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David S. Oderberg

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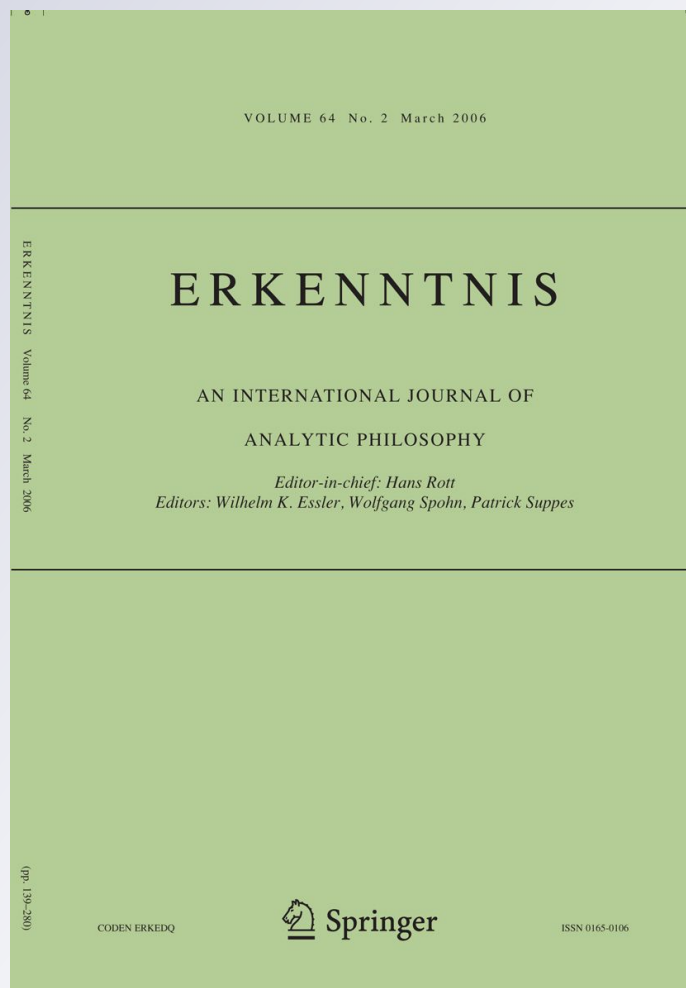
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Abstract The distinction between the essence of an object and its properties has been obscured in contemporary discussion of essentialism. Locke held that the properties of an object are exclusively those features that ‘flow’ from its essence. Here he follows the Aristotelian theory, leaving aside Locke’s own scepticism about the knowability of essence. I defend the need to distinguish sharply between essence and properties, arguing that essence must be given by form and that properties flow from form. I give a precise definition of what the term of art ‘flow’ amounts to, and apply the distinction to various kinds of taxonomic issues.

1 Introduction

How do we get to know what an object is? The simple and straightforward answer is that we get to know what an object is by knowing what it is like. We know that a thing is, say, red, round, hard, and covered in leather; add a few details about its relational characteristics and we can conclude with confidence that it is a cricket ball. But we know that cricket balls can be white, so we do not, if we know about cricket, insist that they have to be red. We do, though, insist that they have to be round, hard, and used for cricket. We find a red, round, hard, leather-covered ball that looks for all the world like a cricket ball but has never been used for cricket. So we modify our requirements: we say, for instance, that this particular ball is exactly the sort of thing that *would* be used for cricket if a cricket ball were needed and a player came across it. Or we say that it is the *sort* of thing that is used for cricket, even if this particular ball is not. Or we propose that it must at least have been manufactured with the purpose of being used for cricket.

D. S. Oderberg (✉)
Department of Philosophy, University of Reading, Reading RG6 6AA, UK
e-mail: d.s.oderberg@reading.ac.uk

All of the above assumes some background knowledge of cricket. If Joe has to judge whether *this* thing in front of him is a cricket ball, he had better know something about cricket and the ball used to play it. In other words, for Joe to be a *sorter* of cricket balls he has to work with, at the least, an implicit theory of—better, a set of assumptions or ideas about—the essence of a cricket ball, part of which will be a distinction in his mind between what is essential to such an object and what is merely accidental. It is not enough that he have background knowledge of what bona fide cricket balls *happen* to be like; he needs to know what they *must* be like: does this object meet the minimum requirements for being a cricket ball? And he needs to know whether what this object has is *enough* of what cricket balls have to be one of them. There is ample empirical evidence that humans sort and classify objects using background essentialism even as children.¹

Matters are more difficult when it comes to kinds of object that are wholly unfamiliar, and about which we have little or no background knowledge. The field essentialist, as we may call him, has to start only with general background knowledge if he lacks specific knowledge of the unfamiliar kind with which he is presented. Hence terms such as ‘sort’ and ‘classify’ are ambiguous: to classify some object as a *K* (for some kind *K*) could mean to put it in the *K* basket, as it were, on the assumption that one already has background knowledge about *Ks*. Or it could mean the act of *discovering* a *K* and hence of judging that a new kind of thing, the *Ks*, exists. The discovery and judgment are agent-relative, as we might put it. One might discover kangaroos without being *the discoverer* of kangaroos. Each of us is a field essentialist in our own way much of the time, and most often as children. When we are not being field essentialists and yet are learning about things, we are usually simply *told*—sometimes on expert authority, sometimes not—which things belong to which kinds and which kinds there are.

It is my view that the difference between the two meanings of ‘sort’ and ‘classify’ mentioned above is one of degree only. Background knowledge specific to a kind makes it easier to sort its members from its non-members than to judge that a new kind exists in the first place. In both cases, the overall method of operation is the same: the field essentialist has to separate an object’s essential properties from its accidental ones. Yet the term ‘essential property’ is probably the most abused in contemporary essentialism. Arguably it is simply a misnomer involving a concatenation of ideas that need to be kept distinct—the idea of a thing’s essence and that of its properties. The accusation will sound strange to most contemporary essentialists, yet I hope to support the charge in what follows. Making good my claim that there is a fundamental misunderstanding at work here will shed important light on the practice of classification itself.²

¹ Gelman (2003).

² Note that what follows is meant to apply in a wholly general way, i.e. without restriction to certain kinds as opposed to others. Although it is my view that everything that exists has an essence, this is not presupposed in the present discussion. What is presupposed is that for everything that *does* have an essence, the distinction between essence and properties applies.

2 Real Definition and Properties

On the standard modalist conception stemming from Kripke and Putnam, the essence of an object is given (partly³) by its necessary characteristics, or ‘properties’ in the common but—as I will argue—mistaken conception of the term. In recent years, powerful arguments have been brought to bear, most notably by Kit Fine, against modalism;⁴ I will not rehearse them here. The lesson of the critique, drawn by Fine and others, is that we need a more fine-grained notion of essence than modalism, with its bare appeal to necessary characteristics, can supply. More specifically, essentialists need to rehabilitate the concept of *real definition*, whereby objects themselves rather than the terms used to refer to them are defined by their essences. Typical examples are:

(G) Gold is a metal whose atomic constituents have atomic number 79.

(S) Sand is a naturally occurring granular material composed of finely divided rock and mineral particles.

(K) A kangaroo is a large, herbivorous marsupial, on average heavier and less thick-set than wallabies and wallaroos, native to Australia and Papua New Guinea, with large, powerful legs and a tail used for jumping.

Some real definitions are more accurate than others. (G) is more accurate than (S); indeed, (G) seems to be *the* correct definition of gold. (S) is more accurate than (K), but it is still incomplete: further specification of the required particle diameter range used by geologists to distinguish sand from both silt and gravel is needed. Sometimes a (real) definition will be wholly accurate—complete, precise, non-circular, and as brief as possible. Sometimes it will be partially accurate, lacking one or more such desiderata; it might, for instance, not contain a genuine *specific difference* dividing the kind from its congenics (kinds belonging to the same genus). Sometimes it will be vague, approximate, gestural, and the like. That definitions are not always wholly accurate, even that most of the ones we have in the encyclopedia of human knowledge are, for all we know, not wholly accurate, is of no metaphysical consequence. If we could *never* have a (wholly) accurate definition of anything there would be cause for metaphysical concern, namely that such accuracy was in principle impossible. But we do have accurate definitions: (G) is one of them. So is (S), supplemented by the requisite diameter range of .0625–2 mm. That this range is partly a matter of convention is also metaphysically insignificant as far as the concept of real definition goes:⁵ the range is stipulative but precise (problems of universal vagueness aside). As such, even objects that are

³ The full modalist conception of essence, of course, identifies it with necessary and sufficient characteristics, but I focus here, as with other critics, on whether necessary characteristics are essential.

⁴ Fine (1994). See also Gorman (2005), Oderberg (2007): Chap. 1.

⁵ It is not, of course, insignificant in general: that some objects are partly conventional is quite significant for their metaphysical analysis. By ‘insignificant’ here, I mean only as far as the possibility of real (as opposed to nominal) definition is concerned.

partly conventional or mind-dependent in nature have real definitions, the possibility not being eliminated by this aspect of them.⁶ Also accurate are:

- (V) The violin is a bowed string instrument with four strings usually tuned in perfect fifths beginning in ascending order with G below middle C.
- (E) Elm trees are deciduous or semi-deciduous trees within the genus *Ulmus* and family *Ulmaceae*.
- (M) Man is a rational animal.

