

Materiality and Immateriality

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1. TWO PRELIMINARY PRINCIPLES, PRIOR TO CONCEPTUAL NETWORKING

The best strategy for getting to know an ontological concept and the questions that relate to it is to display the connexions it has to other ontological concepts. I will do so by presenting some more or less obviously true principles, all of them of an analytical (i.e. broadly logical) nature, all of them relating the concept *material* to the concept *immaterial* and to other ontological concepts.

Before one discusses the relation of concepts, it is necessary to delimit their field of application. I fulfil this requirement by postulating:

P0a For all x : x exists at some moment of time.

This postulate has the consequence that all concepts discussed will be discussed within a framework in which they apply only to items that exist at some moment of time. By P0a, I do not wish to exclude that some items do not exist at any moment of time. Maybe some items do, maybe none do—I simply do not here wish to discuss the question whether the first is true or, on the contrary, the second. Thus, “For all x ” is here to be taken to mean as much as “For all x that we are talking about (here)” and not to mean as much as “For all x ”.

It is another question how *existence at a moment of time* is related to *existence simpliciter*. The policy here followed is this: If x exists (*simpliciter*), then x either *clearly exists in time* and therefore *at some moment of time* or x , though existent, does not clearly exist in time. But then it may be said to *exist at all moments of time* and therefore, again, *to exist at some moment of time* (since some items are moments of time). For illustration of the latter case, consider the number 4: this item, if it exists, does not *clearly exist in time*, but if it exists, it may be said to *exist at all moments of time* (in fact, it seems to me that if the number 4 exists, it should be *excluded* that it does not exist at some moment of time); therefore, also the number 4, if it exists, may be said to *exist at some moment of time* (since

some items are moments of time). Thus, there emerges the following principle (complementing P0a):

- P0b For all x : x exists (*simpliciter*) if and only if
 x exists at some moment of time.

I have argued for the *only-if-part* of P0b; its *if-part* does not need arguing. Perhaps it would have been a good idea to distinguish *existence simpliciter* typographically from *existence at a time* in some obvious way, but I trust that no confusions will arise.

Note, finally, that it follows from P0a, in view of P0b, that *everything* (here *spoken about*) exists. Given that we use classical predicate logic (where we have the classical basic inference-rules “For all x : $F(x)$; hence: $F(a)$ ” and “ $F(a)$; hence: For some x : $F(x)$ ”), it follows that “ a exists” is true for *all* singular terms a . Nevertheless, inadequacy does not arise; because even if one is liberal with respect to what counts as a singular term, not all admitted singular terms will be *relevant*. *Relevant* singular terms have the referent that fits their sense. But singular terms that are *irrelevant* do not have the referent that fits their sense; instead, they all refer to *the Moon* (say). Thus, “Pegasus exists” is indeed true (if “Pegasus” is admitted as a singular term). But “Pegasus” is an *irrelevant* singular term (or so I take it). Therefore, “Pegasus exists” says nothing else than “the Moon exists” (a harmless statement), and all statements that are ostensibly about Pegasus are really about *the Moon* (which is harmless, since “Pegasus” is an *irrelevant* singular term).

2. MATERIAL/IMMATERIAL SIMPLICITER AND QUALIFIED

Besides the *simpliciter*-concepts *material* and *immaterial*, one does well to consider the following *qualified* concepts: *wholly material*, *partly material*, *partly immaterial*, and *wholly immaterial*. These concepts are related to each other in the following ways:

- P1 For all x : x is partly material if and only if x is not wholly immaterial.
 P2 For all x : x is wholly material if and only if x is not partly immaterial.
 P3 For all x : if x is wholly material, then x is partly material.
 P4 For all x : if x is wholly immaterial, then x is partly immaterial.
 P5 For all x : x is (*simpliciter*) immaterial if and only if
 x is wholly immaterial.
 P6 For all x : x is (*simpliciter*) material if and only if x is partly material.

Comments: P1 and P2 need no comment. P3 and P4 display the logical regulation that “partly” is to be understood in the sense of “*at least partly*”, that is, in a sense in which “partly” does not logically exclude “wholly”. P5 and P6 display

the standard definitions of the *simpliciter*-concepts on the basis of the *qualified* concepts. Note that it would not have been adequate to define “(*simpliciter*) immaterial” by “partly immaterial” and “(*simpliciter*) material” by “wholly material” (for the *simpliciter* use of the terms “material” and “immaterial” is not *that way*), but, *syntactically*, such a procedure would have been entirely analogous to the one actually chosen (manifested by P5 and P6). And note that four of the six concepts introduced can be defined on the basis of two of them (as the preceding six principles show): for example, on the basis of *wholly immaterial* and *partly immaterial* (or on the basis of *partly material* and *partly immaterial*, or . . .).

3. THE ANALOGICAL USE OF “MATERIAL” AND “IMMATERIAL”

It is easily seen that the following is a consequence of the six principles enumerated (or, more precisely speaking, of P6, P1, and P5):

T1 For all x : x is either material or immaterial (but not both).¹

Although this is true, it goes without saying that an *individual* (or *particular*) is material, respectively immaterial, in a very different way than a *state of affairs*, or a *property*. (The state of affairs that $1 + 1 = 2$ is plausibly an *immaterial* state of affairs, the property of being a prime number plausibly an *immaterial* property; in turn, the state of affairs that the moon revolves around the earth is plausibly a *material* state of affairs, the property of weighing five hundred pounds plausibly a *material* property.) There is a global, formal sense of “material” and “immaterial”, but, according to the category of entity that these two predicates are applied to, that formal sense is filled out, is made specific in very different ways. Such a characteristic is, of course, *not* a speciality of the predicates “material” and “immaterial”; it also applies to other predicates of very wide application, as for example “exist” and “not exist”, “is the same” and “is not the same”, “good” and “not good”. The existence of the global, formal sense of “material” and “immaterial” is indicated by some universal analytic principles that are true for these predicates (see later discussion). It is also indicated (1) by the fact that, although an immaterial individual is *immaterial* in a rather different way than is an immaterial property, the use of “immaterial” in both cases is felt to be a case not of *equivocation* but rather of *meaning-analogy* (whereas the use of “immaterial” in the sense of “unimportant” or “irrelevant” is felt to be a case of equivocation *vis-à-vis* the *ontological uses* of “immaterial” just indicated); and (2) by the parallel fact that even though a material individual is *material* in a rather different way than is a material property, the use of “material” in both cases is felt to be a case of *meaning-analogy*, not of equivocation (whereas the use of “material” in the sense of “important” or “relevant” and even in the sense of “non-formal” is felt to be a case of equivocation *vis-à-vis* the uses of “material” just indicated).

