Abstract

Colocated Objects, Tally-Ho:
A Solution to the Grounding Problem

Are a statue and the lump of clay that constitutes it one object or two? Many philosophers have answered 'two' because the lump seems to have properties, such as *being able to survive flattening,* that the statue lacks. This answer faces a serious problem: It seems that nothing grounds the difference in properties between colocated objects. The statue and lump are in the same environment and inherit properties from the same composing parts. But it seems that differences in properties should be grounded. For this reason, philosophers including Mark Heller, Dean Zimmerman, Theodore Sider, Trenton Merricks, and Eric Olson have rejected the answer 'two'.

I offer a solution to the grounding problem to revive the traditional account. I argue that extrinsic relations contribute to the supervenience base of many kinds or sorts, and these extrinsic relations ground differences between colocated objects, such as statues and lumps of clay, human beings and lumps of tissue, and planets and masses of matter. The same parts can stand in multiple extrinsic relations necessary to compose the member of a kind, and each such relation grounds the existence of a new object and the properties of that object that differ from the properties of other objects that share the same parts.

Colocated Objects, Tally-Ho: A Solution to the Grounding Problem

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0. Introduction

Can two or more nonidentical objects—perhaps a statue and the lump of clay that makes it up—be composed of the same parts at the same time? The view that they can is called *colocationism,* or sometimes *coincidence,* because objects that share the same parts will be *located* in the same space, or spatially *coincide*. Colocationism is a traditional view, but it faces a serious problem: It seems that nothing grounds the difference in properties between colocated objects. The statue and lump are in the same environment and inherit properties from the same composing parts.[1] But differences in properties should be grounded. For this reason, philosophers including Mark Heller, Dean Zimmerman, Theodore Sider, Trenton Merricks, and Eric Olson have rejected colocationism. In this paper, I offer a solution to this 'grounding problem' to revive the colocationist view. I argue that kind membership is forged by a relation that holds between parts and something extrinsic to the parts—such as human intentions about what statues are. Parts can stand in more than one such extrinsic relation, and each relation contributes to the supervenience base of a new composite object—thus the same parts can compose more than one thing. I argue that extrinsic factors contribute to the supervenience base not only of artefacts like statues and lumps, but also species kinds. (In the case of species kinds, the extrinsic factor is *not* human intentions.) I show how extrinsic factors in kind properties ground the property differences for colocated objects.

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[1] Whether the statue and its constituting lump have *all* parts in common is controversial. Lynne Rudder Baker (2000, pp. 181, 46–58), for example, thinks that the statue has a nose as a part but the lump does not. Baker holds that the lump has a nose only derivatively, only in so far as the lump constitutes a statue that has a nose. But all parties agree that 'at some level or other of decomposition', to use Trenton Merricks's phrase, the statue has the same parts as the lump. For example, the objects are composed of all the same molecules. For brevity I have left out the qualifying phrase *on some taxonomy of the parts*, but it can be read into discussions throughout the paper.

Before discussing colocation cases that involve natural kinds, such as a human being and the colocated lump of tissue, let us begin with the familiar statue–lump puzzle, which represents colocated artefacts. An artist has a lump of clay, which can change shape but which cannot survive losing parts, or else it will be a different, smaller lump—such are the persistence conditions of lumps. The artist forms the lump into a statue; the lump of clay still exists, but we seem to have an additional object in our ontology—the statue. The statue could survive losing a few parts, say a finger (or more, think of the *Venus de Milo,* which without arms is none the less the same statue as the original two-armed *Venus de Milo*)—such are the persistence conditions of statues. The same thing cannot both have and not have the property of *being able to survive losing some parts;* thus, we must have two objects, a statue and a lump, that share the same parts and are located in the same place at the same time.

The lump and the statue illustrate a larger group of cases, including masses colocated with members of natural kinds. A collection of atoms constitutes your body, but the collection is not identical to your body. Your body persists through changes in the atoms that compose it. Recall John Locke's example: 'an Oak, growing from a Plant to a great Tree' and the 'mass of matter' that constitutes it (1689, Bk. II, Ch. XXVII, Sect. 4, p. 330). The oak, in virtue of being an oak, can take on new parts and grow over time. A mass of matter, in virtue of being a mass, cannot take on new parts and continue to be the same mass.

The colocationist position has enjoyed a long, staid history since the time of Locke. More recently, Allan Gibbard thickened the plot by imagining a statue–lump case in which an artist moulds one piece of clay into Goliath-above-the-waist and a second piece of clay into Goliath-below-the-waist (1997, p. 96). The artist then joins the two pieces, 'bringing into existence simultaneously a new piece of clay and a new statue'. Gibbard's case illustrates the grounding problem well because it keeps us from

being distracted by distinct histories for the statue and lump that might be thought to ground differences in kind and modal properties.[2]

1. The grounding problem and why we need a new solution

A handful of philosophers have made the grounding objection.[3] Let's consider a representative version from Dean Zimmerman:

> Should not two physical objects constructed in precisely the same way out of qualitatively identical parts have the same capacities for survival under similar conditions? Of course one may say that the big difference between the two is found in the *sort* each belongs to—one is a mere mass, the other a living animal. But can sortal [or kind] properties be *basic,* not possessed in virtue of any other feature of a thing? (1995, p. 87)

Zimmerman's answer to this last question is 'no'. If he is right, then sortal properties (e.g. *being a statue* or *being a lump*) *are* possessed in virtue of more basic properties, and the alleged statue has the same properties as the alleged lump of clay. If this were true, there would be no motivation for colocation because the colocationist position is premised on the seeming difference in properties between the statue and the lump (or other objects that are candidates for colocation).

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[2] Without Gibbard's case, four-dimensionalism would solve the statue–lump puzzles. On the four-dimensionalists' account, distinct histories mean that the statue and lump have different parts because an object is the totality of its spatiotemporal parts spread over time. If the lump has parts before the statue, then the lump is temporally bigger than the statue, and the two objects do not completely overlap. But Gibbard's case brings the four-dimensionalist into the same boat as the three-dimensionalist. Now both have an apparent case of colocation to explain.

[3] See Mark Heller (1991, pp. 30–1, including footnote 2); Eric Olson (2001, pp. 337–55, especially p. 339); Trenton Merricks (2001, pp. 39–40); and Theodore Sider (2001, pp. 158–9).