That (V) is a definition of an artefact does not of itself undermine its accuracy, albeit artefacts are in some ways harder to define than natural objects.⁷ That (E) contains apparent reference to two genera, one the botanical 'genus' and the other the higher-order genus referred to botanically as 'family' is irrelevant: *metaphysically* speaking, elms form a species, *Ulmaceae* being the metaphysical genus and *Ulmus* the metaphysical specific difference. If the kinds of elm falling under *Ulmus* formed distinct *botanical* species rather than mere varieties, those kinds would themselves also be metaphysical species rather than metaphysical varieties. If they were botanical varieties, those kinds would also be metaphysical varieties, and the botanical genus *Ulmus* would be what is known metaphysically as an *infima species*, viz. the lowest species within a given taxonomical hierarchy.⁸ That there is much confusion between terms used in metaphysical classification and identical terms

⁶ What about the changeability of conventions? Suppose sedimentologists altered their stipulation of the minimum diameter of sand by .001 mm; or consider the fact that an engineer might stipulate a different diameter range from a sedimentologist; or that national standards as to what constitutes sand might differ. I do not pretend there to be *no* metaphysical significance to any of this: the metaphysical analysis of partly (or wholly) conventional objects is a difficult issue I cannot pursue here. What I do claim, however, is that once a stipulation (even if it is imprecise or non-mathematical) is made, it is really (as opposed to nominally) the case that sand has a definition that fits the stipulation. The conventional aspect to the definition means that sand's unifying form is partly stipulative, and the significance of this is that it would be wrong to call sand as such a *substance*, at least without qualification. Its existence is partly ontologically dependent on human convention, since its unifying form has a conventional element. As my initial example of a pure artefact—a cricket ball—is meant to convey, the early part of the discussion is not limited to substances but covers any entity with a unifying form, from pure substance to pure artefact. Sand falls somewhere in between. It is only later that I narrow the discussion down to substance as my primary concern.

⁷ Though it is arguable that in general artefacts are easier to define since we have greater access to our stipulations and conventions than to the workings of nature. Although I will avoid important epistemological questions here, I hold that there is no easy separation of essences into the class of those knowable a priori and those knowable a posteriori. For instance, in the case of (V), the essence of the violin is largely knowable a priori by its inventors but only a posteriori by users who had no part in determining its structure and function. (Note 'largely': part of the essence of a violin is to be tuned a certain way, but the essence of the tuning, which is part of the essence of the violin, is only knowable a posteriori.) In the case of (S), the essence of sand is knowable largely a posteriori but also partly a priori since there is an element of stipulation with respect to diameters. In general, the essences of artefacts contain more content that is knowable a priori than those of non-artefactual or natural kinds. Hence the sort of essentialism I defend cannot be identified with the position that all essences are knowable a posteriori or that they are all knowable a priori.

⁸ In fact, since not all elms can cross-breed it appears that there are genuine botanical species within the botanical genus *Ulmus*, thus making *Ulmus* a metaphysical genus as well—the *proximate* genus, to be precise—with the botanical family *Ulmaceae* being the next highest metaphysical genus and the botanical species within *Ulmus*, assuming no further species lower than these, being metaphysical *infima* species.

used in botanical and other organic classification is a matter for regret; it has historical origins and I merely report it.⁹

(M) does not look very scientific. In the broadest sense, however, it is as scientific as a metaphysically-minded taxonomist can get. Since modern biological classification, especially concerning animals, is permeated by the historicism born of evolutionary biology, an anthropologist or paleoanthropologist will look askance at (M). They will be convinced, by and large, that classification must be by descent. Irrespective of the historical *accuracy* of any given account of an organism's evolutionary descent, as a metaphysician one should not think that this is part of an organism's definition. The definition tells you what an organism *is*, not where it came from—with the exception of kinds that are themselves intrinsically historical, such as *tradition*, *legend*, *work of art* (at least arguably), and *evolutionary process* itself.¹⁰

That definitions range from the partly accurate to the completely accurate does not militate against the fact that achieving any degree of accuracy in definition requires attending to the characteristics of the object to be defined. As we saw, however, some characteristics are more closely tied to a thing's essence than others: that the cricket ball is, say, round and hard is more closely tied to what it essentially is than that it is red and lying on the ground. Since closeness comes in degrees, we run into problems. For how do we assess degrees of closeness? How do we compare characteristics *F* and *G* in order to judge whether *F* is more closely tied to an object's essence *E* than *G* is? Can we partition the characteristics of a *K* into the ones that are most closely tied to its essence and all the rest, asserting that the former just *is* the essence? The latter thought might be cashed out as follows. Take the three characteristics *F*, *G*, and *H* that are most closely tied to a *K*'s essence *E*. Say that '*F*, *G*, and *H* are most closely tied to *E*' just means '*F*, *G*, and *H* are parts of *E*'. Assuming that if *F*, *G*, and *H* are more closely tied to *E* than any other characteristics of *K* then there are no other characteristics that are candidates for being part of *E*, '*F*, *G*, and *H* are most closely tied to *E*' just means '*F*, *G*, and *H* are identical to *E*', i.e. they wholly constitute it where, in this case, constitution just is identity.

Yet how do we pick out the characteristics that are *most* closely tied to *E*? If we could, we would then be able to say we had singled out the *essential properties* of a *K*. As for the rest, they would be, as the usual contemporary parlance goes, the *accidental properties* of a *K*, and we could proceed to the task of classifying what there is. The most common, perhaps the only, candidate account currently proposed for singling out the essential properties is a causal/explanatory one. Although not articulated in detail, this seems to be the idea behind both Kripkean and Putnamian 'hidden structure' or 'internal constitution' essentialism, following in a fairly straight line from John Locke.¹¹ The basic idea is that every *K* (at least for natural

⁹ For more on this, see Oderberg (2007): Chaps. 8 and 9.

¹⁰ For an extended critique of historical analyses of the idea of biological essence, see Oderberg (2007): Chap. 9.

¹¹ See: Kripke on 'internal structure', in his (1980): 120ff; Putnam on 'hidden structure', in his (1975): 235ff; Locke on 'real essence or internal constitution', in his (1975/1690): II.XXXI.6; also II.XXXIII.3, III.VI.9 and elsewhere. For a contrary interpretation of Locke, see Leary (2009).

kinds on the Kripke-Putnam picture) has an internal structure that explains all of its macroscopic characteristics. If so, it is a short step to claiming that the internal structure gives the essence of every *K*, since essence explains what a thing is like. As Putnam says, 'if there is a hidden structure, then generally it determines what it is to be a member of the natural kind, not only in the actual world but in all possible worlds.'¹² The terms are, of course, vague, and for hidden structure essentialism to be made out as a defensible theory of essence much detail and precision would have to be added.¹³ One point to note is that the notion of explanation here is supposed to be extensional. On the assumption that essences exist independently of mind, perspective, or context, the hidden structure essentialist wants to say that internal constitution explains macroscopic features in a wholly objective way: the hidden structure *causes* the object to have the features it has. And it is a matter for empirical investigation to determine what that structure is and how it causes those features.

I do not propose to pursue hidden structure essentialism here.¹⁴ My concern is with the need for the essentialist to make a rigid distinction between the essence of a thing and those characteristics of the object that are, in a sense to be clarified later, tied to the essence. Whether or not the essence is an internal structure, what it cannot be is simply some privileged group, set, or bundle of 'essential properties'. The main reason is what I call the 'unity problem': if the essence is a group (set, bundle) of properties, what holds those properties together? Why, in the case of a *K* with putative essential properties *F*, *G*, and *H*, are those properties always and only found together in the *K*s, assuming that the essential properties specify what a *K* is such as to distinguish *K*s from every other kind of thing? Let us call the view of essence in question the *privileged group* theory. And suppose the theory to hold that the group consists not of mere particularized properties as in pure trope theory,¹⁵ but of co-instantiated real universal properties, the instances being tropes or, better, modes.¹⁶ The unity question can then be stated as: in virtue of what are the essential properties of a *K* co-instantiated always and only in the *K*s?

There seem to be only two broad possible answers: in virtue of nothing or in virtue of a law. Take the latter first, and consider the example of electrons as defined thus: electrons are elementary particles carrying unit negative electrical charge.¹⁷ The first problem is that there *is* no law relating the (putative) properties *being an*

¹² Putnam (1975): 241. To be fair, Putnam confines his attention to natural kinds only, and further allows that not all natural kinds may possess a 'hidden structure', but the overall emphasis is on essences as given by such structures, even when he considers living things. Ellis in his (2001) is far less cautious and more explicit in his commitment to internal structure essentialism.

¹³ For a little more detail, see Gorman (2005).

¹⁴ For some criticisms, see Oderberg (2007): 13ff., 157ff.

¹⁵ Since the trope bundle theory is more acutely subject to unity problems of its own (such as trope migration), I leave it to one side and concentrate on a unity-friendlier theory incorporating real universals as well as property instances. For varieties of the trope bundle theory, see Simons (1994); and for criticisms, see Lowe (1999): 206ff.

