the idea is this: the table cannot be seen as the sum of its material parts, since then we leave out the structural aspect of things. Hence, there has to be an extra ingredient: its formal parts. However, if the formal part of a table indeed is the "recipe", as explained by Koslicki, that pertains to all objects of its kind (tables), and if, furthermore, parts of things are themselves things, the formal part has to be some sort of thing too (presumably, an abstract object). But the sum of table-parts plus this extra object which is the formal part does not guarantee at all that the table-parts indeed *satisfy* the recipe—again, they (including the recipe) only have to *exist* for their sum to exist.

Surely this is not what Koslicki intends. She wants to get the material parts of the table to *satisfy* the recipe, but I fail to see why making the recipe a genuine *part* of the table secures this. However, she does offer independent arguments for her claim that the formal components of things are indeed proper parts of those things. One argument runs as follows [see Koslicki 2008, pp. 179–186]: consider a statue composed of a single lump of clay. The difference between them can be accounted for by holding that the

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<sup>16</sup>In fact, this is, more or less, the criticism Koslicki mounts against Kit Fine's theory of embodiments, which says (very roughly) that for any function from times to objects the world contains a further object which is the *variable embodiment* having at each time the objects specified by that function for that time as parts. See Fine [1982, 1994a, 1999].

statue has something *extra* that the lump lacks—the extra being, of course, a formal part. Now, the argument implies that the lump is a *proper* part of the statue, which is, I think, mistaken. Maybe the arm-shaped lump of clay is to be judged a proper part of the statue, but not the entire lump. If it is a part at all, it is an *improper* part (see § 1.2, where I briefly discussed Simons’s idea of a notion of improper parthood that allows two distinct things to be each other’s improper parts). Moreover, the argument relies on the assumption that if there is a difference between the lump and the statue, that difference has to be accounted for *by mereology*, which (at least to me) seems to frustrate Koslicki’s insistence on *not* letting (classical) mereology settle all the metaphysical questions.

I think it is better to abandon the view that every object should be individuatable as “the sum of its parts”. Why not hold that the lump and the statue have exactly the same parts, but differ in their essences? Of course, this invites the so-called “grounding problem”: how can objects with exactly the same microstructure have different essences? My approach would be to deny that everything has in the end to be explained by reference to microstructure<sup>17</sup>—maybe the essence of statues derives in part from far more inclusive facts about their makers and their intentions, about our culture in general, etc. The assumption that everything there is to the statue here and now has to be accountable for in terms of what its microstructure is *here-now* is simply a familiar but stubborn reductionist dogma that can (and must) be challenged. There are accounts available of natural kinds that broaden the scope by invoking historical and/or functional considerations, thus forcing us to look beyond the “here-now” and the microstructure, towards (say) the history or the function of the thing in question [see, e.g., Millikan 2000, 2004; Elder 2005, Part III]. Accordingly, one might improve Koslicki’s conception of the “formal components” of things by including not only requirements concerning the geometrical or topological relations among the parts, but also requirements concerning (say) the history of the object’s ancestors, the intentions of the object’s creator, etc.

Back to our question: are Koslicki’s formal components really best construed as *parts* of the wholes to which they attach? Koslicki offers as additional support the fact that this view allows her to make some very nice distinctions [see Koslicki 2008, pp. 183–186]: an object is *composed* by all its parts, but it is *constituted* only by its material parts. Hence she can hold that the statue is constituted by the lump of clay, but not *vice versa*, since the lump of clay is part of the statue while the statue is not part of the lump (the statue has formal parts that the lump lacks). This solves what Koslicki calls the “Problem of Constitution”, which is the challenge to come up with an account of material constitution that explains how constitutionally related things (like the lump and the statue) share so

<sup>17</sup>For a thorough and insightful discussion of these matters, which pays due attention to the contemporary theories of physics, see Hüttemann [2004].

many properties, while also making the constitution relation asymmetric (for Koslicki, this is secured by the asymmetry of the proper parthood relation).<sup>18</sup>

Could we achieve a similar result without having to accept formal parts as genuine *parts* of objects? Well, let's try what happens if we simply hold on to the view that the table is indeed a table by virtue of satisfying the "recipe" associated with the kind *table* (i.e., by having the corresponding essence), but has as proper parts only what Koslicki calls material parts. Why not account for the asymmetry of the constitution relation by pointing out that, although the statue-recipe allows lumps of clay to be used as an ingredient, the lump-recipe does not list statues as possible ingredients? Statues require some piece of material to be constituted by (presumably), whereas lumps of clay don't require being such as to constitute a statue—that's why the lump survives the deformation that destroys the statue. Moreover, the striking similarity of the lump and the statue can also be explained by pointing out that it is *that very lump* that helps satisfying the recipe for statues right here in important ways. Put briefly, it turns out that all the advantages Koslicki claims for her view can be achieved by alternative means that do not imply the structures of things to be, literally and fully, their *parts*.