4. PHYSICAL AND CONCRETE IN THEIR RELATION TO MATERIAL

The predicate "material" is connected to the predicates "physical" and "concrete" in the following ways:

P7 For all x : if x is material, then x is physical.

P8 For all x : if x is material, then x is concrete.

The reverse of P7 does not hold, nor does the reverse of P8. But it is easily seen that the following two theorems are consequences of the principles introduced thus far:

T2 For all x : if x is not physical, then x is wholly immaterial.

T3 For all x : if x is not concrete, then x is wholly immaterial.

Proof: Suppose x is not physical/concrete; hence, by P7/P8: x is not material; hence, by P6: x is not partly material; hence, by P1: x is wholly immaterial.

The reverse of T2 does not hold (for the same reason why the reverse of P7 does not hold: a portion of empty space is wholly immaterial—i.e. (*simpliciter*) immaterial, i.e. not material (according to P5 and T1)—yet *physical*), and the reverse of T3 does not hold (for the same reason that the reverse of P8 does not hold: a portion of empty space is wholly immaterial—i.e. (*simpliciter*) immaterial, i.e. not material—yet *concrete*). With the defining principle of *abstractness*,

P9 For all x : x is abstract if and only if x is not concrete,

having been added to T3, we obtain:

T4 For all x : if x is abstract, then x is wholly immaterial.

The qualifications by "partly" and "wholly" can be made for "physical" and "non-physical" in the same way as for "material" and "immaterial". Replace, in P1-P6 and T1, the word "material" by the word "physical" and the word "immaterial" by the word "non-physical": the resulting principles P1'-P6' and T1' are as analytically true as P1-P6 and T1. These same replacements, if applied to P7 and T2, yield principles—P7' and T2'—that are as analytically true as P7 and T2 (*trivially* analytically true in the case of P7'). Indeed, it appears that these same replacements also transform P8, T3, and T4 into principles—P8', T3', and T4'—that are still analytically true.

5. TOWARDS THE CENTRAL MEANING(S) OF "MATERIAL" AND "IMMATERIAL" (IN ONTOLOGICAL SIGNIFICATION)

Since there is an analogical use of the word "material" in ontological signification (see section 3), it makes sense to ask which meaning is *the central meaning*—or which meanings are the central meanings—of that word in that signification,

that is: the meaning(s) to which all its other ontological meanings are not only *analogical* but also *peripheral* (or *secondary*). But note that such a meaning or such meanings might not exist, for an analogical use of a word can very well exist without the word having any central meaning around which all its meanings, in the relevant family of meanings, revolve; all these meanings might merely be *analogical to each other*, without being peripheral (or secondary) to any central meaning. Note also that *the* central meaning—if it exists—is *not* the formal or global sense of the analogically used word, *is not* the common denominator of all the meanings of the word that are in the relevant family of meanings. The formal or global sense of an analogically used word is, however, a necessary ingredient of a given analogical use of it, since that sense characterizes *the relevant family of meanings* that all the analogical meanings of the word, in that use, come from. Now, how does all this apply to the word “material” (the *adjective*, not the substantive) and its negative “immaterial”?

Take “material” in its global, formal, ontological sense. This formal sense is filled out differently in the combinations “material substance”, “material particular (individual)”, “material property”. How so exactly? Consider first “material particular”.

Particulars come in at least two varieties: momentary particulars and persistent particulars. Hence, there are at least two varieties of material particulars:

- D1 A *momentary material particular* is a particular x that (i) exists at exactly one moment of time, and (ii) is such that *the mass of x* at the moment of its existence > 0 .
- D2 A *persistent material particular* is a particular x which (i) exists during at least one continuous stretch of time (i.e. at any time in that stretch), (ii) is such that every moment at which it exists belongs to a continuous stretch of time during which it exists,² and (iii) is such that the following holds true: If t is any moment of time at which x exists, then *the mass of x* at $t > 0$.³

These two definitions, however, allow of two interpretations, depending on whether one thinks of *particulars* as *subsistent* or as *occurrent particulars*. An *occurrent particular* is a particular which is such that every momentary phase of its existence is a part of it. A *subsistent particular* is a particular which is such that no momentary phase of its existence is a part of it. An *occurrent particular* is the (temporally ordered) mereological sum of the momentary phases of its existence; it is, in other words, an *occurrence*. A *subsistent particular*, however, cannot be the sum of the momentary phases of its existence; it is not an *occurrence* but a *subsistence*.

Note that *substances*, as conceived of in the Aristotelian tradition, constitute a special kind of subsistences. Note also that the distinction between *occurrent* and *subsistent particulars* also applies to particulars that exist only at one moment of time; that is, it also applies to momentary particulars. However, in the case of momentary particulars, the distinction appears to be pointless (though

it exists): because a momentary occurrent particular is as present in its entirety at each moment of its existence (it is only *one*) as a momentary subsistent particular is *present in its entirety* at each moment of its existence. In contrast, in the case of persistent particulars, the distinction *occurrent/subsistent* is far from being pointless: because a persistent occurrent particular is *present only in part* at each moment of its existence, while a persistent subsistent particular is present in its entirety at each moment of its existence.