Zimmerman's target is colocationists like Lynne Rudder Baker, who have suggested that we can explain the differences between colocated objects by pointing to differences in essential properties. We naturally then ask, What grounds the differences in essential properties? According to Baker (2000, p. 187), sometimes there is an explanation but other times 'there is *nothing* that explains the fact that things of certain kinds have certain properties essentially. It simply makes no sense to ask "What determines that rivers are essentially streams of water?"'[4] I follow Baker in accepting colocation, but I argue that we *can* make sense of what grounds the differences in essential properties and kind properties between colocated objects.

We need a new solution to the grounding problem because current solutions have extravagant metaphysical commitments that most colocationists are reluctant to accept.[5] Ryan Wasserman (2002), for example, argues that colocationists should adopt counterpart theory to solve the grounding problem. But counterpart theory has serious problems: Michael Fara and Timothy Williamson (2005) have shown that counterpart theory leads to a contradiction in the very statue-and-lump cases it is supposed to explain, and Trenton Merricks (2003) has argued that counterpart theory is false unless David Lewis– style modal realism is true, and most philosophers reject modal realism. Karen Bennett (2004) offers a different solution to the grounding problem, arguing that colocationists must take kind or sortal properties (such as being a statue or being a lump) as brute and ungrounded. She suggests that colocationists should escape the mysteriousness and seeming arbitrariness of this brute-difference account by holding that an object corresponds to every possible combination of modal properties for

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[4] Baker allows that some kinds have their essential properties in virtue of relational factors; the statue, for example, gets its essential properties from a relation to the art world. But she thinks that some cases of colocation, such as river and the colocated aggregate of molecules, are such that 'nothing' explains the difference in essential properties.

[5] A notable exception is Amie Thomasson's 2007a colocationist solution, offered within the scope of her work on inanimate, 'ordinary objects' (the title of her book). In this paper, I flesh out a different solution for artefacts as well as a solution for biological organisms and persons.

each given space-time region, and we then choose which ones to name. Bennett calls this view 'modal plenitude', and her solution posits a multitude of objects for every space, whether we know it or not.

In what follows, I offer a solution that does not require us to change our ontological commitments just to patch the grounding problem. I show how sortal properties can be grounded without resorting to metaphysical commitments that are anathema to the traditional colocation account. I argue that property differences among colocated objects are grounded in multiple extrinsic relations that the composing parts stand in.

My view puts flesh on the idea that there can be more than one composition relation (see Rea 1997 and Hawley 2006).[6] L. A. Paul (2006) elegantly argued for this idea, though her solution to the grounding problem requires positing property parts in addition to spatiotemporal parts; my solution does not expand ontological commitments as Paul's does. I present my solution in three stages: (1) colocated artefacts, (2) colocation of nonbiological natural kinds with parcels of matter, and (3) colocation involving a member of a species, with special attention to human being–person colocation. The solution for artefacts lays the groundwork for the latter categories, but which extrinsic factors are doing the work changes when we get to human being–person colocation.

2. Artefacts and the solution to the grounding problem

In this section, I focus on artefacts, manmade objects. The short answer as to where *artefact* kind properties come from is that they come in part from us and our intentions about the functions of the artefact kinds that we create.[7] The same parts can stand in more than one relation to human intentions. And if said relation is necessary for the existence of the composite object, then the parts could compose more than one object by standing in an extrinsic composing relation more than once. It is

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[6] My view is not consistent with Rea's framework, however.
[7] Amie Thomasson (2007b) also argues that artefact kinds depend on human concepts. Thomasson discusses the implications for the epistemology of kinds and argues that realism can accommodate this theory of artefacts.

commonplace for a thing to stand in the same relation to multiple other things at the same time, such as a person standing in the parent-of relation to multiple children.

My claim is that there is an *extrinsic* relation between parts and human intentions that creates objects. On the one hand, *intrinsic* properties, such as mass, size, and shape, are fixed by the parts that compose an object. The same set of parts cannot have more than one mass or more than one shape at the same time. In contrast, the same parts can stand in more than one extrinsic relation to human intentions at the same time. In the statue and lump case, the same parts stand in the compose-a-statue relation and in the compose-a-lump relation. So the grounding problem is solved, at least for artefacts such as statues. Now that I have given a short answer to the grounding problem, I will make clarifications, offer arguments, and address objections.

2.0 Intrinsically composed objects versus extrinsically composed objects

Let us take a detour through terminology in order to clarify my solution to the grounding problem. A property of object O is *intrinsic* if the property depends only on O or on O's parts. A property of O is *extrinsic* if the property depends at least in part on something outside of O and O's parts. Thus, my body has the *intrinsic* property of *having ten fingers* because it has ten fingers as parts. My fingers, however, have the *extrinsic* property of *being parts of my body* because my body is mostly outside of my fingers.

Based on the familiar distinction between intrinsic and extrinsic properties, let us draw a new distinction to clarify my solution to the grounding problem. I suggest that the parts that compose the statue and the lump compose nothing until those parts enter into an extrinsic relation with human intentions. This relation is necessary for composition to occur. That is, the existence of statues depends essentially upon intentions (human or other) about statues. Let us distinguish between the following types of composition:

extrinsic composition: An object O is *extrinsically composed* iff O's being composed (and

thus O's existence) is grounded in part by relations that O's parts stand in to things that

are not parts of O.

intrinsic composition: An object O is *intrinsically composed* iff O's being composed (and

thus O's existence) is *not* grounded, even in part, by relations that O's parts stand in to

things that are not parts of O.

I have said that artefacts are extrinsically composed and will argue later that members of biological

species are as well. I do not know if *any* things are intrinsically composed. But all that matters to solving

the grounding problem is to show that for any group of colocated objects, at most one is intrinsically

composed. Any number of extrinsically composed objects could be composed of the same parts, for

each object comes to exist in virtue of a different extrinsic relation that the parts have to something or

things external. While colocated objects have similarities that are grounded in shared parts with shared

intrinsic properties, they have differences that are grounded in different extrinsic relations had by those

parts. The statue and the lump have the same mass of *x* kilograms, which is grounded in the mass of

their composing parts, but they differ in their kinds, which are grounded in relations that the parts stand

in to (1) human intention about statues and (2) human intention about lumps, respectively. I am not

claiming that human intentions are among the parts that compose these objects; instead, I am claiming

that human intentions are part of the supervenience base for artefact kinds and that they contribute to

the properties had by members of those kinds. Nor am I claiming that we have intentions about simples

(though we might in special cases); our intentions that create artefacts are intentions about the artefact

kind itself. The composing parts or simples stand in a relation to our intentions when those composing

parts satisfy our criteria about what it is to be a thing of kind *x*. The kind properties that distinguish

colocated objects from one another are often a subset of persistence properties.