On the other hand, the idea of viewing the essences of things (at least in part) as a kind of "recipe" in the way Koslicki proposes does seem fruitful for purposes of developing a more robust mereological theory. A similar idea can be found in Lowe's work: he introduces talk of *composition-conditions*, which, just like existence-conditions, identity-conditions and persistence-conditions, can be considered to belong to the essence of (composite) continuants, and which can be taken to *differ* among different kinds of continuants [see Lowe 2005b]. Of course, we should not take the essences of continuants to be themselves things, let alone genuine *parts* of those continuants—tables don't consist of four legs, a top, *and* an essence.

What a more robust mereological theory looks like depends in large part on extra-mereological, metaphysical considerations—is collocation a tenable idea? Can we indeed conceive of the essences of things along the lines Koslicki and Lowe propose? Are there differences in the ways objects of various kinds go together to compose a further thing? A mereological theory that tells us something substantial about how parts compose wholes in various more specific cases can only be developed in tandem with a more

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<sup>18</sup>The perdurantist, for example, does an excellent job at explaining how the statue and the lump can share so many properties (since either they are identical, or the one is a temporal proper part of the other), but fails to account for the asymmetry in question: if the statue outlives the lump, the lump will indeed be a proper part of the statue, but otherwise (which is more likely) the statue will be a proper part of the lump.

general metaphysical theory.<sup>19</sup> In abstraction from these more robust questions, we can only specify the most general, formal properties of mereological notions—that is, we can give a theory like *SZM*, based on axioms [A.1]–[A.4].

The next and final chapter offers a brief, summarizing conclusion of the results achieved in this essay.

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<sup>19</sup>See, for example, Simons [1987], parts II and III, for a discussion of more specialized mereological theories that differentiate between different kinds of things.

## Chapter 5

# Conclusion

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**I**N THE LAST CHAPTER, I have sketched an approach to realist metaphysics that takes as its starting point the scientifically informed, common-sense view that the world is inhabited by continuants. Such an approach will not allow large metaphysical issues to be settled by mereological considerations, rather, it will attempt to construct a mereology which fits ontological commitments that are largely independent from mereological considerations. I have given a rough outline of some of the metaphysical ground that needs to be covered: the inventory of kinds of things embedded in the common-sense ontology of continuants needs to be scrutinized, since it includes many rather elusive or spurious kinds of things, and gives rise to many metaphysical puzzles. Moreover, some account of the modal profiles of things needs to be given; a neo-Aristotelian view of continuants as essentially belonging to their natural kinds seems the most promising way to achieve this. Mereology comes in as the theory that, given the ontology of continuants, tells us how parts relate to the wholes they compose, hence contains a rather modest formal core which coincides with the theory I called **S~~E~~M**, and has to be developed further in tandem with the broader metaphysical theory of which it is a part.

However, there are those who disagree and take a rather different stance on the role mereology has to play within the metaphysical discussion. These philosophers take **CEM** as the starting point for metaphysical theorizing, which leads to a view shaped to a very large extent by mereological considerations: universalism. The first three chapters of this essay were devoted to an in-depth exploration and criticism of this view. In short, the results of my discussions are that the universalist view has a highly revisionary character, which makes it exceedingly difficult to come to grips with a considerable variety of issues that are central to our understanding of the world: the very nature of physical objects, what change, motion and persistence consist in, what modality is, what laws of nature are, etc. I have given a more extensive summary of these results at the

beginning of the last chapter (see p. 73).

I have offered reasons to reject such radical revision, drawing on results from earlier chapters, arguing that the metaphysical realist, whose aim is to find out what reality is like, should start from what we already know about reality, rather than starting from scratch. Revision might be necessary in the end, but only if what we thought we already knew about reality turns out to be false. I supported my argument by pointing out that both common sense and science, in theory as well as in practice, do assume an ontology of enduring continuants which have modal profiles. We cannot simply abandon this view in favor of some fancy alternative—at the very least, the alternative has to enable us to understand reality (and ourselves) just as well as the established view does. My criticisms of the universalist metaphysic in previous chapters show that the universalist metaphysic definitely fails on this count.

I have traced this failure of universalism to its roots in taking CEM as a starting point for metaphysics. CEM itself has its roots in a philosophical tradition (of which Carnap can be viewed as a representative) that is very hostile to realist metaphysics, and was meant to support projects of unconstrained construction of theories. The universalist retains such an unconstrained approach to theory-construction within his realist framework, thus justifying his adopting CEM as the starting point of metaphysical inquiry—hence, his metaphysic starts from scratch, instead of being sensitive to what we already know about the world. This is what makes for a thoroughly revisionary metaphysical theory.

The main question of this essay was: *what can mereology teach us about metaphysics?* The gist of the answer I have presented can be formulated as follows: taking classical mereology to have substantive metaphysical import yields a metaphysical theory that is untenable on several counts; therefore, classical mereology should be replaced by a new mereology construed in a metaphysically modest way, as a chapter within a much broader metaphysical theory that is not unduly revisionary but rather sensitive to what we already know about reality. It suits realists to be realistic when engaging in metaphysical inquiry.

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