I shall avoid discussing which conception of particulars is the correct conception, particulars qua *occurrences* or particulars qua *subsistences*. Instead, let D1.1 be D1 with the word “particular” interpreted as *subsistent particular*, and let D1.2 be D1 with the word “particular” interpreted as *occurrent particular*. Apply the same procedure also to D2. I shall concentrate on material particulars qua *subsistent particulars* (and therefore on D1.1 and D2.1)—which is, after all, the classical conception. But I do not thereby repudiate the non-classical conception (often called “four-dimensionalism”). Note that if one is ontologically wide-minded (in other words, not quick to wield Ockham’s Razor), then both conceptions can be upheld side by side: Each conception is consistent in itself, and compatible with the other *if it is not applied to the same particular*. That is, while one cannot say that a given particular x —say, *this table*—is both an occurrence and a subsistence, one *can* say that particular x_1 —(*this table*)₁—is a subsistence and that particular x_2 —(*this table*)₂, which corresponds one-to-one to x_1 —is an occurrence. But one will have to decide whether x is x_1 , or rather x_2 (since x cannot be both and since there is certainly not a *third* object besides x_1 and x_2 that x might be).

In order to keep the complexity of the discussion at a tolerable level, I shall not only concentrate on material particulars qua subsistent particulars but shall also understand the substantive “particular” in the sense of “subsistent particular”. This stipulation makes it possible to “define” the concept of a *material substance* as follows:

- D3 A *material substance* is a persistent material particular (i.e. persistent material *subsistent* particular) which has a *sufficient* amount of ontological independence and is a centre of a *sufficient* amount of independent activity.

Given the wording of D3, it is clear why I put the word “define” in the sentence preceding D3 in scare quotes: the *definiens* of D3 is utterly vague. This essay is not the place to make it precise, and it is, in fact, doubtful whether it can be made precise: One must clarify the notions of *ontological independence* and of *independent activity*, and—what is likely to prove the most difficult task—one must make precise what, in D3, is to be meant by “a *sufficient* amount”, in the case both of ontological independence and of independent activity. “A *sufficient* amount” is, of course, meant to indicate an amount of ontological independence, respectively independent activity, that is *minimally sufficient* for ascribing ontological independence *simpliciter* and independent activity *simpliciter*; but *what* amount is minimally sufficient for these ascriptions?

If a particular is neither a momentary material (subsistent) particular nor a persistent material (subsistent) particular, then it does not follow that it is an immaterial particular. It is merely true that if a particular is not (*simpliciter*) material, that then it is (*simpliciter*) immaterial (by T1). But, so far, it has not been defined what it means to say that *x* is a material particular. Here is the definition:

D4 A material particular is a particular *x* which is such that, at some moment *t* of time at which *x* exists, the mass of *x* at $t > 0$.

It follows—on the basis of D1, D2, and D4—that all momentary material particulars and all persistent material particulars are material particulars; this is as it should be. But it does not follow on the basis of those definitions that all material particulars are either persistent or momentary material particulars, and this, too, is as it should be. Here is an important possibility of being a material particular that those definitions leave open:

It has traditionally been held—in classical Christian hylomorphism, as taught, for example, by Thomas Aquinas—that *integral human beings* (*homines*) are, indeed, persistent material (subsistent) particulars (in a sense) but that *human persons* are material (subsistent) particulars that are neither momentary nor persistent material particulars. For, according to classical Christian hylomorphism, the entire continuous stretch of time of a human person's existence has three consecutive extended phases: in the first phase, T_1 (from Birth to Death), the mass of the human person is greater than 0 at any moment in T_1 ; in the second phase, T_2 (from Death to the Resurrection: while the person dwells, for example, in Purgatory), the mass of the human person is 0 at any moment in T_2 ; in the third phase, T_3 (from Resurrection onward), the mass* of the human person is greater than 0 at any moment in T_3 (the asterisk indicates that, *after the Resurrection*, a transformed concept of mass applies). The human person—Vergil, say—coincides with the integral human being during T_1 ; during T_2 , however, the human person is reduced to and coincides with the former soul of that integral human being, whereas that integral human being *itself* does not exist at any moment in T_2 (it is *dead* during T_2); during T_3 , finally, the human person again coincides with the integral human being, *the same* as the one it coincided with during T_1 .⁴ In this view, the integral human being—if one disregards that the concept of mass is not the same for T_1 and T_3 —is a persistent material particular (with all the moments of its existence contained in the one or the other of two separate continuous stretches of time: T_1 and T_3) but *not* the human person, which, however, is still a material particular.

Given D4—i.e. the definition of (*simpliciter*) material particular—the definition of (*simpliciter*) immaterial particular is obvious:

D5 An immaterial particular is a particular *x* which is such that, at any moment *t* of time at which *x* exists, the mass of *x* at $t = 0$.

D4 can be taken to define *also* what it means to be a *partly* (i.e. at least partly) material particular, and D5 can be taken to define *also* what it means to be a *wholly*

immaterial particular. Then the definitions D4 and D5 allow, by themselves (without making use of T1), not only the demonstration of T1 *in restriction to particulars* (which can be put in the following way: "For all particulars x : x is a material particular if and only if x is not an immaterial particular") but also the demonstrations of P6, P5, and P1 *in restriction to particulars*; for those demonstrations one must merely presuppose that if the mass of x at t is not greater than zero, that then it is zero, or, in other words, that it is greater than zero if it is not zero (the inverses of these conditionals are, of course, *trivial*). These results constitute a vindication of definitions D4 and D5. From the definitions D1, D2, and D3, as models that indicate the relevant basic structure, it can, moreover, be easily read off how to define, given D5, *momentary immaterial particular*, *persistent immaterial particular*, and *immaterial substance*. For example:

- D6 A *persistent immaterial particular* is a particular x which (i) exists during at least one continuous stretch of time, (ii) is such that every moment at which it exists belongs to a continuous stretch of time during which it exists, and (iii) is such that the following holds true: If t is any moment of time at which x exists, then the mass of x at $t = 0$.

