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ON THE PRINCIPLES OF REALITY

There is an enormous difference in philosophical perspective between the ancients and medievals on the one hand and modern philosophers on the other, and of course this difference has been characterized in various ways. This paper proposes a new account of what the difference is by contrasting the types of principles that Aristotle and, briefly, Aquinas, offer with those of philosophers from the modern period. By comparing the difference, we will see a problem emerge. Appreciating it will help us understand some distinctive features of both periods. I will suggest that the problem remains unresolved.

To cover such an enormous sweep of philosophy in one brief paper may seem foolhardy, and perhaps it is. However, the details are so complex and controversial that focusing on them would obscure the bigger picture.[1] Likewise, on a subject as widely discussed as this one, readers could rightly expect extensive critical engagement with other accounts aimed at convincing them that still another discussion is necessary and that the new approach offers advantages. However, what I propose here, unfamiliar though it be, does not aim to undermine other accounts so much as to encompass them in a larger, more intelligible framework. A brief treatment like this one cannot convince, but it can introduce this new framework and something of its power.

[1] Much of the discussion of Aristotle here is based on my three volume study: Halper 2005, 2009, and forthcoming.

I

Aristotle claims in two passages that we know each thing (ἕκαστον) when we know its first cause (*Phys*. B.3.194b17-20; *Met*. A.3.983a25-26). In each passage, he goes on to expound his well-known doctrine of the four kinds of causes. For my purposes here, what is important about the causes is that they are beings of some sort: the bronze of the statue, the health someone walks to attain, the sculptor of the statue, the essential nature that is the form of a dog, and all the myriad of other examples. Evidently, to know something's cause is to know some being.

The term «principle» (αρχή) also signifies a cause and, thus, a being, but it is broader: «what is common to all principles is to be the first from which something is or becomes or comes to be known» (*Met.* Δ.1.1013a13-16). The most important principle of knowledge, the principle of non-contradiction (Γ.3.1005b11-21), is not a cause: since this principle extends to all beings, it cannot be a particular being (1005b5-11). However, the principle is not unconnected with beings, for Aristotle's central assumption in disputing those who deny the principle is the existence of an essential nature (4.1006b11-15; 8.1012b5-8). I have argued that the principle of non-contradiction is, as it were, an indirect way of affirming the existence of essential natures [Halper 1984]. This is important because in contemporary philosophy, the term "principle" has come to mean something like a deeply seated belief.[2] It may be a belief about ontology, but it need not *itself* have any sort of objective being. In contrast, when Aristotle speaks about a «cause», he refers to something that exists in the world, and the same is true when he speaks about a «principle» even though it is less obviously so. Since the principle is that through which something exists or is known, unless the principle were itself a being, nothing could be through it; and unless it itself were known, nothing could be known through it. To know the principle is to know *its* first cause. Besides determining which beings are the first principles of knowledge and being, the *Metaphysics* is also concerned to determine what it is to be a principle or a cause. Thus,

[2] Lewis 2013, 110, 114, speaks of principles of substitution and sameness and, elsewhere in his book, proposes a host of assumptions without considering what kind of being a principle is.

Aristotle asks many times which sort of being a principle is, whether for example it is a universal or a particular, separate or immanent (B.4.999a24-b24; Λ.1.1069a26-30). These are ways in which a being could be a principle and so possible answers to the question of what it means to be a principle. In each case, the principle is a being.

Thus, when Aristotle speaks about metaphysics's seeking the first principles and highest causes, he says that it is clear that they must belong to some nature *per se* (Γ.1.1003a26-28). Later, he makes clear that the inquiry is about the principles and causes of *ousiai* (Λ.1 esp. 1069a18-19, a25-25). He distinguishes three *ousiai* (1069a30-36) or, rather, three types of *ousia*. There is no doubt that one type, eternal and immobile *ousia*, is the nature that is the principle and cause of all else. The first principle and cause of all beings is some one being or one sort of being, an unmoved mover.