¹⁶ Following Lowe, who adheres to the more traditional terminology in his (2006).

¹⁷ Where unit negative charge is -1.602×10^{-19} coulombs. In fact this is only a partial definition of electrons, since muons and tauons are also elementary particles with unit negative charge: what distinguish the three are their different masses, inter alia. For simplicity in the ensuing discussion, however, I will take the partial definition to be complete.

elementary particle and *carrying unit negative electrical charge*. Photons (on the standard model) are elementary particles with zero charge. Chloride ions are non-elementary particles with unit negative charge.¹⁸ Hence the unity question for electrons cannot be answered by appeal to a law explaining the co-instantiation of the two properties concerned. It is of no avail to add the rider that there is a law relating the two properties *only in the electrons*, because the question is precisely *why* such a rider would obtain. To cite an alleged electron-specific law relating the two properties is not really to appeal to a law at all but to restate with rhetorical flourish the fact that an appeal to law is supposed to explain.

The second problem arises if the proposed law is thought to relate, instead, the properties *being an electron* and *carrying unit negative electrical charge*. Alexander Bird makes a pertinent point about such a proposal¹⁹: the fact that electrons are negatively charged 'is not itself any kind of nomic fact. It is part of the essence of an electron that it is negatively charged, but that is not a law of nature.' Although Bird does not elaborate, he is surely right. 'Electrons carry unit negative electrical charge' is not something one will find in an inventory of the laws of physics. We can unpack the point as follows. Take a theory of laws that holds them to be relations between universals, along the lines of Armstrong's nomic necessitation account.²⁰ We might think of the property *being an electron* as a complex property whose parts are, at least, the properties *being an elementary particle* and *carrying unit negative electrical charge*. Call these properties E and U , and represent the property *being an electron* as $[E, U]$.²¹ On the necessitation theory, then, there is a higher-order relation of necessitation between $[E, U]$ and U . Such a relation exists, to be sure, but it is nothing other than necessary inclusion.²² Since, by definition, we already know that *being an electron* consists in part of *carrying unit negative electrical charge*, to assert that it does so in the form of a purported law statement is to add no new fact to the simple fact that electrons exist. In other words, the appeal to law as an explanation of why electrons carry unit negative electrical charge is an illusion.

Bird's point can be expanded further. The privileged group theorist has the task of explaining what unifies the essential properties of an electron. Those properties are *being an elementary particle* and *carrying unit negative electrical charge*. The switch to an account in terms of the unity of *being an electron* and *carrying unit negative electrical charge* was designed to focus on a more patently defensible

¹⁸ Albeit chloride ions have unit negative charge in virtue of gaining an electron. Nevertheless, it is not just the electron that carries the charge but the ion of which it is a part, which is why in sodium chloride the oppositely charged sodium and chloride ions themselves are attracted.

¹⁹ In the context of both criticizing Lowe's account of law statements and expressing scepticism about the role of natural kinds in dispositional essentialism: Bird (2007): 208–209.

²⁰ Armstrong (1983).

²¹ Leave aside whether we might want to include other properties such as *having maximum radius* 10^{-22} m. On the version of essentialism I defend, and as will be clear from this paper, there would be no place for any other such property as part of the property *being an electron*, assuming (which I deny anyway) that *being an electron* is a property at all.

²² I use square brackets simply to avoid any suggestion that there is something specifically set-theoretic in the idea. Since $[E, U]$ is thought of as a mereologically essential complex, the relation to U should if anything be understood as necessary parthood rather than as necessary inclusion or membership, but I use the latter in the main text as a more generic term.

unity: it did so, as we saw, but at the cost of vacuity. But suppose the nomic necessitarian claims that he appeals to *being an electron* in his unity account only because *being an electron* is a determinate instantiation of the higher-order determinable *being an elementary particle*, and so the charge of vacuity is avoided: the unity of *being an electron* and *carrying unit negative electrical charge* is contentful precisely because the former property instantiates the determinable, *being an elementary particle*, that is the real target. The idea here is not to think of *being an electron* as the complex property $[E, U]$. Rather, think of it as a simple property instantiating the higher-order property *being an elementary particle*. Then the unity of *being an elementary particle* and *carrying unit negative electrical charge* in electrons is supposed to be explained by the fact that the distinct, lower-order property *being an electron* necessitates the property *carrying unit negative electrical charge*. The problem here is that the account reverses the correct order of explanation: it is, rather, the unity of the *former* two properties that explains the *latter*. Consider the metaphysical law relating *being coloured* and *being extended*. One cannot explain the unity of colour and extension by appeal to the distinct lower-order facts that *being red* necessitates *being extended*, *being green* necessitates *being extended*, and so on. Rather, the latter facts are explained by the former. As for metaphysics, so for natural science.

Taking a different approach to laws—the dispositional essentialist theory favoured by Bird—the objection to explaining the unity of the essential properties of an electron in terms of a law is that electrons are simply not disposed, in response to a given stimulus, to have unit negative charge, let alone to *acquire* one. They just have this charge, always have, always will, and must do so. There is no room for a stimulus-response account of unity when it comes to electrons. And this is a general problem for the privileged group theory. Mammals are lactating vertebrates (to keep the definition simple at the cost of some imprecision), but *being a mammal* does not confer on mammals the disposition to lactate in response to a stimulus. This is so even though *lactating* is itself a (partly) dispositional property, as is *carrying unit negative electrical charge*. I will say little about regularity theories of laws here,²³ other than that the unity problem is, as it were, tailor-made for regularity theorists, as Hume saw at least in respect of personal identity.²⁴ For the privileged group essentialist to cite the regular concurrence of essential properties is not to explain the unity of essence at all: it is merely to observe the universality of what needs to be explained.

So far, I have appealed to a specific but typical case, that of electrons, to argue against the idea that the unity question can be answered by an appeal to law. There is nothing peculiar to the example that prevents generalization to any case where an object has more than one essential property (as, arguably, anything with an essence does)—remembering that the term ‘property’ is still being used in the contemporary sense I will soon call into question. There is, however, a more explicitly general argument for the same conclusion.²⁵ For any species falling under a genus, there will be some essential property shared by another species. For example, mammals

²³ For trenchant criticism, see Bird (2007): Chap. 4.

²⁴ Hume, Appendix to *A Treatise of Human Nature* in his (1978/1739): 635–6.

²⁵ Thanks to an anonymous referee for suggesting this to me.

are species of animal, hence *animal* is a genus. But then there will be other species, i.e. all of the non-mammals, also falling under the same genus, since that is what it is to be a genus—to have multiple species falling under it.²⁶ So the non-mammals will share the essential property of being animals with all of the mammals. Therefore, there could not be a law uniting being an animal and being a mammal: *animal* is not always and everywhere co-instantiated only with *mammal*. So for all cases where an object has an essential property deriving from its falling within a genus, this will be shared by some other object falling under the same genus but in a different species.

The other broad answer to solving the unity problem is to assert quite simply that the essential properties of a *K* are always and only co-instantiated in *Ks* in virtue of nothing at all: it is just a brute fact. What the brute fact response amounts to is the criticism that the request for an explanation of unity is a step too far in the demand for explanations if it is supposed to have any content over and above the request for an answer to a range of more mundane questions. The brute fact theorist effectively says: ‘You ask what unifies the essential properties of a *K*. It seems you want an answer to the question, “Why are there *Ks*?” And if you ask me why there are *Ks*, then all I can reply is that they just *exist*. This is the trivial answer. But I can also give you, say, a *causal* or *historical* or some other analogous explanation of why there are *Ks*—but this is not what you are asking for. I cannot, however, make sense of any further metaphysical question as to why there are *Ks*.’

The brute fact theorist is right that there are related ‘why’ questions that have substantive answers, for instance: *Ks* exist because they evolved from prior kinds; or because somebody made them; or because of some cosmic coincidence. It might be said that *Ks* exist rather than *Js* because *Ks* were more adapted to their niche than their competitor *Js*; or because people prefer *Ks* to *Js*; and the like. Where he errs, I submit, is by insisting that there is nothing more to be said, at a *metaphysically* significant level, about why there are *Ks*.

In fact there is something right about a brute fact response to the question of why there are *Ks*, but the essentialist should insist that the question is distinct from that as to what unites the essential properties of *Ks*. Were essentialism false, the question ‘Why are there *Ks*?’ would still be available. Either it could be given a substantive interpretation calling for an informative answer, as the examples above suggest, or if something else were meant by the questioner then the response ‘Because there just are’ might be appropriate. It is, however, a distinct metaphysical question, given the truth of essentialism, as to what unites the essential properties. These properties are distinct beings with diverse existence and identity conditions. On the Humean ‘cut and paste’ theory of distinct existences,²⁷ there is no metaphysical principle that can

²⁶ I am, therefore, ruling out the possibility of a genus with only one species. More precisely, I exclude the possibility of a genus for which it is metaphysically impossible that it have more than one species. If all the non-mammals were wiped out, then *animal* would only have one immediately lower species, namely all the mammals (and, of course, species of mammals below it, and so on, but this is irrelevant to the argument). But it would still be metaphysically possible for non-mammals to exist, and hence for the genus *animal* to have more than one species. Only the metaphysical possibility of multiple species of a single genus is necessary for the argument to go through.