But note that the notions of *wholly material particular* and of *partly immaterial particular* will here remain undefined. In view of this, it is helpful to have an illustration of the application of these latter concepts.

We have seen that, according to classical Christian hylomorphism, both the integral human being and the human person are material particulars (as defined by D4), hence (at least) partly material particulars (by P6). But it is also true, according to classical Christian hylomorphism, that neither the human person nor the integral human being is a *wholly material particular*, which means (according to P2) that both are *partly immaterial particulars*. Only *the human body* is a wholly material particular (but there is reason to doubt the truth of this widespread opinion; see the end of section 8), whereas *the human soul* is—not only for Descartes but also for classical Christian hylomorphism—a wholly immaterial (i.e. *simpliciter* immaterial) particular, in fact, an *uninterruptedly persistent* one.⁵ However, for classical Christian hylomorphism, the human soul is *not quite* an immaterial substance (the reason is this: Since the human soul is meant to be a *part* of an integral human being—and normally is such a part—it is not deemed to have the requisite amount of ontological independence for substancehood). Another point of interest is this: In contrast to the human soul and the integral human being, the human person is—according to classical Christian hylomorphism—neither a persistent immaterial nor a persistent material particular, though it is indeed, like them, a *persistent particular*:

- D7 A *persistent particular* is a particular which (i) exists during at least one continuous stretch of time (i.e. at any time in that stretch), and (ii) is such that every moment at which it exists belongs to a continuous stretch of time during which it exists.

In fact, the human person is, in classical Christian hylomorphism, a materiality/immateriality *amphibian-particular* with respect to persistence (not, however, *simpliciter*; *simpliciter* it must be *either* a material or an immaterial particular—and in classical Christian hylomorphism it is a *material* particular, not an immaterial one, as we have seen).

6. CENTRAL AND PERIPHERAL MEANINGS OF “MATERIAL” AND “IMMATERIAL”

Traditionally, the combination “material substance” has been taken to yield the central meaning of “material”, and “immaterial substance” the central meaning of “immaterial”. This position is questionable—at least from the modern ontological point of view, which is no longer *subservient to substance*. It will hardly be controversial, however, that among *central* ontological meanings of the adjectives “material” and “immaterial” are the ones they take on when they are connected to the ontological substantives “particular” and “substance”. What is responsible for this semantic phenomenon is the applicability of the concept of *mass* to particulars and substances (substances being special particulars, and particulars—the reader is reminded—are always understood here to be *subsistent particulars* or *subsistences*). The concept of mass, which is treated in detail in the next section, is itself *central* to materiality and immateriality.

But whereas it obviously makes sense to speak of a *material* or *immaterial* property, it is not at all obvious that it makes sense to speak of *the mass of a property*. It might, perhaps, be truthfully said that, for any property *x* and any moment of time *t*, the mass of *x* at *t* is zero. But if this were without qualification relevant for the materiality or immateriality of properties, it would follow that *every* property is *immaterial*—which does not seem right, or at least does not seem to be the result that pertains to the most pertinent sense in which properties can be said to be *immaterial*. But if not all properties are immaterial, if some are immaterial and others *material*, then what is it that “material property” and “immaterial property” mean? Since the meanings of these expressions cannot, then, involve the concept of mass in any direct way, those meanings are not central meanings of “material” and “immaterial” but are merely *analogical and peripheral* meanings. Here follow the definitions that exhibit those meanings—definitions which presuppose, for the purposes of this essay, that properties are (a) properties of (subsistent) particulars, and (b) universals (hence non-particulars):

D8 A material property is a property *x* which is such that no immaterial particular has *x* at any moment of time.

D9 An immaterial property is a property *x* which is such that some immaterial particular has *x* at some moment of time.

The first definition, D8, displays the precise relation which a certain analogical and peripheral meaning of “material”—namely the one given in the

combination “material property”—has to a certain central meaning of “immaterial” (!)—namely to the one given in the combination “immaterial particular” (as defined by D5). In this relation, a further relation of semantic derivativeness is *implicit*: this time to a central meaning of “material”, namely to the meaning of “material” given in the combination “material particular” (as defined by D4); this is so because “no immaterial particular has property x at any moment of time” is *equivalent* to “no immaterial particular has property x at any moment of time, and some material particular has property x at some moment of time”.

Proof (of the non-trivial part): Let x be a property. By P0a, x exists at some moment of time. But for a property to exist at some moment of time *means* that some particular has that property at some moment of time. Hence, some particular y has x at some moment of time. Now, if no immaterial particular has x at any moment of time, then y cannot be an immaterial particular. Hence y is a material particular (by D5 and D4; see the remarks following D5). This completes the proof.

After these comments about D8, it is obvious that, in the second definition, in D9, the semantic derivation of a certain analogical and peripheral meaning of “immaterial” is rather more straightforward than the derivation of a certain analogical and peripheral meaning of “material” in D8. Note that D8 and D9 obviously allow, without making use of T1, the demonstration of T1 *in restriction to properties*; this constitutes a vindication of those definitions. I bring this section to a close by presenting some examples of material and immaterial properties (as defined by D8 and D9).

The singular term “the property of weighing one hundred pounds” and the singular term “the property of being a material particular” are both *relevant* singular terms (regarding this notion of *relevance*, see section 1). Thus, the property of weighing one hundred pounds is a material property, according to D8, since no immaterial particular has that property at any moment of time (which does not preclude that an immaterial particular might be said to “have” that property in an analogical and peripheral sense of property-having: A soul might be said to have—peripherally and analogically—the property of weighing one hundred pounds *via* its body having—centrally and properly—that property). And, for the same reason, the property of being a material particular is also a material property, according to D8.