One problem for Aristotelian metaphysics is how all beings can be known through such a cause when the nature of the cause is itself unknown – for Aristotle proves its existence, discusses the sort of being it must be (a pure actuality, a thought that thinks itself), and links each unmoved mover to a heavenly sphere (Λ.6-9), but he does not indicate its nature. Indeed, he suggests that a human intellect could never know its nature.[3] We need not dwell on this issue here.[4] Suffice it to say that the natures of sensible *ousiai* are not known through the unmoved movers. These latter are responsible only for the persistence of sensible natures.

The natures of sensible *ousiai* must, then, be known somehow through themselves. Since we know by knowing the first cause, there must be causes, specifically first causes, that belong to sensible *ousiai*. How are they located in an *ousia*? This Aristotle expounds in an important chapter in the *Physics*, B.7. After briefly mentioning the four kinds – the matter, the form, the mover and that for the sake of which – he notes that the natural scientist should know them all, but that often three of them are one (198a21-25): for the formal and final causes are

[3] «By partaking of what it thinks, the intellect thinks itself [...] so that the intellect and what it thinks are the same thing» (Λ.7.1072b19-21, Sachs transl.). For us to think the essential nature of this separate intellect, we would need to become the intellect, which, having bodies, we cannot do.

[4] I discuss it in Halper, forthcoming.

one, and that from which the first motion comes is the same in form with these, for a human being is the cause of a human being (198a25-27). The fourth cause is the matter.

That is to say, the formal and final causes of a sensible *ousia* are simply the form of this *ousia*. Its efficient cause is the form of another *ousia*, its parent; but this form is the same as the form that exists in the *ousia* itself. The material cause of this *ousia* is simply the *ousia*'s matter. It follows that, with one qualification, all the causes of any natural *ousia* are its very own form and matter. The qualification is, again, that the efficient cause of the *ousia* lies in another *ousia*; but since it is the same as the form that is *within* the *ousia*, this latter *ousia* can be known through itself. Consequently, a sensible *ousia* is not just an independent, self-subsistent being. It is a unit of knowing. In other words, an individual *ousia* is known through its own essential nature; that is, through its form and through the matter in which that form resides.

This conclusion, that a sensible *ousia* is known through itself, seems to fly in the face of widely-known Aristotelian doctrine. In *Metaphysics* Z 15, Aristotle argues that an individual cannot be known. Rather, knowledge is of the universal (B.6.1003a14-15; K.1.1059b25-26). Countering this objection requires making more precise just how an individual *ousia* can be known. So, the objection proves useful support for my claim. Still, we might wonder why my contention seems so contrary to the received view. I can only speculate, but I suspect that Aristotle intends his denial that an individual can be known and his affirmation that the universal is the object of knowledge precisely for the purpose I will use them; namely, to delimit the way in which an individual can be known. His emphasis on knowing individuals is so pervasive that it does not need to be asserted; it needs to be refined.

Z.15 argues that an individual cannot be known because it comes to be and passes away (1039b20-1040a7; cf. B.2.997b32–34). Since knowledge is always true, its object must be something that always persists. A perishable individual can be or not be. So, no definition or demonstration about it will always be true.[5] This argument seems to contradict the claim in H.2 that those who define a house mention

[5] Hintikka 1973, 64, 68, 72-75, claims that this argument is rooted in the Greeks' use of temporally indefinite statements to make knowledge claims.

either (1) the matter, (2) the actuality or form of the matter, or (3) both (1043a14-21). It would seem that an individual house can be defined and, thus, known and that even its matter can be known.

The contradiction is only apparent. The individual that cannot be defined is the individual that is generated and destroyed, but the formula of such an individual is neither generated nor destroyed (1039b20-26). It is this formula or, rather, formulae that H.2 discusses. The individual can be known through any of its three formulae. They all express characters that the individual shares with all others of the same kind. Due to the nature of language, any formula could have multiple instances. Hence, what is expressed through a formula is universal, and knowledge is of the universal. On the other hand, what is really distinctive about this individual, the particular matter to which its form belongs, is not known. Its *kind* of matter as well as its kind of form are knowable through universal formulae, but the particular boards, bricks, and other constituents of a particular house do not belong to its definition.