²⁷ The useful epithet comes from Gendler and Hawthorne (eds) (2002): Introduction.

explain why these beings are always and everywhere co-instantiated in the kinds to which they belong and why they must do so. For the essentialist, by contrast, unity comes at a price: a real metaphysical principle of unity is required. For the hylemorphic theory of essentialism I defend, that principle is *form*. The real definition of a *K* expresses its form. And since form is a real metaphysical principle distinct from any of a *K*'s characteristics, no matter how closely tied they may be to its essence, the definition of a *K* must itself be kept distinct from anything that is a consequence of that definition.

3 Contentful Unifiers or Bare Substrata?

I have defended the reality of form and the hylemorphic theory behind it elsewhere and will not rehearse the arguments here.²⁸ What is germane to present purposes is that substantial form—that is, the form of a substance, which is what we are *primarily* concerned with in this discussion²⁹—is a mind-independent, objective principle of unity that explains the necessary co-instantiation of the constituents of a thing's essence.³⁰ What are the constituents? As noted above, the privileged group theorist regards them as a bundle of essential properties, usually those that explain all the other properties of a thing but are not themselves explained by any properties of that thing. That the constituents of essence explain a thing's properties is not something the essentialist should dispute. That the constituents are *themselves* properties should, however, be denied. For if the constituents of essence are properties, and these essential properties need an explanation of their unity in terms of form, then we have something of a case of metaphysical double vision. It would be otiose to hold the essence to consist *both* of the unified essential properties and the real principle that unifies them. Since the unifier is metaphysically distinct from what it unifies, essence on this view would simply have a duality it does not need. If we do away with form and hold essence to consist just of the essential properties, we are back with the unity problem. If we retain form but say it is not part of the essence, its only role being that of unifier of the essence, we end up with something

²⁸ See Oderberg (2007), esp. Chaps. 4 and 5.

²⁹ But not exclusively, as my example of the cricket ball is meant to suggest.

³⁰ Although there are important differences between the essences of artefacts and those of natural kinds, I present and discuss the unity problem in terms of both. This is because although the story is more complicated for artefacts it is the same in principle as far as the requirement of a principle of unity is concerned. Artefacts are not strictly substances but ontologically dependent entities consisting of one or more substances, one or more of their accidents, and at least one mind that stipulates certain functions etc. for the substance/s in virtue of those accidents. The unity of natural kinds does not require a mind to stipulate their function (leaving aside issues to do with a divine cause), but the unity of artefacts does. Nevertheless, that the cause of an artefact's unity partly requires something extrinsic to the artefact is a fact additional to the fact that artefacts still require a form to unify those elements and properties that they are stipulated to have. It is just that the form, as principle of unity, will not be wholly intrinsic. For more on artefacts, see Oderberg (2007): Chap. 7, Sect. 4. (Although, as in the definition of sand, there is sometimes a stipulative element with respect to the essences of natural kinds, the situation is different from that of artefacts, for with kinds such as sand the stipulation merely determines the *range* of objects that fall under the kind. This does not mean that sand lacks an intrinsic substantial form, or that sand is an artefactual kind, only that it is a natural kind with a stipulative element.).

that is distinct from and stands behind the essence as guarantor of its unity. This looks like a very short route to bare substratum theory, with form as a ‘something we know not what’, to use Locke’s epithet,³¹ that supports or stands behind a thing’s qualities. Without canvassing the many problems of substratum theory, or bare particularism in its current guise, we should note that if form is no part of the essence but acts *merely* as a unifier, then all kinds of object will share the same form, which on its face is absurd. If form exists at all, then surely different kinds have different forms. The reply to this might be that we should not be obsessed over terminology. Don’t call the unifier the ‘form’; call it simply the ‘unifier’ or the ‘principle of unity’. Then different kinds will have different essences but the same unifier. In *one* sense, this is correct: at the highest level, all kinds share something that belongs to the same ontological category, namely a principle of unity. Yet on hylemorphism, at lower levels—the levels of species and genera in the taxonomic hierarchy—distinct kinds do *not* share the same unifiers. There is plenty of overlap, of course, due to the existence of species of common genera. But when the classificatory work on a given kind is done, it must always be found that the kind has a unique unifier, namely its form as given by its lowest genus and specific difference.

On this score, hylemorphism delivers what we should expect. If the members of some kind *K* each have a unifier of their essence, we should expect that unifier not *merely* to unify each *K*’s essence, but to do so *in the way unique to Ks*. If the essence of tigers has a principle of unity for each tiger, it should unify that essence in the way specific to tigers, not kangaroos or cheetahs. What both scientists and layfolk primarily investigate when they classify the world are the particular ways in which the features of a given kind come together to constitute the members of that kind as the whole kind-members that they are. The metallurgist, for instance, wants to know how the features of gold are united into that specific kind, in other words how each individual instance of gold has its features united in the way that every other instance does, such that those instances are all members of precisely the kind *gold*. Unifiers must, then, be contentful; they cannot be bare substrata.

The important question then arises of whether forms should be regarded as metaphysically simple or complex. If form is the principle of unity, and yet form itself has parts, the privileged group theorist will rightly ask what unifies those parts: does every form itself need a higher form to unify it, and would this not be a vicious regress? Moreover, if form itself needs a principle of unity, why doesn’t the former simply drop out of the picture, leaving the privileged group theorist to appeal to the latter as unifying the essential properties? It is well known that Aristotle himself raises the question of the unity of form, particularly in *De Anima*,³² where he asks whether the soul as form of the living thing itself has parts which have to be held together by a higher principle of unity, and so on ad infinitum. Presumably the same question applies to all substantial forms, organic or inorganic, as it is a wholly general worry about the ontology of form. Aristotle’s implicit answer, since he

³¹ Locke (1975/1690): II.XXIII.2, p. 295.

³² For some useful discussion of the issue, see Koslicki (2008): 147, 159–62. For Aristotle, see *De Anima* I:5, 411b5–13, and also *Metaphysics* Delta: 25, 1023b12–25.

should be read as posing the question rhetorically, is that the soul is simple and indivisible into parts, whatever the multiplicity of powers or functions for which it is responsible. This is certainly how Aquinas reads him.³³

The idea that form is simple and indivisible into parts is, for all that it may appear otherwise, wholly compatible with the fact that essential definitions are themselves complex. As Aristotle says in the *Metaphysics*, the elements of a definition are parts of the whole, but he does not count form itself as a whole, though he does count as wholes those substances which are hylemorphic compounds of matter and form.³⁴ A definition, since it contains a genus and a specific difference, is indeed a whole with parts. To take the simple stock case of 'Man is a rational animal', this definition is complex with rationality and animality as parts. What unifies the definition is *not* form, but simply the fact that the definition *is* a definition giving an essence or 'formula which explains a thing', as Aristotle says. (Let us leave aside speculation as to whether the definition itself *has* a form which unifies it. This may be so, but it takes us into a different area, that of semantic unity and whether semantic units have forms.) What unifies *human beings*, however, is not a definition but their *form*. Their form is a combination of rationality and animality, but not in any way that enables us to say that rationality and animality are *parts* of the form of a human any more than that they are parts of a human themselves. Rationality and animality are universals; as such, they are distinct entities. Animality can be instantiated where rationality is not (in non-rational animals). Rationality could be instantiated where animality was not (in the case of God, spirits, or other disembodied intelligences).

None of this means, however, that *in the human being* rationality has a distinct existence from animality or animality from rationality, as though there were two forms in the human being, combined or added together in some way. The rationality of the human being is animal, and the animality of the human being is rational. One can, of course, investigate human rationality while abstracting from anything animal (e.g. language) and also human animality while abstracting from anything rational (e.g. digestion), but one does not thereby investigate distinct forms or elements of a single form. In a single substance, all of the universals that do or can appear separately in other kinds of entity appear together inseparably and not tied together by each other or by anything else. Hence we must say that substantial form, i.e. the form of the substance, is simple and without elements. There is a *conceptual* distinction between, say, rationality and animality in the human being: one can consider the human form under the aspect of rationality or of animality, but one does not thereby consider distinct forms that are elements of a larger form, or distinct parts of the human form in any sense. In the definition *corresponding* to the form, by contrast, there appear the semantic elements that denote the really distinct universals (rationality and animality, in the human case) that, in the substance, are *indistinctly* one.

We now need to tackle an epistemological issue lurking in the background. Locke derided substantial forms precisely because of their alleged unknowability.

³³ Aquinas (1951): Book I, Lectio 14, Sect. 206.

³⁴ Hence, when Koslicki (2008): 147, n.57, speak of 'form, in the guise of definition', appearing in *Met. Delta*: 25 as a kind of whole, this is in my view a mistake for the reasons given above.