I mentioned that among a group of colocated objects, at most one may be intrinsically

composed and have its properties grounded in the intrinsic properties of the composing parts and the

relations of those parts. In fact, among many if not all groups of colocated objects, all of the objects are

extrinsically composed. In the statue and lump pair, for example, both objects are extrinsically

composed, each object's existence depending on a different extrinsic relation had by the composing

parts.

2.1 The intention-latching objection

A natural objection is, How can I have intentions toward only the statue or only the lump? Each

is made of the same parts, and each is located in the same place. How do my intentions latch on to one

but not the other? The answer is that our intentions latch on to neither the statue nor the lump. Without

our intentions, there would be no statue, and there would be no lump, so our intentions cannot be

directed toward either one. Instead, our intentions are about what it is to be a lump or what it is to be a

statue. The things that are soon to be parts of the lump and parts of the statue stand in the right relation

to our intentions about lumps and statues. For the parts to stand in this relation to our intentions, we

need not understand the nature of the individual parts—our intentions are about statues and lumps, not

about the parts themselves. The parts satisfy our intentions by being organized in the right way.

2.2 Substance sortals versus phase sortals

My account relies on a traditional distinction between *substance sortals* (or *substance kinds),*

such as *human being, oak tree,* and *motorcycle,* on the one hand, and *phase sortals,* such as *teenager,*

oak sapling, and *red motorcycle,* on the other. Phase sortals are ways that substances can be: a human

being can be a teenager for part of its existence but then grow into adulthood. The individual—the human being—continues to exist, but the individual ceases to be a teenager. A motorcycle can be red for a period of time before its owner paints it jet black; the motorcycle continues to exist through the colour change. The substance sortal can outlast the phase sortal, but not vice-versa. There could not be a teenager that continues to exist as teenager but ceases to be a human being. (In contrast, in cases of colocation, either of the colocated objects could outlast the other. The statue might outlast the lump or vice-versa.)

For parts to stand in a composing relation, they must stand in the right relation to a substance sortal. Phase sortals do not new objects make. When phase sortals come and go, they bring changes to an individual substance, such as a human being or motorcycle, but no object thereby begins or ceases to be. What qualifies as a substance sortal? In the case of living things, such as plants and animals, that question is the work of science—to discover what kinds of species there are. (For more on this, see the discussion of theories of species later in the article.) In the case of artefacts, what substance sortals there are depend on our purposes and intentions and conventions. (See the next section for our role in the sortal and modal properties of artefacts.)

2.3 Sortal (kind) properties are extrinsic, relational properties

If an artefact has a property in virtue of human intentions or purposes, then that property is an extrinsic, relational property. The property qualifies as extrinsic because it depends at least in part on something outside of the artefact (human intention), and the property is relational because it holds between parts and persons. So to argue that sortal properties are extrinsic and relational, I will argue that they derive, at least in part, from the intentions of persons. I do not claim that all modal properties of artefacts arise from human purposes, because they do not. Our statue, for example, has the modal property of being such that it would crack when hit with such-and-such a force. The lump has the

property of cracking under the same force. This modal property does not depend on human purposes. To be nonidentical, the statue and lump need have only *some* difference in properties, so I aim to show that *some* modal properties arise from human purposes and that those purposes determine statuehood and lumphood.

Let me illustrate a case in which an artefact gets some of its modal persistence properties from human purposes. Imagine an inventor in her shop. She develops a widget, the first of its kind. The widget is freestanding, 15-inches tall, and it has a Y-shape at the top. It is made of wood and brightly painted. Could a widget survive being hollowed out?

We cannot answer without first knowing what a widget is, and more precisely, a widget's purpose. If we knew more detail about the intrinsic properties, such as the collective mass of the parts, we still would not know if the widget could survive being hollowed out. Consider two different scenarios, in which the inventor has different purposes for her invention, and which lead to different answers about persistence. If she invented the widget to prop up heavy windows, then it could *not* survive being hollowed out because hollowing would compromise structural integrity, and part of being a widget is being able to hold open windows. If instead her widget was a representational tool to teach children about family trees (wherein a parent's name can be written on each branch of the Y and the child's name on the stem), then surely the widget could survive being hollowed out. These persistence properties arise in virtue of the purpose of a kind, and purpose is determined by human intentions, which means that persistence properties are extrinsic, relational properties. In the lump and statue case, the statue's property of being able to survive losing an arm (as the *Venus de Milo* did) comes not from the microstructure of the statue but from the human intention that defines what it is to be a statue.

2.4 Lump is conventional too

In the statue and lump case, most philosophers agree that if the statue exists, it does so by convention (in some manner or other). What is more controversial, which I would like to press here, is that the lump is conventional as well. Why would we think that the lump is *not* conventional, that the lump exists independently of our conventions about lumps? Perhaps we think that because the parts of the lump are stuck together and are moved as a unit, the existence of the lump depends only on being stuck together and requires no human conventions.

But we are in the habit of recognizing that things can be stuck together yet fail to compose anything, so it is far from obvious that being stuck together is sufficient for composition prior to human interests or conventions. Imagine owning a new lunch box in the third grade. You decorate your lunchbox with a sticker. In the fourth grade, you decide the sticker is so third-grade and must be replaced. But, alas, the sticker is stuck and will not come off the lunchbox. If the conditions for lumphood were sufficient for composition in general, then we would recognize the lunchbox and sticker as two parts that compose a new object once they become stuck together.[8] But we do not. Sticking together is insufficient grounds for the existence of an object. Thus the lump cannot exist purely based on having its parts stuck together. We need some other ingredient for composition to occur. I suggest that human convention about what qualifies as a *lump* or *piece* fits the bill.