Someone might object that if the house is known through a universal, it is wrong to say that the individual is the basic unit of being and of knowledge. This objection misunderstands the nature of an Aristotelian universal. It is, as we might say, distributive rather than collective: a universal belongs to each individual, rather than to all as a totality. It exists as a potential part of each individual that comes under it (M.10.1087a10-25). To say, then, that the universal is known is to say that each individual is known through a character that belongs to it and, somehow, to everything else of the same kind. Each house is known through its form and its matter, even if all houses have the same form and the same sorts of matter. So, to know a universal is perfectly compatible with my claim here that the individual is the basic unit of being and knowability.

Is the form of an *ousia*, then, a universal? It is known universally because it is known through an essential form that is expressed in words and, therefore, like all verbal formulae, can belong to more than one instance. However, Aristotle argues at length that the form is not a universal (Z.13-16). A universal is a character that belongs to multiple instances. The form of an *ousia* is an actuality; it is the functioning together of the *ousia*'s material constituents. In Z.17 Aristotle argues

that what makes the material parts one could not itself be a material part; it is, rather, a form. This conclusion holds of artifacts, like houses, but also, and more properly, of plants and animals. Because forms of artifacts can exist in different types of matters, and because any of these materials can take on different types of forms, artifacts are intrinsically pluralities and, thus, not properly *ousiai*. In contrast, the material parts of plants and animals, the organs, cannot exist as such apart from the form. The form is the cause of this unity because it is the actuality of these material parts, and form and matter are, *in a way*, the same (H.6.1045b17-23). The way in which they are the same is that both form and matter are the capacities that the *De Anima* calls «first actualities» (2.1.412a21-b6). The *form* is the capacity of the matter, that is, the capacity of the organs of a natural *ousia*, to function together. Since the matter only exists as such, that is, as organs, when each organ has the capacity to function, and since it has this capacity only when it is united with the other organs, the *matter* too is the capacity of the organs to function together.

Insofar as the form is the *functioning* of a particular matter, it not only unifies the organs, but also makes them into a *single*, composite individual. A matter that has the first actuality, that is, the form, is an individual. To be sure, we know a form's nature through a universal formula, and this formula characterizes the forms of all the like instances of the species. However, the form cannot *be* a universal because it is the functioning of some particular matter and, thereby, constitutes that matter as a particular individual. Nor can the matter that functions be the universal through which it can be known. Again, we can say that the particular kind of functioning that characterizes dogs is the same in all dogs, but the functioning itself occurs only with a matter, and the functioning individuates this matter into one dog. In this way, the form is the principle of knowledge and of being of an individual *ousia*. It is the primary *ousia* even though it is separate only in formula and not separate simply (H.1.1042a25-31).

With this conclusion we can finally see what it really means to say that an individual is the basic unit of being and intelligibility. The *material* parts of a natural *ousia* constitute an *ousia* because they are capable of functioning together. This capacity to function together is their *form*,

and the *purpose* of their functioning together is to sustain the natural *ousia*, that is, to allow it to continue to function. This functioning comes to it from its parent and is passed along to its offspring. In short, the four causes through which an individual *ousia* is known play determinate roles within the individual *ousia*.