How could bare supports of qualities ever be proper objects of scientific investigation? The point is fair, and it only goes to show both that Locke misunderstood substantial forms and that whatever they are, they are not bare substrata. On the other hand, there is something about form as the principle of unity that does militate against its amenability to scientific or other empirical investigation. If privileged group theory is correct, there is nothing about essence that is in principle undetectable by observation (confining ourselves, as I have implicitly been doing, to material substances). We might lack the technical resources or the brain power to grasp the essence of a *K*, but it is never metaphysically opaque to observation. After all, on this theory we are only investigating the properties of a thing, and why should these be in principle inaccessible to empirical investigation? Contra privileged group theory, however, we need something more, namely a *metaphysical* principle of unity, and this is something we can only deduce by a priori metaphysical reasoning. More precisely, *that* there must be a unifier is something for the metaphysician to know, not for the scientist or lay investigator to discover. *What* that unifier is, on the other hand, *is* for them to find out. That gold must have a principle of unity is not within the remit of observation; that gold is a metal whose atomic constituents have atomic number 79 is. The principle of unity for gold has content and is accessible, resources allowing, to empirical investigation. So it cannot be a bare support.

What if resources do not allow? This is often the case; perhaps it is mostly the case. Or resources may allow for a given kind, but the investigator simply does not know *yet* what the essence is. When the situation is like this, the taxonomist has to fall back on *proxies* for the essence. And this is where the true properties come in. If we know the essence directly, we do not need properties to stand in as part or all of a thing's definition. We have already performed enough investigations of gold to know exactly what it is. For a long time we relied on properties that were not part of the essence, such as malleability and ductility. Now we know that these are not part of the essence, since we know that the essence of gold is simply to be a metal with a certain chemical composition. By contrast, we are less certain about mammals. When we define them as lactating vertebrates (or, arguably, as lactating animals, since no non-vertebrates lactate and so there is no need to descend from the higher genus *animal* to the lower genus *vertebrate* in order to distinguish the mammals from all other kinds) can we be sure that lactation is indeed the specific difference, i.e. that part of the essence of mammals that fundamentally picks them out from all other kinds? The genetic reductionist will insist that lactation is but a property proxy for some underlying genetic characteristic that both (a) is responsible for lactation and (b) simultaneously picks mammals out genetically from all other kinds. I will briefly discuss such reductionism later, merely claiming for now that it should be doubted. The present point is only that we can sometimes not be certain if we have really got at the form of a *K* or are still labouring in the region of proxies.

That we can at least *sometimes* know the essence of something with certainty is enough for us to consign bare substrata to the metaphysical waste dump. More importantly, though, it is the reason that essentialists should appropriate the misused term 'property' to a very specific purpose and at the same time make a rigid distinction between the essence of a thing and its properties.

4 What the Relation Between Essence and Properties Could Not Be

If the privileged group theorist is convinced of the need for a principle of unity and so heads in the direction of hylemorphism, she can continue to use the term 'property' to include reference to those aspects (to use a deliberately vague word) of a *K* that are within its essence. She can also continue to use the term for what lies outside the essence but is in some way connected to it. If she wishes, she can call the first 'type 1 essential properties' and the second 'type 2 essential properties'. She can also maintain her devotion to contemporary usage by calling *every* feature of a thing a property of it, qualifying the non-essential properties as 'accidental'. Still, not much is to be achieved by terminological promiscuity except obfuscation. The path to hygiene is to be found by putting the term 'property' back in its rightful place. The essence of a thing is *distinct* from its properties. The essence, as given by the unifying form, consists of the parts or elements that constitute the thing as the kind of thing it is. Those parts are encapsulated in a real definition. Moreover, for reasons that cannot be explored here,³⁵ the definition must be binary, consisting of a lowest or proximate genus and a specific difference. The elements of both are ipso facto elements of the essence as given by the form.

The properties, on the other hand, are a special class of characteristics or accidents of a thing. Locke puts it at least semi-correctly when, summarising the traditional Aristotelian theory, he says: 'For, since the powers or qualities that are observable by us are not the real essence of that substance, but depend on it, and flow from it, any collection whatsoever of these qualities cannot be the real essence of that thing.'³⁶ Moreover, these powers and qualities have a specific name: they are the properties.³⁷ As the etymology indicates, they are *proper* to the kind in question. Sometimes they are called 'necessary accidents'.³⁸ Kit Fine gives them their traditional Latin name of 'propria', contrasting them explicitly with essence.³⁹ He still regards the propria, or properties as I call them without qualification, as just a subset of the set of essential properties. As indicated, I do not find this a helpful way of looking at the matter. What constitutes the essence are not properties at all, since they are not characteristics of the object in any but the loosest, vernacular sense.⁴⁰

³⁵ See further Oderberg (2007): Chap. 5.

³⁶ Locke (1975/1690): II.XXXI.13, p. 383. I say 'semi-correctly' because what is right about his summary is the distinction between essence and the characteristics that flow from essence. What is wrong is his belief that essence itself is unobservable, i.e. that *all* we can observe are the properties that flow from it. We can observe that gold has atomic number 79 and that fish are vertebrates. The whole story, however, is more complex; see further Oderberg (2007): Chap. 2.

³⁷ Locke (1975/1690): II.XXXII.24, p. 392–3; III.VI.19, p. 449.

³⁸ As in Gorman (2005).

³⁹ Fine (1995): 57.

⁴⁰ Note: what is a constituent of the essence of one kind of thing might be only a property of another, and what is a constituent of the essence or a property of one kind of thing might be a mere accident of another. Sphericity is of the essence of a basketball but a property of free water droplets. Redness is a property of blood but a mere accident of fire engines. It is not easy to find a single universal that performs the role of all three in different kinds, but the point is that it is universals in all those roles. The idea that universals can be constituents of essence, or properties, or mere accidents, goes back to Aristotle in *Topics* 101b17ff. and Boethius in his translation of Porphyry's *Isagoge*, which slightly modified Aristotle's theory.

Fine's privileged group theory takes what he calls an essential property to be 'a constitutive part of the essence' of an object if it is 'not had in virtue of being a consequence of some more basic essential properties of the object.' Otherwise, it is what he calls 'a consequential part of the essence.'⁴¹ This distinction between the constitutive and the consequential is of prime importance and is a key feature of Aristotelian essentialism. What constitute the essence are *parts* or *elements* of it. They define the object with that essence, and as parts they are unified and organized into a whole. That whole is the *form* of the object.⁴² This is another reason for not thinking of them as properties in anything but a loose sense, since the only apparent way of keeping together the thoughts that what constitutes the essence are parts and that those parts are properties is to think of those properties as parts of some conjunction of properties, effectively as no more than parts of a *list*. But an essence is more than a list: it is a structural, organizational unity. Any attempt to capture this thought would require putting aside the idea that the parts of an essence are also properties, or recognizing, at least, that if they are properties they are so unlike the properties that flow from the essence, being formally organized, that the point in continuing to call them properties disappears.

The problem now is to specify the relationship between the constitutive parts of the essence and the consequential ones, to use Fine's terminology, or between the essence and the properties, to use the language preferred here. Employing Locke's term of art, the properties 'flow' from the essence. As a first attempt, we might say that the properties are logically implied by the essence, meaning as follows: for some essence **E** and for some property *P*, *P* is logically implied by **E** just in case it is a logical truth that all possessors of **E** have *P*.⁴³ We need to raise one important issue only to put it aside for the moment, namely that we should not want to say that even the most obvious case of a property is such that necessarily every possessor of an essence from which that property flows has the property. This looks to be simply too strong a requirement. But here is another problem. As Fine points out, logical truths are logical consequences of any proposition.⁴⁴ So for example, '*a* possesses **E**' entails 'not (*p* and not-*p*)' yet we do not want to say that it is true in virtue of the essence of *a* that the law of non-contradiction is true, i.e. that the law of non-contradiction is somehow a property of *a*.⁴⁵ Similarly for mathematically necessary truths, since we should not think that it is a property of *a* that $2 + 2 = 4$. The moral Fine draws is that 'one may not want an object to figure in the essence of another unless it genuinely pertains to the nature of that other', a difficulty that may be

⁴¹ Fine (1995): 57.

⁴² As claimed earlier, the form itself is metaphysically simple. It gives the essence (in conjunction with matter as is always presupposed for material substances) but is not *itself* the essence. The essence has parts, but the form does not unify them by *itself* having parts. Hence it is only in a loose sense that I call the form a *whole*; strictly, only substances are wholes with parts (and the corresponding essence with its parts). More needs to be said about how form can unify without itself having complexity, but I leave this for another occasion.

⁴³ Fine (1995): 56.

⁴⁴ Fine (1995): 59.