2.5 Masses, if they exist, are extrinsically composed

Some philosophers have suggested that the statue is constituted by a *mass,* an individual, physical object that is a homogeneous collection of individuals and has its parts necessarily. (Throughout this section I am using 'mass' to refer to a kind of physical object as just described. Earlier, in section 2.0, I used 'mass' as the physicists do to refer to a measure of the amount of matter in an object, measured,

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[8] Cf. Peter van Inwagen's consideration of the 'special composition question': When is there a thing such that some *x*s compose that thing? He rejects the proposed answers of physical bonding (fastening, cohesion, fusion). See van Inwagen 1990, especially pp. 56–71.

for example, in kilograms.) The mass, like the lump, has its parts essentially, but unlike the lump, the mass can survive its parts being scattered. The assumption that masses as individual objects exist has been largely unargued, and I argue that there is no compelling reason to believe that masses exist. If they exist at all, they exist in virtue of our interests and conventions, and thus are extrinsically composed. In the absence of a reason to believe that masses exist prior to our interests, we should not add them to our ontology as intrinsically composed objects.

Here is one reason not to believe that masses exist prior to our interests: the property of *being a mass* is barren as a subject of induction. We can study many samples of masses, and we will not learn anything new about the property of *being a mass.* We might learn something new about matter or the laws of physics, but not about masses per se. Everything we know about masses we know by stipulated definition. In contrast, consider natural kinds that exist prior to our interests: noroviruses, oxygen molecules, whale sharks. Studies of these are inductively fecund. Study of noroviruses has broadened our knowledge of noroviruses and their properties, causes, and effects.

Why have some thought that masses exist? We sometimes want to talk about collections of homogeneous matter, and positing masses makes obvious the referents of our talk. Dean Zimmerman (1995, p. 56) gives this example: 'The sugar in my coffee is the same sugar as the sugar that was in that cube'. We must be referring to something when we name the sugar, so 'the sugar' must individuate a mass of sugar. The example is vivid, but the motivation for masses seems hasty: a collection of sugar composes a physical object because we must be referring to something. In fact, we often refer to collections of individuals without positing a physical object composed of those individuals. For example, we talk about 'the Kentucky Derby winners' or 'the boulders in the avalanche', and these collections can be picked out despite changes in location or scattering. We are not tempted to conclude that there is a physical object that is composed of all of the Kentucky Derby winners or composed of the boulders that cascaded down the hill. For some, the temptation may kick in when we begin to talk of smaller, more

fine-grained things, but smallness would be an odd restriction for whether or not some things compose a further object. We can talk about the Kentucky Derby winners without positing an object composed of over 100 horses. (A good way to talk about groups in the language of logic is to use plural quantification; see McKay 2006.) Likewise, we can talk about sugar without positing an object composed of so many sugar molecules.

Thus, if masses exist, they exist not for some intrinsic reason but by our conventions based on our interests in talking about such things. And so, if masses exist at all, they are extrinsically composed. Because masses would be extrinsically composed, the road to colocation is made smoother.

I claimed earlier that my solution to the grounding problem does not require us to change ontological commitments for the sole purpose of patching the grounding problem. I recognize that my claim about masses is controversial (of course, any internally consistent metaphysical theory contains controversial claims). But even if there were no grounding problem in the first place, we would still have reasons to believe that masses either do not exist or exist by our conventions, and my arguments for this conclusion do not appeal to the need to solve the grounding problem. My solution to the grounding problem draws on metaphysical commitments that I think we should have independently of the concerns about grounding.

2.6 The instantiation objection

Karen Bennett has argued against the idea that artefacts depend in part on us for their sortal properties (2004, p. 349). To understand her objection, we must first see how she characterizes the view she argues against. She writes that the view must be based on a principle by which we establish that, whenever certain properties obtain, it follows that certain sorts come into existence. She writes:

In each place where non-sortalish properties N are instantiated, there is a thing *x* with

sortalish properties S_1 and another thing *y* with sortalish properties S_2.

Bennett then presents her objection (p. 350):

Begin by noticing that the antecedent simply says that certain non-sortalish properties

are instantiated in a region. Question: does anything instantiate them? I mean does

anything initially instantiate them—is there an object whose instantiation of the non-

sortalish properties enables the principles to hook onto the world in the first place?

Bennett then gives a dilemma: if the answer is yes, and there is an object that instantiates them, then

that object is strangely an object of no sort. Its properties are neither accidental nor essential because

essential properties are had only in virtue of belonging to a kind or sort. Because this object is a strange

beast, Bennett concludes that this horn of the dilemma is a non-starter. We are then left with the second

possibility, that nothing instantiates the non-sortalish properties, and we are, in her words, 'stuck with

the rather odd claim that properties can be instantiated without being instantiated by anything'. So

whichever horn of her dilemma we take, Bennett thinks we are in trouble.

But this objection rests on the assumption that non-sortal properties are a sufficient

supervenience base for artefacts, an assumption that I have just given reason to reject. One of the

necessary properties for the existence of the statue is a certain relation to human intentions. That

human-intention half of the relation is loaded with sortal properties—ideas about what a statue is.

Without that relation, we do not have a sufficient supervenience base for a statue. Once we add in that

relation, we add in sortal properties and the existence of the statue.

But what of Bennett's dilemma? Human intentions about statuehood must latch onto something with non-sortal properties. For example, human intentions about statues includes the idea that statues are physical objects. So human intentions about statuehood cannot latch onto nonphysical things and bring about the existence of a statue—there must be some thing or things with physical presence, non-sortal properties such as extension and weight that the intentions latch onto. Bennett is right to reject the possibility that an object of no sort instantiates non-sortal properties.