This is the way in which an *ousia* is the unit of being. We can see that it is intelligible through itself, but there is more. In the *De Anima*, Aristotle claims that we never think without a sensible image (οὐδέποτε νοεῖ ἄνευ φαντασμάτος) (3.7.431a16-17). The reason is that the objects of thought reside in sensible forms (ἐν τοῖς εἴδεσι τοῖς αἰσθητοῖς τὰ νοητά ἐστι) (8.432a4-5). As we saw in the *Metaphysics*, an intelligible form, a first actuality, that is, the potential for the material parts to function together, is what makes those material parts one *ousia*. I think that the *De Anima* is saying that we know the intelligible form *through* images of sensible forms because we grasp the intelligible form as the source of the unity of these images. The sensible forms are the counterparts of the material parts, and the intelligible form exists as the principle of the unity of sensations in our minds, just as it exists as the principle of the unity of matter in the *ousia*. The form that exists in the *ousia* is, thus, the form that our mind comes to receive or, better, that our mind comes to be in knowing the *ousia* (4.429a15-18; 429b30-31). In this way, the physical world is not only intelligible to us, but it contains within itself something intrinsically intelligible and akin to mind (430a3-9). Again, the unit of being and the unit of knowability are the same, the individual *ousia*. There will, in general, be multiple instances of any natural *ousia*. But each is known through itself, even if it is known in the same way as every other *ousia* of the same sort.

Immobile, eternal *ousiai* are not made many by matter. Hence, each of them is, in itself, one in number and one in formula (Λ.8.1074a33-37). Each is and is intelligible through itself. So, each unmoved mover is also a unit of being and of knowledge, even if knowing its nature is beyond our capacity. It serves as the cause of all other *ousiai* but not by any direct action on its part. Instead, it is a cause, a final cause, because all other *ousiai* seek to imitate it. So seeking, the sensible *ousiai* or, at least, their species come to partake in eternity through continuous generation. However, in the generation of a composite individual, neither its form

nor its matter is generated (1033a24-b19). Both are somehow passed along. To a remarkable extent, individual composites are known through themselves.

II

The Aristotelian synthesis that we have just seen is enormously attractive. However, cracks begin to emerge when we reflect on the consequences of making individual *ousiai* the basic units of being. The main problem is how to understand interactions among different *ousiai*. For Aristotle an interaction is a relation, one of the categories. As such it is «present in» some individual *ousia* (*Cat.* 1b25-27; 2a34-35). That is how instances of all categories other than *ousia* exist. If, then, two *ousiai* are related, their relation cannot be a single being because it could neither exist alone nor belong to one *ousia*. Rather, one *ousia* contains within itself an instance of the category of relation, its relation to the other *ousia*, and the latter in turn contains within itself its relation to the former *ousia*. One relation becomes two distinct beings with distinct locations.

The limitations of this way of thinking become apparent when we try to understand global features of the cosmos. Because each *ousia* is one, there cannot be an *ousia* composed of other *ousiai* (Z.13.1039a3-4), even though Aristotle sometimes treats groups of *ousiai* as if they did constitute a single *ousia*. Thus, he claims that all the *ousiai* in the cosmos are ordered in respect of one thing (πρὸς [...] ἓν), but in the same way as in the household where the free man is least able to act at random and must rather do as prescribed, and the slaves and livestock, contributing little to the common good, act most randomly (Λ.10.1075a17-23). He means that the heavenly bodies, being most rational, are most orderly; whereas human beings, only sometimes governed by reason, are less orderly. Neither cosmos nor household is properly an *ousia*, but each is close enough to admit a proportion: what is most governed by reason is most orderly, whereas what is less rational is less orderly and more random.

The proportion seems to be a kind of organizing principle. So, we should ask, what sort of being is it? Where is it located? Aristotle claims

that someone with reason will act rationally, and someone without it will not, unless he is governed by someone else with reason. As in the family, so in the cosmos. Principles of action lie in the individual agents: *ousiai order themselves* in respect of the unmoved movers. Thus, there need be no overarching principle, nor could there be such a principle because there is no place for it to reside. At best there is a kind of fortuitous harmony among independent *ousiai.* Aristotle recognizes analogies, but because they are not confined to a single genus (Δ.6.1016b31-1017a3), and because every nature belongs to some genus, analogies can have no nature (see I.2.1053b24-1054a19). They are, then, not beings. In each genus there is some species that is one in that genus, a species through which other species in the genus are measured. But these ones have no common nature. Their analogy amounts to a bit of metaphysical fortune rather than ontological principle. To be sure, all beings are related, directly or indirectly, to the unmoved movers, and all owe their being to the unmoved movers. However, other beings get their order from their own natures, not from the unmoved movers.