⁴⁵ Though we could formulate the thought using property abstraction.

overcome 'by restricting the objects that figure in the consequentialist essence of something to those that pertain to its nature.'⁴⁶

Fine is surely right that pertinence to nature is needed to rule out what he calls 'extraneous objects' such as the alleged property of *a* that $2 + 2 = 4$, but his definition of pertinence does not work. He says: 'it is characteristic of the extraneous objects that they can be generalized away. Thus not only is it [not]⁴⁷ true in virtue of the identity of Socrates [i.e. in virtue of Socrates's essence; my interpolation] that $2 = 2$ but also that, for any object *x*, $x = x$. The objects pertinent to a thing's essence can therefore be taken to be ones which cannot in this manner be generalized away.'⁴⁸ Fine's example is ' $2 = 2$ '; but his definition does not work for ' $2 + 2 = 4$ ', which cannot be generalized away; unless, of course, one tries a dubious logicist manoeuvre on the mathematical truths. But there is nothing special about mathematical truths in this context. Presumably by 'generalized away' Fine means that only logical terms and operators remain in the proposition, in which case there is a problem for such propositions as 'All triangles have sides', 'All coloured things are extended', and for that matter 'All bachelors are unmarried'. Perhaps on a suitably expansive understanding of 'logical truth' at least some of them come out as logical truths, but even if not, what is special about logical truths as far as Fine's legitimate worry is concerned? We do not want it to be true in virtue of the essence of *a* that all triangles have sides even if it is only true in some suitable subset of possible worlds—say, the ones in which both *a* and triangles exist—that all triangles have sides. If 'All triangles have sides' is a logical truth, it cannot be generalized away. If it is not a logical truth, it is still entailed by '*a* has **E**' on some conception of entailment less than logical. Either way, Fine has not solved the problem.

We do need to stipulate that a property must pertain to the essence of a thing. But even if we leave aside the question of generalizing away what is not a property due to its being extraneous to the essence, we still cannot appeal to the concept of logical consequence or any closely related notion to do the job of specifying the properties. This is so even if the consequent clearly does pertain to the essence in an intuitive sense. *Being a mammal* entails *being an animal* (whether logically, metaphysically, or by some allied notion of entailment), and the latter evidently pertains to the essence of the former. Yet we should not say that mammals have the property of being animals. *Being an animal* is not part of the consequential essence of mammals—to revert to Fine's terminology—but part of the constitutive essence.

⁴⁶ Fine (1995): 59. One might object that *being such that the law of non-contradiction is true* or *being such that $2 + 2 = 4$* are not even potential properties of an entity, and hence are not good counterexamples to the consequential conception of essence. It is true that Fine employs a liberal conception of 'property' in this context, but the point could equally be made with logical consequences that look more plausibly to denote potential properties of things. '*a* has **E**' entails 'Either *a* is *F* or *a* is not-*F*', but Fine would not want to count this consequence as part of *a*'s essence any more than the others he mentions. I am not sure he would be right about this particular example, since one might claim that on a suitably aetiolated conception of what essence amounts to, *being F* or *being not-F* is part of the essence of anything at the most general level. Consider, though, *being unmarried if a bachelor*: this does not seem to be part of anything's essence though it arguably expresses a property (loosely speaking), albeit a conditional one.

⁴⁷ The 'not' is missing in the text but I have confirmed that this is a typographical error.

⁴⁸ Fine (1995): 59.

It is part of what a mammal *is* that it is an animal, in virtue of mammals' being a species of the higher genus *animal*. *Being gold* entails *being a metal*, but gold does not have the property of being a metal: it is part of what it *is* to be gold that it is a metal. *Being water* entails *having chemical composition H_2O* , yet the latter is not a property of the former, but part of its identity as a kind. Still, *being an animal*, *being a metal*, and *having chemical composition H_2O* all pertain to the essences of mammals, gold, and water respectively. Whatever genus an object belongs to, its being in that genus entails its being in all the higher genera that subsume it (the mammal/animal example). In addition, whatever infima species an object belongs to, its being in that species entails being in its proximate genus (the gold/metal example). And whatever infima species an object belongs to, its being in that species entails its being in (or having) the specific difference of that species (the water/ H_2O example). Therefore, entailment simpliciter cannot make the requisite distinction between essence and properties.

5 Specifying the Relation Between Essence and Properties

Form gives the essence of a thing. This is slightly imprecise, since for material substances it is a combination of form and matter that gives the essence. But when laying down the essence of a material substance as given by the form, the combination with matter is presupposed. The form of a human being is precisely that of a rational animal, but having such a form presupposes being a form-matter compound. So we can safely leave matter to one side for present purposes⁴⁹ and propose that it is form which is responsible for the properties of a thing.

The properties flow from the form. Here is a way of making the notion more precise:

1. *Causation*: The form of a K causes the properties of K s.
2. *Origination*: The properties of K s originate with the form of a K .

We can then define the relation between essence and properties, given that form provides the essence:

FLOW: The properties P_1, \dots, P_n are properties of the objects of kind K with essence $\mathbf{E} =_{\text{def}} P_1, \dots, P_n$ are caused by and originate with the form of a K .

The first point to make is that the causation to which I am appealing works at two levels. At the universal level, the form of K s causes the properties of K s. At the level of particulars, each individual K has its properties caused by its own form. In this sense, there is no difference from causation by universals in general: we can say that drinking too much causes liver disease, and that Bob's drinking too much caused *his* liver disease. Forms are indeed universals, and the substantial forms that are my concern here are a special, fundamental category of universals that constitute the essences of substances. The causation for which they are responsible, as for all universals, manifests itself at the level of particulars; but (following the realist view

⁴⁹ See further Oderberg (2007): Chap. 4, esp. Sect. 3.

implicit throughout this discussion) we can abstract real, universal causation as a feature of the world, something which is expressed (as in laws of nature, for example) by the particulars that share the relevant universal.

Now to the more important question: what kind of causation does FLOW invoke? Since FLOW is wholly general with respect to kinds of object, it cannot be causation essentially involving matter. The properties of a triangle are caused by its form just as much as the properties of a mammal are caused by its form. Nor should we expect there to be a relation of *production* between form and properties. The form of a triangle does not produce the triangle's properties, though the latter are still referred back to the former as that which is responsible for those properties. On the other hand, one might want to say that the form of a mammal does produce the mammalian properties. If you are a genetic reductionist and believe the form of a species of organism just is its genotype, you are likely to believe that the causation of properties by form is identical to the expression of the phenotype by the genotype. The productive pathways of the genotype will be in principle observable as an instance of a certain kind of causation involving material processes. We should not want our conception of causation by form to rule this out a priori, which is why we must say that causation by form does not *essentially* involve matter.

Nevertheless, the hylemorphist will rightly be suspicious of genetic reductionism. We cannot be confident that there is a single genotype or part of a genotype common to all mammals. The methodological problem might then be that genetic reductionism is self-defeating. For suppose biologists propose **G** as the common mammalian genotype. Imagine that it later turns out that one species of mammal, *M*, lacks a portion **p** of that genotype. The genetic reductionist will then assert that the true mammalian genotype is **G—p**. (Suppose the process to be reiterated.) But why should we believe this rather than the alternative hypothesis that the mammals have no common genotype? It is not just that the reductionist could be accused of ad hocery or of a methodological prejudice in favour of reductionism. The problem is that if she says, '**G—p** is the true mammalian genotype because it is the one shared by the mammals', self-defeatingness threatens. What is the essence of the mammals? The reductionist says they are the ones with a certain genotype. What if they do not after all share that genotype? The reductionist answer is that they share a portion of it, the portion that is the true genotype. But why should *this* be a better candidate than the previous one? Because, retorts the reductionist, this must be the genotype that is the essence of the mammals. Yet by what criterion is the reductionist now specifying the mammals? Rather than drop the conviction that *M* is a kind of mammal after all, she will insist that *M* is a mammalian kind but that the proposed essential genotype has to be restricted. The insistence can only be because, although nominally a reductionist, she identifies mammals by non-genetic criteria, in particular the mammalian morphology—lactating, having a certain bone structure, and so on. By insisting that the essence of the mammals must be a genotype rather than a form, the genetic reductionist tail ends up wagging the morphological dog.

Still, we want to allow that genetic reductionism might be true and that causation by form might, for suitable kinds, follow observable, material pathways. In any case, the causation of properties by form is sufficiently different from any other kind

of causation to be given its own name of *formal causation*. Only formal causation, by whatever principle of operation, is the kind of causation in virtue of which what a thing is determines what it is like. In cases where the causation has no material pathway, formal causation is essentially the same as for the material case. Surprising as it may sound, then, the causation of the mammalian properties by the form of the mammals is more like the causation of the properties of a triangle by the form of the triangles than it is like the causation of a fire by the striking of a match.

In addition, as stated earlier, properties *originate* with form. Having hair is a property of mammals. Yet we should, I submit, regard lactation not as a property but as part of the essence as given by the form, the reason being that the way in which a species of animal reproduces or sustains its own kind is a better candidate (maybe not incorrigibly so) for being of the essence of the kind than the way in which its skin protects it. (Note, though, that having hair also has a metabolic function, which is arguably as close to the essence as reproductive method; hence the corrigibility of such proposals.) Now having hair is caused by having a certain follicular skin structure. Suppose the skin structure is caused directly by the form, with no intervening steps. It might be, as per genetic reductionism, that the mammalian genotype expresses the skin structure. Or it may be, if reductionism is false, that the genetic properties are caused by the form in a way that is not amenable to scientific observation: it is a metaphysical fact that mammals have a certain form, and that form results in their having a certain genotype which then causes a certain skin structure that itself causes the possession of hair. Either way, the property of having hair is mediated by other properties that cause it. But it still *originates* with the form. Not all origination is causation: water can originate from a well without being caused to exist by the well; a graph has an origin without that origin's causing further points on the graph. An origin in the metaphysical sense is where we must start from in trying to understand some phenomenon because it is first in the order of explanation relative to the phenomenon.⁵⁰ Put conversely, if we want to understand the phenomenon, we have to trace it back to its source. This source, at least in ontology, usually will be the first cause of the phenomenon as well, as in the case of form and properties. But not all causation is origination, since a causal process can be mediated by a number of causal steps. FLOW stipulates that the properties are caused by and originate with the form. The form, then, is where the metaphysical buck stops.