It is rather more difficult to give an example of an immaterial property, for D9 implies that if nothing is an immaterial particular, then nothing is an immaterial property—and many people *do* believe that nothing is an immaterial particular (I shall come back to this issue in the last section of this essay). If they are right, then the singular term “the property of being an immaterial particular” is *irrelevant*.⁶ But if they are wrong and something is an immaterial particular, then the property of being an immaterial particular is, indeed, an immaterial property, according to D9—because, if something is an immaterial particular, then certainly some immaterial particular has, at some moment of time, the property of being an immaterial particular.

7. THE CONCEPT OF MASS AND THE MYSTERY OF MATTER

The central ingredient of the definitions D1-D6 in section 5 is the concept of *mass*, of which the following formal principle is true (a principle which has already been made use of):

P10 For all particulars x and moments of time t : if x exists at t , then the mass of x at t is either 0 or greater than 0.

But what is *mass*? The question has a straightforward first answer: Mass is the quantity of *matter*. But what is *matter*? It is a surprising fact that we do not really know; we know only the *effects* of matter (and we measure the quantity of matter—mass—on the basis of those effects). On the one hand, matter is *whatever* it is that is *wholly responsible* in a persistent material particular for its offering resistance—to be overcome only by *force*—to being *accelerated* and *whatever* it is that is *partly responsible* in a persistent material particular for its offering resistance to being *penetrated* or *deformed* (in the cases of resistance to penetration and deformation, the geometrical structure of the persistent material particular is the other, also *partly responsible* factor). In this perspective, matter is an *anti-dynamical factor*. On the other hand, matter is also *whatever* it is that is *wholly responsible* for the gravitational force a persistent material particular exerts on other persistent material particulars (accelerating them). In this perspective, matter is also a *dynamical factor*.

We also know today that the constancy of matter, which the mediævals ascribed to heavenly bodies, is likely to be found quite on the other side of the size-scale of persistent material particulars: in the elementary particles (the ancient atomists, of course, had a hunch of this fact). Each electron, for example, has a constant mass (in fact, each electron has *the same* constant mass), and this seems to indicate that also *the matter* of each electron is constant during the entire course of its existence. But as soon as we come to the level of *macro-physical* persistent material particulars, constancy of mass or matter is to be had, if at all, only in approximation. In fact, since the matter of a macro-physical persistent material particular x at a moment of time t is the aggregation of the *constant matters* of all elementary particles that go into building x at t (let's assume the *constancy of matter* of these particles), it is clear that the matter of x at time $t + \Delta$ may have nothing in common with the matter of x at t —because no elementary particle that goes into building x at $t + \Delta$ is an elementary particle that already went into building x at t .⁷ This possibility is in fact realized in special persistent material particulars: *organisms* (with sufficient longevity).

Due to Einstein's special theory of relativity, we also know today that matter is a special form of energy and can under certain circumstances (which, unfortunately, human beings have the power to produce) be wholly transformed into thermic and kinetic energy (thus, the quantity of matter in the physical world is *not* preserved; only the quantity of energy in the physical world is

preserved—assuming that the physical world is a closed system). But all of this does not really tell us what *matter* is. The usual materialist is full of contempt for anything *mysterious*—an ontological contempt that makes him move on to denying the existence of what he contemns; it should give him pause that *matter* is *mysterious*.

8. IS MATTER A *PRINCIPIUM INDIVIDUATIONIS*?

Matter is a *principium individuationis* for elementary particles x and y —unfortunately, an entirely useless one, since we cannot recognize as identical or distinguish the matter of x and the matter of y without recognizing as identical or distinguishing x and y . But matter is not a *principium individuationis*—not even a useless one—for persistent material particulars *in general*. The matter of x at moment of time t and the matter of y at moment of time t' are, whether these *matters* are identical or different, sufficient neither for determining that x and y are identical nor for determining that they are different:

If the matter of x at t is identical with the matter of y at t' , it does not follow that x is identical with y (and, of course, it does also not follow that they are different from each other). This is obvious if $t' \neq t$; for the special case that $t' = t$, consider (a) Tibbles, who has a tail before t but none at t' , and (b) Tib, who is Tibbles without her tail; although the matter of Tibbles at t is identical with the matter of Tib at t' , Tibbles is not identical with Tib.

If the matter of x at t is different from the matter of y at t' , it does not follow that x is different from y (and, of course, it does also not follow that they are identical to each other). This is true, but if one makes the extra assumption that $t' = t$, then, indeed, “ x is different from y ” follows from “the matter of x at t is different from the matter of y at t' ”.

The case of Tib and Tibbles is an unusual version of a usual phenomenon: Several persistent material particulars (sometimes indefinitely many) share the same matter at a given moment of time. Consider (1) this statue, (2) this lump of bronze, (3) this gaggle of copper and tin atoms. (1), (2), and (3) have the same matter at a given moment of time, but (2) and (3) may still exist when (1) doesn't, and (3) may still exist when (1) and (2) don't. Thus, the statue, the lump of bronze, and the gaggle of atoms are three different persistent material particulars.

It might *prima facie* be thought that although the identity of matter at time t is not in general sufficient for making persistent material particulars identical, the identity of *spatial location* at time t is in general sufficient for this. But this, too, is not the case—as is, again, shown by Tib and Tibbles, and by the statue and the lump of bronze. There is, moreover, a deep problem connected with the spatial location of persistent material particulars and, as a consequence, also with the *quantity* of that spatial location, the *volume* of persistent material particulars: The deeper one goes into the microstructure of such objects, the further their precise spatial location—if it is to be determined on purely

objective, physical grounds—*evaporates*.⁸ The problem can be put in terms of a paradox:

On purely objective, physical grounds, the precise spatial location of a persistent material particular x at a moment t of time is the region $RO(m(t, x), t)$ of space, in other words: the region of space that is precisely occupied at t by the matter of x at t . But every region R of space that is a candidate for $RO(m(t, x), t)$ contains *empty* space.⁹ Therefore, R is not precisely occupied at t by the matter of x at t , and therefore R is not $RO(m(t, x), t)$.