Whereas global proportions are rare in Aristotle, they are central to Thomas Aquinas's arguments throughout his work. To mention but one random example, in order to argue that creation belongs only to God, he assumes that the order of agents corresponds to the order of actions (*Summa Contra Gentiles* 2.21.2 [2012, 61]). Whereas other actions presuppose creation, creation presupposes no other actions. Hence, it is the first action. God is the first agent. Aquinas does not argue this latter point here, but of course God presupposes no other agents. Given the correspondence between agents and actions, Aquinas concludes that creation belongs exclusively to God.

Another, similar argument for the same conclusion assumes that effects correspond proportionally to their causes (2.21.4). Aquinas reasons that since the act of being is universally present, it is the first effect. Whereas determinate effects like being a man or being white are caused by determinate causes, inasmuch as the act of being is universal, its cause could only be a universal agent, God.

Aquinas claims that the assumption that effects correspond proportionally to their causes, comes from Aristotle's *Physics* 2. He probably means 3.195b25-28, but there Aristotle is expounding a point

about specifying a cause precisely. Aristotle had said that the most precise cause of someone's building a house is his being a housebuilder – is this the source of Aquinas's assumption in 2.21.2 about the order of the agent corresponding to the order of actions? – and the cause of his being a housebuilder is, in turn, the art of housebuilding (195b21-25). Aristotle adds that we should specify a general cause of what is general and a particular cause of what is particular: the sculptor of the statue, as opposed to *this* sculptor of *this* statue (195b25-28).

Whereas Aristotle is making a point about specifying causes precisely, Aquinas reinterprets it as a triple correspondence between the order of agents, the order of actions, and the order of effects. He uses these corresponding orders to derive a conclusion that connects God exclusively to creation. This conclusion requires that each order extend from highest instance to lesser instances and that it have some sort of reality. Aquinas draws on this reality to associate the top entries in each order; that is, the first cause (God) with the first act (creation) and first effect (creation).

It hardly seems necessary that the first cause have a first effect. After all, Aristotle's first cause is a final cause: his cosmic order is the result of individual *ousiai* that, because of their different degrees of rationality, strive to imitate the unmoved movers (the final cause) in different degrees. The unmoved movers are weak organizational principles inasmuch as sensible *ousiai* sustain *themselves* by striving to imitate them. In contrast, Aquinas sees the cosmos and all of creation as produced, preserved, and governed by God (2.1.3). God is the efficient cause of each being, its formal cause, and its final cause (2.15.7,5,8). Inasmuch as the "orders" of beings, acts, and effects belong to the cosmos and creation, they too must be the work of God.

What sort of being do these orders have? They are not *ousiai*, but they have some sort of existence, at the very least in the mind of God, but also in the world. This point helps to explain how Aquinas transforms Aristotle's correspondences into real proportions. When he claims that being is predicated analogically in respect of a relation to God (2.15.2-3), he is speaking about a cosmos with a far more robust unity than

Aristotle's.[6] Aquinas's proportion can reside in such a cosmos as well as in God's mind, whereas Aristotle's proportions are more like verbal parallels (I.1.1052b5-7). This new understanding of the cosmos is an essential step in the development of the modern, that is, seventeenth century, perspective on the cosmos even though it still presupposes that the individual is the principle of knowledge and being.[7]

III

Aristotle's basic unit of being and intelligibility is the individual *ousia*. Thomas Aquinas sets up proportions between different sorts of *ousiai* and their different effects. Modern philosophers hold on to the proportions, but drop the *ousiai*. They see the proportions as mathematical relationships between characters. Often the characters are defined by these relationships. In other words, instead of individual, self-subsistent *ousiai*, modern philosophers talk about mathematical laws of nature that express relations between characters; specifically, between characters that are themselves defined through these relations.