6 Necessary Possession of Properties

Properties are caused by form. But is form sufficient, necessary, or both? Clearly it is necessary, as should be apparent from the preceding discussion. If what a thing is

⁵⁰ An origin, in this sense, is called a 'principle' by Aristotle and Aquinas. Aristotle's term is *archē*, Aquinas's is *principium*. Both put the terms to a wide variety of uses, among which is the explanation of some phenomenon (e.g., change, the generation of substances) in terms of an ultimate or undemonstrable principle. There is no implication of temporal or even epistemological priority, only logical or metaphysical, i.e. the place of a principle in the order of explanation of how other things come to be. Form as origin of properties, in my sense, is a paradigmatic example of what both Aristotle and Aquinas would call a principle out of which other beings arise.

like depends upon what it is, we should expect the dependence to be necessary. What else could be ultimately responsible for a thing's properties?

The hylemorphist makes a stronger claim, however: if the *Ks* have a certain property, they *must* have that property. Otherwise the characteristic concerned would be no more than an accidental one. The 'essential properties' or 'necessary accidents' are just that: they are accidents, in that they are true of the substance possessing them; they are *more* than accidents, inasmuch as they are proper to the essence; and they are necessary, in that what has the essence must have the properties that flow from it. It is a property of gold to be malleable, so gold *must* be malleable, i.e. have this accident in every possible world in which gold exists. It is a property of salt that it is soluble in certain liquids, so it must be.⁵¹ Humans have the property of being able to communicate by means of language, so this must be necessarily possessed by them. I do not wish to address here the epistemic question of how we *know* what the properties are.⁵² Suppose we do. Our question is how to understand the necessary possession of properties.

We seem to be surrounded by non-necessary properties of things, that is to say not mere accidents but features that look intuitively to be 'of the essence' of a kind but nevertheless are not shared by every member. Moreover, such non-necessity sometimes goes to the essence itself, prompting the criticism that what the essentialist proposes as the essence of a *K* is not so after all, leading to scepticism about whether there are any essences at all. Man is a rational animal, yet some humans are irrational. Humans can communicate linguistically, yet some cannot. Wood is combustible, yet it is possible to make non-combustible wood. Tigers have stripes, yet there are albino tigers. And for all dispositional properties, there are so-called 'finks', 'masks', and 'antidotes' that make it such that the object subject to their operation does not possess or manifest the property we take it to have.⁵³

Such cases might be thought to undermine the following thesis:

(NP) Necessarily, for any kind *K* with essence *E*, and for any property *P* that characterizes⁵⁴ the members of *K*: all members of *K* have *P*.

We put aside the question of how we know which features characterize a kind, assuming we have a grasp of this and so are prepared to isolate a special set of features we call the properties. But how, given the sorts of case just mentioned, could (NP) be true?

Call any seeming lack, in a member of *K*, of some feature which looks overwhelmingly like a property, an *apparent absence*. And call finks, masks, and antidotes *negaters*. Negaters have been appealed to as falsifying any purported analysis of dispositional property possession in terms of counterfactuals.⁵⁵

⁵¹ Bird (2001) gives a plausible account of just why salt is necessarily water-soluble in terms of what it is to *be* salt, which accords with the idea defended here that properties flow from essence.

⁵² See further Oderberg (2007): Chap. 7, Sects. 2 and 3.

⁵³ On finks, see Martin (1994); on masks, see Molnar (2003): 92–3; on antidotes, see Bird (1998).

⁵⁴ I follow the useful terminology of Lowe (2006), who speaks of attributes 'characterizing' kinds. He would disagree, however, with my general thesis that there is a special class of attributes such that necessarily every member of a kind has all of the attributes characterizing that kind.

⁵⁵ For example Martin (1994). Extended discussion can be found in Bird (2007): Chap. 2.

Yet although we should resist the idea of synonymy between statements of dispositional property possession and counterfactual propositions, we should expect at least that the truth of the former entail an appropriate counterfactual. Although I will not explore that question here, I claim that defending a suitably *qualified* version of (NP) as a thesis about property possession in general can throw light on the counterfactual issue for dispositional properties.

First we have to put aside the possibility that an apparent absence be a *real* absence due to the putative property's not being a property at all. Suppose our field essentialist is from Mars, never having encountered a human being before. Suppose the first ten thousand humans he encounters are all blonde-haired. (Say he landed in Sweden.) Armed with a clear idea of what it is to be a property, he will justifiably conclude that being blonde is one. If the next human he encounters has dark hair, there are at least two things he can do. First, he can revise his attribution to humans of the property of being blonde. Second, he can (armed with sufficient understanding of gene expression in humans) perform a little alien biochemistry to find out whether being dark-haired is a mutation in the following sense: that having dark hair is caused by some kind of chromosomal or other damage preventing the gene for blonde hair from being expressed. These are, of course, not mutually exclusive actions. The second will yield a negative result, so if he does it he will then take the first course and make the revision. Or he might, for some other good reason, make the revision without performing the analysis. In either case, the revision will be correct. And all this shows is that we can be wrong in our property attributions; but this does not mean there are no properties.

Performing some biochemical or other biological analysis would be the right thing for our Martian essentialist to do, however. For suppose, after encountering ten thousand bipedal humans, he then came across one with no legs. Revising his belief that bipedalism was not a property of humans would be hasty: genetic analysis aside, basic morphological inspection shows that humans with no legs do not function as well as those with two legs. Having no legs results from some form of injury or damage to a human, whether genetic or corporeal. Suppose the legless human encountered by the Martian essentialist suffers from a congenital abnormality. The abnormality would be what we can call a *preventer* of bipedalism in this member of the human species.

The concept of prevention is broad, not limited to the organic case. Heating a magnet above its Curie temperature will demagnetize it. Insulation lessens conductivity. Supercooling a liquid prevents its becoming a solid. Toughening glass by producing Prince Rupert's Drops results in glass that can withstand a hammer blow to one end. Prevention, as used here, encompasses anything from the finkish temporary removal of a property to interference at the last possible moment with a property's manifestation if that manifestation takes time. In the organic case, we have the additional idea of *functioning well/badly* that informs our judgment of whether an organism is failing to display a property it would normally display if its proper function were not impaired. This does not apply generally to inorganic entities, to which no notion of intrinsic proper function is applicable. (There is, however, a notion of extrinsic proper function which enables us to judge whether artefacts function well or badly.) Nevertheless, the idea of prevention is not

essentially normative. Freezing a piece of rubber to remove its elasticity does not mean stopping it from doing what rubber *should* do or would do if it functioned well. Rather, it means stopping a particular power of the rubber by (1) an *independently specifiable process* that (2) refers back, mediately or immediately, to the *form* of the rubber.

By 'independently specifiable process' I mean that there is available for description a process of stopping the manifestation of the property that is not parasitic upon the mere fact that the property is absent. To say, then, that all rubber is elastic unless prevented from being so is not to say vacuously that it is elastic unless it is not. Such an accusation of vacuity is sometimes levelled at the counterfactual analysis of dispositions: the conditions under which a disposition is not manifested might be wholly open-ended, so that the counterfactual theorist has to add an 'ideal conditions' rider to the analysis. But, so the criticism goes, to say that an object will manifest a disposition in response to a given stimulus unless conditions are not ideal is vacuous. If it says anything at all, it is that the disposition will be manifested unless conditions are such that it is not manifested. What the counterfactual theorist needs is not an 'ideal conditions' rider, but a 'non-prevention' rider. Cooling a piece of rubber below the glass transition temperature causes its polymer chains to assume fixed geometries, resulting in a loss of elasticity. Eliminating the property in this way is a kind of prevention, and is contentfully describable.

Secondly, reference back to the form of the rubber, for example, means that prevention is achieved through a process that involves the essence of the thing. In this case, cooling the rubber alters its polymer structure, which latter is part of the essence of rubber. It needs to be stressed here that prevention does not entail *destruction* of the form of a thing. The form of the rubber is not destroyed by freezing; rather, the form is unable to cause a certain property, namely elasticity, to manifest itself. Of course, more radical prevention can destroy the form, such as when a piece of gold loses its malleability by being turned into an alloy.

Since properties flow from form, we should expect that prevention of property manifestation be explicable at least in part by reference to the essence from which the given property flows. Again, the essence of glass is given partly by its crystalline structure. The tempering of glass by producing Prince Rupert's Drops involves the creation of residual stresses within the internal structure of the bulb that gives it the quality of withstanding heavy blows.⁵⁶ It is not surprising, therefore, that the property of brittleness belonging to glass can be prevented by interfering with its internal structure. For any genuine property belonging to members of a kind, non-manifestation must be specifiable in terms of prevention, and prevention in terms of independently describable processes that refer back to the essence of the kind. This gives us a qualified version of (NP):

(NPP): Necessarily, for any kind K with essence \mathbf{E} , and for any property P that characterizes the members of K : all members of K have P unless they are prevented from doing so.