The best solution to this paradox, I submit, is that the precise spatial location of a persistent material particular x at a given time t is not determined on purely objective, physical grounds and is not $RO(m(t, x), t)$. It is also determined by us and differs considerably from $RO(m(t, x), t)$ (which, presumably, does not exist *as intended*; cf. note 9). It is a certain irony of the history of philosophy that Descartes called persistent material particulars—*wholly* material ones in his eyes—*res extensae*, separating them from us, who—in his eyes—are persistent wholly immaterial *res cogitantes*. It can, of course, hardly be denied that persistent material particulars are *extended*, but their precise extension is dependent not only on temperature and pressure but also on our *deciding* how far they are extended, that is, on our deciding what counts as *their* territory and what does not.¹⁰ Empty space is bound to be involved in that territory. Since empty space is immaterial (i.e. *wholly* immaterial), it may, therefore, be reasonably proposed that *no* persistent material particular is *wholly* material.

9. HYLOMORPHIC FUNCTIONS AND THE IDENTITY AND UNITY OF MATERIAL PARTICULARS

Every material particular x is represented by a hylomorphic function $\vartheta(x)$ as follows:

The domain of $\vartheta(x)$ comprises the moments of time at which x exists, and $\vartheta(x)$ assigns values to those moments of time in the following manner:

- (i) If t is a moment of time at which x exists and which is such that the mass of x at t is greater than zero, then $\vartheta(x)(t) = \langle m, f \rangle$, where f is at t the form of x , and m the matter that is at t in union with f in x (i.e., the matter of x at t).
- (ii) If t is a moment of time at which x exists and which is such that the mass of x at t is zero, then $\vartheta(x)(t) = \langle \emptyset, f \rangle$, where f is at t the form of x , and $\emptyset$ the empty set.

While clause (i) is always necessary, clause (ii) may not be necessary for a given material particular (it is not necessary, for example, if x is a *persistent*

material particular). The representation of material particulars by hylomorphic functions makes it particularly easy to see (a) in which manners material particulars may be different from each other and yet partially identical, and (b) what is really sufficient for their being *identical*:

- P11 For all material particulars x and y : if $\vartheta(x) = \vartheta(y)$, then $x = y$ (where $\vartheta(x)$ and $\vartheta(y)$ are functions that, in the manner just described, represent x and y).

It is to be supposed that there are *many more* hylomorphic functions than there are material particulars. Presumably not every restriction of a given particular-representing hylomorphic function represents, in its turn, a material particular; yet it is a hylomorphic function. And consider a function ϑ' that assigns to each moment t of time in some non-empty set of such moments M' (which serves as the domain of ϑ')

an ordered pair $\langle m, f \rangle$, where m and f are such that for *some* material particular x (not necessarily always the same) the following is true: f is at t the form of x and m the matter that is at t in union with f in x .

Although ϑ' is a hylomorphic function, it may well be the case that it does not represent a material particular because its course of values may easily be a patchwork derived from many different material particulars—a patchwork that cannot be assigned to any *one* material particular. Thus, each hylomorphic function that *represents* a material particular x also displays *the specific principle of unity* that belongs to x . And vice versa: If a hylomorphic function displays a specific principle of unity P , then it also represents the material particular to which P belongs. (It is not a misuse of the term “essence” to call the principle of unity that belongs to a material particular *the essence* of that particular.)

Typically, the principle of unity of a material particular x is *diachronic*: it is not already determined by a single value of the hylomorphic function of x ; only in the case of momentary material particulars is the respective principle of unity *non-diachronic* (and—since particulars are taken to be subsistences—in itself *non-temporal*). Note that even though the principle of unity of a non-momentary material particular is diachronic, it cannot be without a synchronic (hence momentarily determined) aspect if the particular’s existence is finite. For, without such an aspect, it would be indeterminate when the particular comes into existence and when it goes out of it.

Any persistent material particular can be classified according to whether the values $\langle m, f \rangle$ of its hylomorphic function are (i) diachronically constant in both the first and the second component, (ii) diachronically constant in the first but not in the second component, (iii) diachronically constant in the second but not in the first component, (iv) diachronically constant neither in the first nor in the second component. An individual (mere) *portion of matter* (it need not be a

spatially coherent portion) is a *degenerate* material particular (a particular that is identical to its matter), and it is a material particular which is only very indirectly accessible to human cognition. Yet it is (at least normally) a *persistent* material particular, and *necessarily* such that the first component of the values of its hylomorphic function is *diachronically constant* (otherwise it would not always be *this self same* portion of matter), whereas the second component of the values of its hylomorphic function can, in the course of time, vary very widely indeed (it can, but it needn't). In contrast, a *neutron* is a persistent material particular and necessarily such that both components of the values of its hylomorphic function are diachronically constant. A neutron is at all times of its existence composed of the same matter and the same form; in other words, the form of the neutron is at any moment *t* of the neutron's existence *the same*, and the matter that is at *t* in union with that form in the neutron is *the same*, too. Most persistent material particulars, however, are neither like portions of matter nor like neutrons. While the second component of the values of the hylomorphic function of *the Ship of Theseus* varies only slightly, the first component of those values varies considerably though gradually, to such a degree that at later moments of the Ship's existence it has nothing in common with what it was at earlier moments of that existence. And if we come to a *living organism*, then no diachronically constant or approximately diachronically constant element in the values of its hylomorphic function is readily discernible. This means that the principle of unity of *such* a persistent material particular is not readily discernible. The traditional hylomorphic answer to the question of what constitutes the unity of a living organism is, of course, this: The principle of unity of an organism is the organism's *soul*. However, it rather seems that an organism's soul is *an effect* of the organism's unity (emergent from it, and perhaps a safeguard for it)¹¹ and *not* that the organism's unity is an effect of the organism's soul.