The second horn of the dilemma is more apt—though misleading. The nonsortal properties are instantiated not by a thing but by things—composing parts. Of course, they are not composing parts until the statue is brought into existence, until then they are merely particles or other individuals. Collectively those particles have sufficient extension and weight, and along with other properties (perhaps arrangement), those particles can enter into the relation with human intentions about statues that is needed to bring about a statue. So some things, the x's, stand in an extrinsic relation to human intentions about statues, and in virtue of that relation, a statue comes to be composed and comes to exist. Those same x's stand in a different extrinsic relation to human intentions about lumps, and in virtue of that relation, the lump comes to be composed and comes to exist.[9]

2.7 What the world was like before human intentionality

What was the world like before there were any creative minds? There were no artefacts that existed by convention. If some atoms came together into the shape of a bench, that was not sufficient for the existence of a bench. For what it is to be a bench depends on purposes, and atoms cannot create purposes for composite objects. Intentional minds are needed for that, and the purposes of such minds (for example, a bench is for sitting on) imbue benches with persistence conditions: a bench would cease

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[9] Donald Smith has posed to me the possibility of an extended simple—could an extended simple constitute another object? I do not know if extended simples exists, but if they do, then a single thing—a single part—could be colocated with an artefact, if the simple stood in the right relation with human intentions about a kind of artefact. Accordingly, we could have a case in which a single thing instantiates nonsortal properties.

to exist if shattered (because it could no longer be sat upon) but would continue to exist if painted (because it could be sat upon as soon as the paint dries). Those who take an eternalist view of time could posit the existence of pre-human benches if the collection of atoms stands in a bench-hood relation to later human intentions. I wish to remain neutral on the question of whether or not composite objects can come into existence retroactively. My point is the more general one that the existence of *artefacts* depends on a relation between the composing parts and creative minds.

This is not to say that world was devoid of objects before creative minds came onto the scene. Non-artefacts, such as plants, animals, and elements do not depend on human intentions. I examine in section four what such objects do depend on, but first, let us examine two objections from the literature that would apply to my solution to the grounding problem.

2.8 Composition-without-manual-labour objection

Eric Olson (2001) has critiqued Lynne Rudder Baker's version of colocation and her account of what makes a thing a member of the kind *statue* and not identical to the lump. Baker (2000) argues that the existence of the statue depends on a relation that holds between the statue and the art world or the artist, and my proposal about the composition of artefacts is in Baker's tradition. Olson objects:

Suppose an artist simply finds a piece of bronze and, without touching or moving it, declares it to be a work of art. The public goes along with this, and it is bought and sold several times, without ever being disturbed. If Baker's story is right, these activities would bring a new material object into existence, one that would not have existed had no one paid the bronze any heed. That would give us the power to bring concrete material objects into existence without getting our hands dirty, just by speaking in the right way. Gods and magicians would envy us! Even they cannot create material objects

without creating new matter, or at least rearranging matter that was already there.

(2001, p. 347)

Olson does not here present an argument against colocation other than to say that it has a surprising result. I propose that the result is surprising because it is an unusual case. Most artefacts are indeed the result of matter being rearranged. Olson focuses on a special case, art in the Readymade school, in which the artist *chooses* rather than *sculpts* the artwork. The most famous case of Readymade is from 1917, when French artist Marcel Duchamp rotated a urinal ninety degrees, signed and dated it, and sent it for display in an exhibit of the Society of Independent Artists in New York City. He titled his artwork 'Fountain'. Readymade is a controversial movement in art, and perhaps Olson would find himself in the camp that believes that Readymade is not art at all. But if we assume with today's art world that 'Fountain' was indeed art (the piece has since been lost), then we have a real-life version of Olson's case of creating an object without manual labour.

Even though Olson's case is rare, it is possible. We invent artefact kinds, and we might come across particles arranged so that they meet the physical requirements to be the kind of thing we invented. Let us consider an example other than art in the Readymade school. Imagine an early hunter who invents and fashions the first arrowhead. The earliest known arrowheads are more rounded than later arrowheads, and they have less precise edges (Hitt 2005, pp. 242–244). We can imagine that the early hunter scavenges for stone to make more arrowheads, and he comes across a stone that has been weatherworn in such a way that it is indistinguishable from the arrowheads that the hunter has already fashioned. The hunter decides, 'Ah, I'll use this as an arrowhead and save myself the trouble of beating a stone into this shape'. The stone stands in an extrinsic relation with human intentionality that is necessary for the composition of an arrowhead. Though the hunter saved himself manual labour, some human labour was still involved—the forging of purposes and intentions about the kind *arrowhead.* This

stone is found later to fit these purposes and intentions. Although cases like this and Olson's do not

require manual labour, they do involve both mental labour and the right kinds of physical things and

arrangements, so we do not have new objects popping into existence without cause.

2.9 The distribution of properties objection

Dean Zimmerman and Karen Bennett have asked what fixes the facts about which properties the

lump gets and which properties the statue gets. Karen Bennett put the objection this way. The

properties of the shared parts, especially those properties that are not sortal related properties,

'certainly do not determine the *distribution* of those sortalish properties. They do not determine which

ones go to *Lumpl* [the lump of clay] and which ones go to *Goliath* [the statue] … ' (2004, p. 344). Dean

Zimmerman similarly argues that the physical properties of the parts (including relational properties)

are 'apparently not sufficient to determine … which object is which—which one has the honor … of being

able to persist through the gain and loss of [parts] … ' (1995, p. 90).

The first thing to remember is that there is no object before the distribution of sortal properties.

The question, Which object gets which sortal properties? is ill-formed because there are no objects

waiting receive sortal properties. There is no object that takes on statue properties and persists through

a pre-statue and then a statue phase; instead, artefacts such as statues come into existence *with* and

because of those sortal properties that depend on a relation between the human mind and composing

parts. We do not have to worry about properties being distributed among already existing objects. What

it is to be the lump is for parts to stand in the right relation to human intentions and convention about

lumps, bringing a lump into existence. What it is to be the statue is for those parts to stand also in the

right relation to human intention about statues, bringing a statue into existence.

What grounds whether the generated object is a statue or a lump? The generated object has

modal properties that are grounded in human intentions about the kind *statue* or the kind *lump*. The

generated object is a statue if its supervenience base includes a relation between the parts and human intentions about statues, and thus it has the modal properties of a statue. The generated object is a lump if its supervenience base includes a relation between the parts and human intentions about lumps, and it thus has the modal properties of a lump.

In everyday life, the question, Which one? often prompts an answer of ostension, such as, That one, there. We cannot distinguish between the statue and the lump by pointing or by other empirical signs, for the two objects share empirical properties. We instead distinguish between the two because we know that each has distinct modal and persistence properties and in many cases separate historical properties. So the answer to, Which one? is simply, the one with the statue properties [or the one with the lump properties]. And those properties come into being at the same time as the objects themselves, so to be the statue just is for those statue properties to be instantiated.