⁵⁶ And, equally curiously, of exploding at the slightest touch to the tail of the bulb.

Recall that I am using ‘prevention’ in a broad and semi-technical sense. An object can be prevented from having a property without having had it at some prior time. For example, a baby is in this sense prevented from being able to communicate linguistically due to immaturity. We can describe a process, or better a complex of states and processes, whereby due to a lack of maturity in brain development, that part of the essence of the infant that is constituted by its rationality is not yet expressed in the linguistic capacity. So the lack of linguistic capacity in human infants is no counterexample to the proposition that such a capacity is a property of the human species. The converse of that description applies to humans who have lost the capacity to speak due to extreme old age. Moreover, independently specifiable *damage* to the brain enables an explanation of why certain injured humans lack the linguistic capacity. Again, this is a form of prevention. Similarly, the thought that some humans are irrational (in the sense of thinking irrationally, even on an habitual basis) does not refute the definition of humans as rational animals. Rationality is part of the essence of the human being. A newborn baby does not lack rationality: it lacks the *use* or *exercise* of rationality. The same for a senile elderly person, a brain-damaged person, or someone who simply does not think well. Certain properties flow from rationality, such as the ability to formulate ideas and make judgments and inferences. In every case in which a human cannot exercise a rational capacity, there is an independently specifiable process, referring back to the essence, that explains why the capacity is prevented.⁵⁷

It might be objected that there is a lingering circularity in my account of property prevention. The thought would be that properties are those features necessarily possessed by members of the kind characterized by the property unless they are prevented from being possessed. But whether they are so prevented depends upon whether the feature is a property in the first place. After all, why on my account does redness not count as a property of fire engines? It seems you can prevent (in my semi-technical sense) a fire engine from being red by painting it white. So if the hylemorphist is to rule this out—as he should—he has, so the objection goes, to say that there is prevention and prevention. It is only the *properties* that can be prevented in the relevant sense, and redness is not a property of fire engines. But isn't this just to insist on what the objector questions in the first place?

The objection is misguided. A first though not wholly adequate reply is that the prevention of redness does not refer back to the essence of fire engines, thus violating condition (2) of our account of prevention in the specific sense employed here. Although correct, this will not do since the objector may insist that we cannot know the essence of a fire engine without knowing its properties in the first place; in other words, we have no right to help ourselves to the essence of fire engines without first singling out their properties, but whether redness is a property of fire

⁵⁷ Note: in the cases mentioned earlier, non-combustible wood is produced by impregnation with non-flammable material, and so-called albino tigers are either not genuine albinos since they still have some striping (albeit pale or weak), or if genuine albino have been described as sickly and stunted. Hence the propositions that wood has the property of combustibility and that tigers have the property of being striped are unrefuted: in both cases an independently specifiable process (impregnation with non-flammable material, or genetic mutation leading to arrested development) explains the relevant prevention.

engines is precisely what has not yet been established. The objector is correct on this score: since we often come to know essences via properties, we cannot single out properties by saying that they flow from essence and are preventable only in ways that refer back to essence.⁵⁸ In other words, (NPP) is not a criterion for *identifying* properties. It tells you simply what follows from something's *being* a property. Recall my assumption at the beginning of the discussion that we have *already* identified the properties. We must not try to isolate them by looking at whether every member of the given kind has a certain feature unless prevented from doing so.

Still—and this is where the objection misses the mark—we come to know properties by inspecting the characteristic operations and behaviour of things. We know what fire engines are because we know what functions they serve, that they are vehicles designed for a certain purpose, and so on. We know that a fire engine does not have to be red in order to perform its characteristic functions, and so we know that redness is not a property, only a mere accident. From this it follows that preventing redness in a fire engine by painting it white is not preventing a property that flows from the essence of fire engines. But we do not, as essentialists, *use* (NPP) directly as a criterion for identifying properties. Instead, we inspect behaviour, perform thought experiments as to how a thing would operate if it lacked a certain feature (could a fire engine serve its purpose if it were white?), and try to determine whether prevention of a feature in the vernacular sense of 'prevention' would amount to prevention in the specific essentialist sense conveyed by conditions (1) and (2) inasmuch as it involved a sufficiently radical change to the way an object functioned, operated, behaved, and so on. In short, we cannot find the properties of a kind by asking whether they are the features that members of the kind necessarily possess unless prevented from doing so. Instead, we ask whether they are the features that point to a distinctive, characteristic way of being that is sufficient to single out the objects having them as constituting a kind possessing an essence. If we can do this, we will be able in principle to give an account of how these features—the properties of the kind-members—can be prevented in a way that is independently specifiable and refers back to the real definition or essence of the kind. Then we will know that the features satisfy (NPP).

So what of the negaters, i.e. finks, masks, and antidotes? They were introduced into the debate over counterfactual analyses of dispositions. Finks remove the disposition of an object to respond in a certain way to a stimulus, on every occasion on which the object is exposed to the stimulus. Masks (following Molnar's characterization) are dispositions of an object which interfere with the manifestation of a distinct disposition by the same object. Universal antidotes (of which masks are arguably a subclass) stop a disposition from ever manifesting itself by breaking the causal chain between stimulus and manifestation. We can, however, apply the idea to property possession, whether the property be dispositional or not. The hylemorphist should regard negaters as extreme or limiting cases of the more general set of preventers. The former do not refute (NPP) any more than the latter, since non-prevention is built into (NPP) in a principled way.

⁵⁸ For more on knowledge of essences via properties, see Oderberg (2007): Chap. 7, Sect. 3.

Consider finks. (Parallel reasoning applies to masks and antidotes.) The hylemorphic essentialist identifies the following alternatives:

- a. The fink cannot remove the target characteristic without destroying the possessor. Bird has argued plausibly that this is so in the case of salt and solubility, though the general argument seems applicable to other chemical compounds as well as elements.⁵⁹ But we do not need much argument to see that no fink could ever remove the property of a triangle that it has an inscribed circle, at least without destroying the triangle.
- b. The fink can remove the target characteristic without destroying the possessor, in which case either the characteristic will turn out not to be a property after all or (c) will be the case.
- c. The fink can remove the target characteristic but it is still a property. Then the fink must be a preventer, not a mere negater. In other words, there must be an independently specifiable process, referable back to the essence, by which the fink negates the property. For instance, a fink could remove the capacity for lactation from mammals, but only by, say, damaging their bodies or chromosomes. Similarly for removing bipedalism from humans or fins from fish. Again, malleability could be removed from gold only by interfering with its atomic structure, and combustibility from wood only via impregnation or some other interference with its form.

To say that one could conceive finkish behaviour in the absence of such an independently specifiable process referable back to essence invites the reply that conceivability does not entail possibility. So it is not enough to hypothesize that an evil demon might, say, separate radioactivity from the sun through no physical process. This would amount to claiming that (NPP) is false because a K could lose its properties by a miracle. Miracles, though, are irrelevant. The entailment in (NPP) is not logical or analytical, it is metaphysical. The hylemorphist believes that the laws of nature are metaphysically necessary in the sense that what things are like flows from what they are: the laws of nature are the laws of natures. But flow is, as defined earlier, a matter of causation and origination. It is a *sui generis* relation connecting form to properties. There is nothing in the relation itself that prevents God (or some sufficiently powerful evil demon) from *suspending* its operation. But (NPP) does not address that possibility explicitly: it merely states that there is such a relation and should be regarded as implicitly excluding miracles as a defeater.

Miracles aside, the lesson for the counterfactual analysis of dispositions is that a similar non-prevention clause would render the analysis more plausible. Again, it is not that we should regard the truth of dispositional ascriptions as semantically or metaphysically identical to the truth of certain counterfactuals, or even that part of what it is for a disposition to be present is for certain counterfactuals to be true. Rather, what makes the relevant counterfactuals true is that the disposition obtains, this latter having ontological reality in its own right. Similarly for (NPP): a K 's having essence \mathbf{E} is not reducible to an entailment between being a K and having certain properties $P_1 \dots P_n$. Having \mathbf{E} is a matter of having a certain form. $P_1 \dots P_n$ are

⁵⁹ Note 51 above.

caused by and originate with the form. But for this to be a true and contentful theory of property possession, non-prevention as defined here must be part of that account.

7 Conclusion

The purpose of this paper has been to give a general theory of the relation between essence and properties. Much work remains to be done on the kinds of properties themselves. In particular, hylemorphism needs a theory of *relative closeness*, i.e. of the ways in which properties can be more or less closely connected with a thing's essence. Part of this issue is whether, as should be possible, a sharp division between properties and mere accidents can be made. For at a high level of generality every accident, i.e. every feature or characteristic of a thing, has some connection with its essence. The solution of the problem will, I submit, involve the concept of binomial definition by means of proximate genus and specific difference. We need a theory of the parts of a thing's essence, and how different kinds of accident, in particular the properties, are connected to those parts. These difficult questions await further exploration.

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