10. ARE SOME PARTICULARS IMMATERIAL?

There is a long-standing phobia—though not always of the same strength and popularity—in Western philosophy against immaterial entities: *either* against regarding the specimens of a given kind as immaterial, while leaving the exemplification of the kind (i.e. its having specimens, its being exemplified) untouched or, if it seems impossible to regard the specimens of the kind as material, then against its very exemplification. It is obviously absurd to regard abstract entities as material (they are *wholly immaterial*, according to T4). Accordingly, it has been proposed (by many philosophers, not a few of them in every century, very many in recent times) that the kind *Abstract Entity* is not exemplified (has no specimens); it has, in other words, been denied that any entity is abstract.¹² It seems, moreover, that specimens of the *God-kind* are bound to be immaterial; however, it is certainly not as obviously absurd to regard gods as material as it is absurd to regard abstract entities as material. Accordingly, we find, in the

course of the centuries, a *divided* phobic reaction against *this case* of *prima facie* immateriality in an ontological species. Most of the philosophers who have a problem with the *God-kind* (and there are many such philosophers, very many in recent times) deny that this kind is exemplified, in other words: they propose that nothing is a god (that not even God is). But a small minority of those philosophers *do* believe that the *God-kind* has a specimen, in fact, a *single one*—which, however, they deem to be (in contrast to what is believed by other, normal monotheists) a material entity: the World, or Nature. There are, finally, fairly strong indications that *human persons*, too, are bound to be immaterial; however, in this case, there is much more room (and motivation) than in the case of abstract entities and gods for contending that, on the contrary, the specimens of the kind in question are, in fact, *material*. Accordingly, we again find, in the course of the centuries, a *divided* phobic reaction against it. But in this third case of *prima facie* immateriality in an ontological species, majority and minority in the phobic reaction against *are* distributed inversely to the previously considered case: In the case of the *God-kind*, eliminativists (deniers of God/gods) formed the majority, non-eliminativists (“materializers” of God/gods) the minority; in the case of *human person*, non-eliminativists (“materializers” of human persons) form the majority, eliminativists (deniers of human persons) the minority (a fairly small one).

But is it the case that some entities are immaterial? Everyone who accepts abstract entities cannot deny that, indeed, some entities are immaterial. And some properties are immaterial if some particular is immaterial: This follows on the basis of D9, since an immaterial particular is bound to have, at some moment of time, some properties. But are there immaterial *particulars*? Well, yes. There are even concrete, non-abstract immaterial particulars: Every region of space is a persistent immaterial particular (in the sense of D6). Some readers will no doubt balk at the idea that regions of space are *particulars* and would continue to do so even if *regions of space* were understood to be *coherent regions that have the form of geometrical solids* (the better-known among which are cubes, spheres, and pyramids). But, really, there is no good reason to deny that regions of space are particulars; there is for this denial just the *bad* (phobic) reason that empty regions of space would be *immaterial* particulars if they were *particulars*.

But if *human persons* were immaterial particulars (contrary to classical Christian hylomorphism; see section 5), then this would certainly be a much more exciting bit of news than the truth that regions of space are immaterial particulars. Here are two arguments for conferring on human persons the status of immaterial particular; one argument is *a priori*, the other *a posteriori*.

The A Priori Argument¹³

Let *x* be a human person. While *x* experiences the physical world in just the way in which *x* in fact experiences it, the entire physical world might not exist [*thesis of the possibility of ontological idealism*].¹⁴ Therefore: It might be the case that *x* exists while the entire physical world does not exist.

Therefore: It is possible that *x* is not a physical entity. But if *x* were a physical entity, then *x* would be a physical entity *necessarily* [*thesis of the essentiality of physicalness*]. Therefore: *x* is not a physical entity. Therefore (according to P7): *x* is not a material entity. Therefore (according to T1): *x* is an immaterial entity. But *x* is certainly a particular [by the *thesis of the individuality of persons*]. Therefore: *x* is an immaterial particular. Therefore: *Every human person is an immaterial particular.*

The A Posteriori Argument¹⁵

Let *x* be a human person. At any moment of time at which *x* undergoes visual experience, *x* sees the world from a certain very small region of space, *O* (this *origin* of *x*'s perspective in *x*'s visual experience can be objectively determined). And if *x* sees the world from *O* at the moment *t* of time, then *x* is in *O* at *t*: *O* is *x*'s location at *t*, as precisely as that location is determinable (it is *not* the region of space that is at *t* occupied by *x*'s body). But the physical entities one finds in *O* at *t* are certainly not *x*. Therefore: *x* is not a physical entity. Therefore (according to P7): *x* is not a material entity. Therefore (according to T1): *x* is an immaterial entity. But *x* is certainly a particular. Therefore: *x* is an immaterial particular. Therefore: *Every human person is an immaterial particular.*

Both these arguments use the expressions "material particular" and "immaterial particular" in such senses as to make right (to the extent this is possible) what is said in them; it is a matter of further investigation—which will not be carried out here—whether those senses (only minimally characterized for the purposes of the arguments) can be identified with the senses given to the expressions "material particular" and "immaterial particular" by D4 and D5 (see section 5).

Both these arguments have premises (otherwise they would not be arguments), and premises can be criticized. But unless a premise of an argument is criticized on grounds that have nothing to do with the fact that one does not believe in the argument's conclusion, such criticism has few credentials. What, then, might be said against the premises of the arguments presented *without* making use of the conclusion-denying assumption that human persons are *material* particulars? What can be said in a non-question-begging way against the three theses on which the *a priori* argument rests (the names of the theses are given in the argument itself: in square brackets, in italics)? Every one of them is plausible enough; *together*, however, they logically imply what to many philosophers can only be *anathema*.