2.10 Section conclusion

With this distribution-of-properties objection out of the way, and Bennett's earlier instantiation objection out of the way, I resubmit my answer to where the difference in properties between the statue and the lump come from: they come from extrinsic relations that hold between (1) human intentions and purposes and (2) the things that will become the parts of a composite object. The things that will become parts can stand in multiple relations to human intentions about artefacts, and multiple relations can ground the composition and existence of multiple artefacts. When we understand that the statue and the lump can exist in the same place at the same time, we avoid having to conflate the properties of one with the properties of the other: we can recognize that the lump can survive being formed into a ball, but the statue cannot. We have one set of parts, but two sets of properties and, therefore, two objects.

3. Nonliving natural kinds and the solution to the grounding problem

Nonliving natural kinds, such planets and diamonds, can be colocated with collections or masses of matter. For example, a diamond is colocated with a mass of carbon atoms. The diamond has properties, such as being able to survive cutting and polishing, that the mass of carbon atoms lacks (if the mass of carbon atoms was cut, it would be a different mass, not identical to the original). On the other hand, if it were possible to rearrange the mass of carbon atoms into a different lattice, the mass could survive as the same mass of atoms, but those atoms would no longer compose a diamond but graphite instead. The diamond would not survive.

The diamond seems a good candidate for intrinsic composition. The existence of diamond does not depend on human intentions about diamond. Diamond was discovered, not invented. My solution to the grounding problem does not dispute the putative intrinsic composition of nonliving natural kinds. But earlier I argued that lumps and masses are extrinsically composed objects that depend for their existence on our conventions. Carbon atoms exist independently of us, but the mass or collection that they compose depends on our mental work of defining what a mass or collection and its persistence properties are. Therefore, nonliving natural-kind members can be colocated with a mass of matter, and no more than one of the colocated objects is intrinsically composed, so the property differences between the colocated objects are grounded.

4. Persons and the grounding problem

I have shown how artefacts can be colocated and how nonliving natural-kind objects can be colocated with masses or collections of matter. But a problem remains. There is a putative case of colocation in which the same parts compose two non-conventional objects: persons and their living bodies. In questions of persons, we have at least three candidates for colocation: (1) the person, (2) the organic human body that gains and loses parts, and (3) the lump of tissue. As I argued above, lumps are

conventional objects whose composition is extrinsically grounded, so they pose no grounding problem when they are colocated with other objects. So we are left to worry about (1) persons and (2) human bodies.

I do not wish to endorse a particular account of persons or personal identity. Instead, I want to show how persons are not colocated with bodies—the reason why depends on the theory of persons at issue—so the grounding problem never arises. For example, if a person is identical to her body, then the person and body are not a case of colocated objects because 'they' are the same thing, and there is no mystery of how a thing exists in the same place as itself. Another theory of persons escapes colocation puzzles: if a person is a nonphysical mind or soul, then there is no worry about grounding or colocation because the soul has no location or material parts and so, obviously, not the same parts as the body.

But it is often thought that a person is a physical being that is not identical to his or her body. Such person–body colocation is often motivated by a *psychological-continuity theory* of personal identity. According to psychological-continuity theories, a person at one time, let us call him Monday Aristotle, is identical to (the same person as) a later person, Tuesday Aristotle, just in case there is an appropriate continuity between the psychology of Monday and Tuesday Aristotle. What counts as an appropriate continuity varies among the family of theories. For example, John Locke, the originator of psychological-continuity theory, pointed specifically to continuity in memory.[10] Psychological-continuity theory leads to colocation because examples abound of men and women who seem to lose or change psychological identity while retaining biological identity. For example, a woman who enters a vegetative state shows no signs of psychological activity but has the same body. If she never recovers, it seems that the body might have outlived the person. Psychological-continuity theories highlight differences

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[10] See Locke's *An Essay Concerning Understanding,* Bk. II, Ch. XXVII: 'Identity and Diversity', Sect. 6 and Sect. 9. Note that Locke was cagey about whether the mind was physical or nonphysical, and framed his theory to allow either possibility. Consequently, it is not clear whether Locke thought that a person could be colocated with her body or whether he thought the person is a nonphysical soul. But even if he did not endorse person–body colocation, he paved the way for it by highlighting the difference in properties between the person and his body.

between what it is to be the same person over time and what it is to be the same biological creature over time, and these theories motivate person–body colocation.

For some philosophers, this is the most important case of colocation. David Wiggins (1968) and Lynne Rudder Baker are among those who believe in persons colocated with (not identical to) human beings. Baker, for example, writes at the beginning of her book on constitution that her aim is to show 'how we can be fully material beings without being identical to our bodies' (2000, p. 4). She writes:

> But if a person is constituted by a body to which she is not identical, what distinguishes a person from the body that constitutes her? My answer, which I shall explain in this chapter, is that a person has a capacity for a first-person perspective essentially; her constituting body has it contingently … .The body of a human person is (identical to) an animal. An animal, human or not, can exist without any capacity for an inner life; a person cannot. (2000, p. 59)

How does my theory account for grounding in these cases? Notice that on my account, what solves the grounding problem is *not* convention's role in composition but instead the role of *extrinsic relations* in composition. Our conventions are but one type of extrinsic factor that can bring about the composition of an object out of some parts. I argue in the next section that being a member of the species *Homo sapiens,* that is, being a human being, depends on an extrinsic relation that holds between (1) the things that compose a human body and (2) other members of the species, which is where the extrinsic part of the relation comes in.

And what about the person; is a person extrinsically composed? Baker argues convincingly that if personhood is having a first-person perspective, then personhood is relational, and essentially so (2000, pp. 69, 72–9). In this case, the person is extrinsically composed, and we have an explanation of

how the properties of the person are grounded in more than just the parts of the person. Baker claims that having a first-person perspective requires a contrast class or individual. In order to have the perspective of 'I' and 'me', there must exist something that I can distinguish from myself. Her argument applies not only to her own view of persons but to those psychological-continuity accounts that follow Locke in including in the definition of a person the ability to 'consider itself as itself' (Locke's *Essay* Bk. II, Ch. XXVII, Sect. 9). Thus, on the psychological-continuity views, what grounds the properties of a person is broader than just the parts of the person, so we have an answer to the grounding problem.

If the person is colocated with her body, then I think that Baker is right. We have reason to believe, however, that persons are not colocated with their bodies, even on a psychological-continuity account of persons. For if being a person is having certain psychological features (e.g. a first-person perspective, continuity in memory), then whatever the supervenience base for personhood includes, it does not include your rib cage. And if your body has a rib cage, but you as a person do not, then your body and you as a person do not have all the same parts. Thus, your body and you overlap but are not colocated. If a person is not colocated with her body, then there is no grounding problem of explaining how they come to have differences in properties.

Someone might object that a person could have for her body only those parts which are necessary for a supervenience base of psychological continuity. We could imagine a (far-fetched but perhaps possible) scenario in which a person is made up of only a brain and nervous system, or perhaps a brain in a vat. It might that seem that the person is colocated with its body. (It seems wrong to use a gendered pronoun for this imagined case.) But a brain and nervous system would not be an organism, would not function independently to sustain life—they would be a lump of flesh at best. There would not exist a human being or organism to be colocated with this person. In fact, a brain in a vat would need to be artificially stimulated to function, and so the person (defined in terms of psychological function) would be extrinsically composed because the person would depend on something outside of

its parts for its continued existence. So this seeming counterexample is not a troublesome case of colocation, if it is a case of colocation at all.

But for those who none the less subscribe to a theory of personal identity and a theory of mind that together entail colocation of persons and their bodies, I suggest turning to Baker to explain how the existence of persons depends on relational properties (and is therefore extrinsically composed).

4.0 Species-membership properties are extrinsic, relational properties

I have shown that lumps and masses are extrinsically composed, and that persons are either not colocated with their bodies at all or extrinsically composed, so all that is left it is to address the human being itself.[11] Now the grounding problem as traditionally conceived is already solved, for even if the human being were intrinsically composed, then only one of the colocated objects would have its existence and properties grounded purely by the composing parts. But it is worth showing that the human being is *extrinsically* composed for a couple of reasons. One reason is to convince those that take a non-traditional approach to colocation, such that they think that the candidates for colocation include something in addition to the usual suspects (see the previous footnote). A second reason is that it has been common to think that the human being might inherit all of its properties from its composing parts,

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[11] I have up until this point assumed that the body *is* the human being and that the human being is the candidate for colocation with the lump of tissue and the person. Some have suggested, however, that focusing on human beings is misguided, and that it is the *organism* more generally that we should have in mind when we think about colocation. Perhaps the property of *being an organism* individuates a body, and the organism is a candidate for colocation instead of the human being. Or perhaps the organism is colocated both with the lump of tissue *and* the human being (perhaps the organism and the human being have different persistence conditions and are each individual things).

None the less, I focus on human beings for two reasons. First, colocation has more often been understood as person–human being colocation, and it is more pressing to address the grounding problem in the way it is traditionally conceived. Secondly, because human beings are extrinsically composed (as I argue in this section), it does not matter to solving the grounding problem whether organisms are intrinsically or extrinsically composed (or whether organisms are colocated at all). Remember that to avoid the grounding problem, no more than one in a group of colocated objects can be *intrinsically* composed. So if an organism is an intrinsically composed object, but the human being, person, and lump of tissue are not, then an organism could be colocated with these other things, and the grounding problem would still be solved.

so my arguments below aim to correct that misconception, which seems worthwhile apart from the grounding problem.

The property of *being a human being* is an extrinsic property because the property arises from a relation between an object, such as Aristotle, and a species, in this case *Homo sapiens,* which depends at least in part on something outside of Aristotle. Most biologists and philosophers of science have come to reject the idea that an individual is a member of a species or living kind in virtue of having an essence. My arguments that biological-kind membership is an extrinsic, relational property are set against this background. Below, I describe the theories that have come to replace essentialist accounts to better cohere with discoveries about biological traits and evolution: (1) the theory of species-as-individuals, (2) the theory of species as homeostatic property clusters, and (3) the theory of species with relational essences (which departs from traditional essentialism in significant ways and skirts the conflicts between the old essentialism and evolutionary theory). There has been little contact between these new theories and the literature on mereology and composition, and the new theories have unexplored metaphysical implications. I use these dominant views of species to show that the property of *being a member of species x* (such as *being a dog* or *being a human being*) is an extrinsic, relational property. To be a dog, the composing parts must stand in the appropriate relation to members of the *Canis familiaris* species.

4.1 Species as individuals

Most philosophers of biology have come to understand species as individuals, and I argue that if this view is right, we should recognize members of species or living-kinds as extrinsically composed. Those who endorse the species-as-individuals view follow philosopher of biology David Hull (1978), who argued that we should no longer understand species as classes organized around static features that transcend spatiotemporal particulars. He argued that we should instead understand species as

historically rooted individuals with parts. Hull rejects species-as-static-classes largely on evolutionary and empirical grounds. A species can change its dominant phenotypes over time, so that a current member of the species is notably different from an earlier member. Furthermore, we cannot predict what features of a species will or will not change, so it is wrong to think that an organism must have specific features to enjoy species membership (as on the species-as-static-classes view).

Hull recommends species-as-individuals on the grounds that species evolve (even if natural selection occurs at the level of genes, organisms, or populations), and evolutionary explanation requires historical and causal continuity: reproduction and copying of DNA, external environment, gene exchange and frequencies (1978, pp. 339–43). Hull concludes that because of the causal roles and spatiotemporal nature of species, they are more properly individuals than static classes. Thus, the relation between a member of a species, say Shaggy the dog, and the species itself, *Canis familiaris,* is a part–whole relation.

We are now in the position to see that if species are individuals, we must understand living kind membership as an extrinsic, relational property. Because Shaggy is a proper part of the species *Canis familiaris,* the kind *Canis familiaris* is in part external to Shaggy (overwhelmingly external to Shaggy), so the property of *being a dog* meets neither of the criteria of an intrinsic property: the property does not depend on Shaggy alone nor on Shaggy's parts alone. Instead, *being a dog* is a bona fide extrinsic property that depends in part on something external to the dog that has it.

Note an interesting result of the species-as-individuals view. An exact molecular duplicate of Shaggy would not be a dog if that duplicate were causally unconnected to Shaggy and *Canis familiaris.* Some philosophers see this as an advantage of the view; others see it as a liability. Biologists, including Darwin, tend to favour this result.[12]

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[12] See Hull, p. 349, for Darwin's take on the matter; for biologists' general take on the matter, see pp. 353–4 and the article at large.