The premises of the *a posteriori* argument are even more plausible than the premises of the *a priori* argument. They are just about unassailable. Note that it would be a move utterly *ad hoc* to propose that *x* is not in the place from where *x* looks at the world. If I am not *there*, where am I then? If the answer is "nowhere", then it is even clearer than if the answer is "somewhere" that I am

not a material particular. If the answer is "where my body is", then this answer is *roughly* true, just as it is *roughly* true that I am where the Earth is. But neither the location of the Earth nor the location of my body is my precise spatial location (otherwise, the Atlantic would not be closer to me than Antarctica; otherwise, my nose would not be closer to me than my feet). I, a persistent particular, do now have a precise spatial location (it is precisely the position from where I would aim a gun—if I aimed a gun). But no material particular that is in that location is *me*. Therefore, I am not a material particular—but an immaterial one.¹⁶

But would I not lack causal power if I really were an immaterial particular? This query presupposes that immaterial particulars have no causal power, which presupposition, in turn, presupposes that matter—which is what immaterial particulars do not have—is the source of all causal power that a particular may have. But such an assumption seems arbitrary. For the greater part of the history of philosophy it was in fact believed that matter is so far from being the source of all causal power that it is totally inert in the causal respect. In view of the facts that matter is a special form of energy and exerts gravitational force, that belief can no longer be upheld (just as it cannot be upheld that matter is totally passive and indifferent with respect to the form it acquires at a given moment of time). But it does not follow that matter is the source of *all* causal power.

If (some) immaterial particulars are to have causal powers *that are effective in the physical world* (which seems to be the only way to hold their *reality* in proper esteem), then their having such causal powers must, of course, be compatible with the Law of the Preservation of (Physical) Energy. Although it is often denied, there is, in fact, conceptual room enough *both* for according such causal powers to immaterial particulars *and* for respecting the laws of physics.¹⁷

NOTES

1. Although *x* cannot be both material (i.e. partly material) and immaterial (i.e. wholly immaterial), *x* can be both partly material and partly immaterial (for *examples*, see section 5). And although *x* cannot be neither material nor immaterial, *x* can be neither wholly material nor wholly immaterial. (The instances of being neither wholly material nor wholly immaterial are, of course, the same as the instances of being partly material and partly immaterial.)
2. Given P0a and (ii), (i) is superfluous. I nevertheless include it for the sake of perspicuity.
3. A special case of a persistent material particular is an *uninterruptedly* persistent material particular. An *uninterruptedly* persistent material particular is a persistent material particular which is such that the sum of all moments of time at which it exists is a *continuous stretch* of time. (Note: A *continuous stretch* of time is called an *interval* of time only in the case of its finiteness on both sides. Continuous stretches are always non-empty and *extended*, i.e. have a *length*.)

4. There are *other* ways of interpreting the eschatological progress of the human person. One might, for example, hold that the human person *never* coincides with the integral human being but is always merely the integral human being's *kernel*, its *soul*. And one might hold that, whereas the human person is still *the same* throughout its career, the integral human being that exists during T_3 is not the same as the integral human being that exists during T_1 . Such other interpretations are, however, rather more dualistic than classical Christian hylomorphism.
5. For the concept of an *uninterruptedly persistent material particular*, see note 3. Simply transpose what is said there to the case of a *persistent immaterial particular* (as defined by D6).
6. Suppose "the property of being an immaterial particular" is a *relevant* singular term. Hence (see section 1), *the property of being an immaterial particular* is (*not* the Moon *but*) an *existent property*, that is, a property that exists at some moment of time (by P0a and P0b). But for a property to exist at some moment of time *means* that some particular has that property at some moment of time. Hence, some particular has the property of being an immaterial particular at some moment of time; hence, it has that property *at every moment of time* (for, according to D5, the property of being an immaterial particular *is identical* to the property of being a particular with zero mass at any moment of its [the particular's] existence, which property is had at all moments of time if it is had at some). Hence, *something is (simpliciter) an immaterial particular*.
7. Nevertheless, *the mass of x at $t + \Delta$* (i.e. *the quantity of the matter of x at $t + \Delta$*) may well be more or less the same as *the mass of x at t* (i.e. *the quantity of the matter of x at t*).
8. Cf. Uwe Meixner, "The Non-Physicalness of Material Objects", in *Unity and Time in Metaphysics*, ed. Ludger Honnefelder, Edmund Runggaldier, and Benedikt Schick (Berlin: DeGruyter, 2009), 47–51.
9. This is what we find, and indeed it seems that it cannot be otherwise: If it were otherwise, the density of x at t would be infinite, but, of course, the density of x at t is *not* infinite. It is, therefore, not unreasonable to suspect that $RO(m(t, x), t)$ does not exist *as intended* (i.e. exists, but the singular term " $RO(m(t, x), t)$ " is *irrelevant*—and refers to *the Moon*; see section 1). But where, then, is *matter*? The difficulty of locating matter is a not inconsiderable part of the *mystery* of matter.
10. Cf. Meixner, "The Non-Physicalness of Material Objects", 51–55.
11. A theory of the soul along these lines is developed in Uwe Meixner, *The Two Sides of Being. A Reassessment of Psycho-Physical Dualism* (Paderborn: Mentis, 2004), in chapters VIII, IX, and X.
12. If this were true, then, in the present system, all admitted singular terms that are meant to designate an abstract entity (like "4", "the Pythagorean theorem", "the perfect circle") would be *irrelevant*—and designate *the Moon* (see section 1).
13. Cf. Meixner, *The Two Sides of Being*, 85–121.
14. Note that the thesis of the *possibility* of ontological idealism is *not* the thesis of the *truth* of ontological idealism.
15. Cf. Uwe Meixner, "Materialism Does Not Save the Phenomena—and the Alternative Which Does", in *The Waning of Materialism*, ed. Robert C. Koons and George Bealer (Oxford and New York: Oxford University Press, 2010), 418–422.
16. Note that the *a posteriori* argument shows that being spatially located does not contradict immateriality (though not being spatially located contradicts materiality). But this is not as surprising as it may seem at first sight: Spatial regions, too, are immaterial and spatially located.
17. See Uwe Meixner, "New Perspectives for a Dualistic Conception of Mental Causation", *Journal of Consciousness Studies* 15 (2008): 17–22.

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