4.2 Species as homeostatic property clusters

Richard Boyd has proposed a theory of natural kinds (including species) that, like the view of species as individuals above, captures the importance of historical and genetic relations for species individuation. Boyd's theory is called the *homeostatic property cluster* theory of kinds. As the name suggests, kind membership is observed when we pick out clusters of properties that overlap; a kind is described in terms of overlapping properties that are common but not necessary among a group of related members. The name also suggests a role for *homeostasis*—causal mechanisms bring about clustering and are significant in the identity of kinds. Clusters are not neat enough or stable enough to form necessary and sufficient conditions. For example, a notable characteristic of *Homo sapiens* is rationality, and many but not all human beings exhibit this trait. A man or woman is who is profoundly mentally disabled might not be rational but is clearly a human being, and the homeostatic property cluster theory of kinds accommodates that fact. The theory also accommodates the fact that species can change over time so that a phenotype that is clustered in a species may over time virtually disappear through selection, and the species persists through the change. An individual man or woman has the property of being a member of *Homo sapiens* in virtue of sharing stable, causal mechanisms and phenotypic characteristics with other individuals, usually individuals with a shared genetic ancestry.

Property clusters among individuals are of course relations among individuals, and thus kind membership is once again an extrinsic relation. The property of *being human* is an extrinsic property, even though being human depends in part on intrinsic phenotypes, for recall that an extrinsic property is one that depends *at least in part* on something outside of the object or its parts, which kind membership does.

4.3 Species with relational essences

A third theory of species wears on its sleeve its dependence on extrinsic relations. Often referred to as 'relational essentialism', the view posits that species have essences, but those essences involve relations that are central to evolutionary theory. The essential relation might be descent from an individual organism or organisms (Griffiths 1999 and LaPorte 2004, cited in Ereshefsky 2010b, p. 679); for example, an animal might be a member of species *y* if and only if that animal descended from a small group that originally belonged to species *x* but migrated and became geographically isolated, giving rise to the new species *y*. Samir Okasha (2002, pp. 199–201) cites other candidate essential relations. One is Ernst Mayr's interbreeding relations: 'Mayr (1969) defined species as "groups of interbreeding natural populations that are reproductively isolated from other such groups"' (Okasha 2002). Another candidate is a relation between the species and its environment—'two organisms are members of the same species if … they exploit the same set of environmental resources and habitats' (Okasha 2002, p. 200).

Although this relational approach to species is essentialist in that it gives necessary and sufficient criteria for inclusion in a species, this approach is part of the movement that breaks from traditional essentialism. Okasha points out that relational essentialism is not the essentialism of Aristotle or Locke for two reasons. First, Locke indicated that a real essence must be intrinsic and is 'that particular constitution which every Thing has within its self, without any relation to any thing without it' (1689, Bk. III, Ch. 6, Sect. 6; quoted in Okasha, p. 202). Second, relational essences might not explain the individual's non-essential properties, as traditional essences were thought to do. For example, while having the essence of a dog would, according to traditional essentialism, explain the property of being disposed to bark, it might not explain the property on a relational essentialist account in which the species is defined by interbreeding relations.

We can now see that if relational essentialism is true, then the human being is extrinsically composed. The property of *being a human being* is had, at least in part, because of a relation to an extrinsic factor, such as an ancestor or ancestors, or interbreeding relations, or the environment that

defines the species. The property of *being a human being* cannot arise only from the composing parts of the body.

4.4 The grounding problem and species

In subsections 4.0 through 4.3, I argued that being the member of a species is an extrinsic, relational property, and I demonstrated how the main theories of species support this. I have argued this in order to show how Aristotle's kind membership arises from an extrinsic relation of parts to members of the kind *Homo sapiens,* and the atoms that compose Aristotle can stand in other relations that are sufficient for composing additional objects, such as a lump of tissue. I addressed Dean Zimmerman's version of the grounding problem in the section about artefacts. Let us return to Zimmerman's objection, this time thinking in terms of biological entities:

> Should not two physical objects constructed in precisely the same way out of
> qualitatively identical parts have the same capacities for survival under similar
> conditions? Of course one may say that the big difference between the two is found in
> the *sort* each belongs to—one is a mere mass, the other a living animal. But can sortal
> properties be *basic,* not possessed in virtue of any other feature of a thing? If we admit
> that sortal differences are ungrounded in this way, we would seem to be committed to
> the possibility of a world in which a four-dimensional path through space and time is
> successively filled by a series of masses of cellular tissue *S* that—in every other
> respect—is exactly like the series of masses *S** making up my body in the actual world,
> but that differs only in that *S** constitutes a persisting human body and *S* does not.
> Surely this is absurd. (1995, p. 87)

The going theories of species membership depend on historical relationships. In the case of Aristotle, he belongs to the kind *Homo sapiens* because his individual history traces back to, and is part of, the *Homo sapiens* history. This is not to admit that 'sortal differences are ungrounded'; they are grounded in a relation that holds between parts and a species. Yet this is to commit to the idea that Zimmerman finds absurd: that there could be another possible world in which a mass or series of masses is an atom-for-atom duplicate of his body but fails to compose a member of *Homo sapiens.*

But the possible-world scenario is not as strange as it could be on the brute–kind membership solution that Zimmerman worried about. The brute solution might allow that Zimmerman's nonhuman duplicate inhabit a possible world that was exactly the same as ours all along. In contrast, on the solution that I have proposed, which depends on going theories of species, the Zimmerman duplicate would be human in a world with the same history as ours. The duplicate could be nonhuman *only in a world in which it had a different evolutionary history.* This result arises not from the metaphysics of grounding but from work in the philosophy of biology on what it means to be a member of a species. So the difference between the human Zimmerman and the nonhuman Zimmerman duplicate, though perhaps surprising, is grounded after all—the difference is grounded in evolutionary histories.

5. Conclusion

I have argued that artefacts, masses, and members of species are *extrinsically composed* objects. Multiple objects can be composed from the same parts, with each of the composed objects depending for its existence on a different extrinsic relation that the parts stand in. These objects can have properties that their parts lack. The new properties and objects arise from the composing parts' relations to human intentions or to a species. The door is now open for the colocation of nonidentical physical objects. In this paper, I presented a solution to the grounding problem, which is the most

serious challenge to colocationism. With the grounding problem out of the way, colocationism should be

a more enticing solution to statue–lump and person–body–mass-of-matter puzzles.[13]

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