It follows that the modern perspective on the principles of reality is the inverse of the Aristotelian position. Whereas Aristotle takes an individual *ousia* as the basic unit of being and knowledge and, accordingly, must take a relation between two *ousiai* as two distinct attributes, each belonging to one *ousia*, seventeenth and eighteenth century thinkers take the relation to be the basic unit of being and knowledge. This transformation allows them to treat the cosmos as a whole and to appreciate the uniformity and regularity of connections, that is, scientific laws. Yet, it comes with a cost.

In order to make this transformation, modern philosophers need to deal with the problem of location: where does a relation exist? Aristotle could point to an individual sensible *ousia* as the location of relations

[6] This unity explains why it is plausible for Aquinas to take πρὸς ἓν to be a kind of analogy in contrast with Aristotle who distinguishes πρὸς ἓν from analogy: in Aquinas's unified cosmos, analogies become ontological relations.

[7] Foster 1934, 446-468, esp. 448, argues that Christian doctrine lies at the root of modern science.

and other attributes, as well as the location of the causes through which it is known. The first cause is another *ousia*, one that is itself uncaused, and therefore even more intelligible through itself than sensible *ousiai*. As I said, the latter depend on the former for their persistence, though not for their natures.

Where, though, is a law of nature? Newton's first law, inertia, takes motion as an attribute of one body that will be retained by the body unless, through impact, it is passed along to another body.[8] His second law, F=ma, is more problematic because it expresses the impact of one body on another. It envisions a force, such as the force of gravity, that belongs to or is derived from one body being applied to a second body over a period of time and predicts how much the second body accelerates. So, the law expresses the relation of two bodies. Does this law reside in the impacting body that exerts the force, the left side of the equation, or in the body that is impacted and, thereby, accelerated in accordance with its own mass, the right side? What could it mean for this law to be in either body if it expresses a relation between them?

Even more challenging is the law of gravity. According to this inverse square law, a force of gravity extends outward from every mass infinitely throughout space even if the force can be measured only in relative proximity to the mass. In order for a force or, indeed, anything else to extend through space, space must somehow be able to carry it, and that is only possible if space or the cosmos as a whole is somehow a unified thing. But what sort of a thing could it be?

Neither a law nor a force extending throughout space could be an individual entity in any ordinary sense, in the way that Aristotle envisions his principles. What are they and where are they located? I submit that this question motivated the emergence of modern philosophy and that the more familiar questions about how mind exists, about the relation of mind and body, and about the explanatory character of matter arose in connection with attempts to answer this question.[9]

[8] Newton 1999, 62. He states the law of gravity in bk 1, prop 74 [1999, 239].

[9] Still influential: Burtt [1925, 11] «For modern metaphysics [consists of] the attempt to reinstate man with his high spiritual claims in a place of importance in the cosmic scheme». In sharp contrast, Machamer [1976, 168] thinks that Descartes aims to explain the inanimate world by referring only to matter, but fails [1976, 195].

This is obviously too large a thesis to argue here, but part of any case for it is its ability to account for the striking differences between the ancient/medieval and modern approaches and for some of the, frankly, bizarre notions that modern philosophers advanced. It will suffice for my purposes here merely to explain how it *could* be the basis of an alternative understanding of the impetus to modern philosophy and, indeed, modern science.

Perhaps, modern philosophy's most striking innovation is its separation of mind and matter into distinct realms. In Aristotle and his medieval successors, intelligible form exists together with sensible matter as its shape or function, and the individual composite is intelligible by virtue of its form, as we saw. It follows that something akin to mind exists in nature. In contrast, when mind and matter are separated, matter (body) can be considered on its own: One body has the same nature as another, though it may have quantitatively measurable differences, including differences in motion. And one body can act on another with the result being the motion of a body. In other words, there is a certain autonomy to matter once it is separated from mind. However, any treatment of matter can only be done through mind. Thus, in his sixth meditation, Descartes argues that our clear and distinct idea of matter must be caused by matter if God is not a deceiver [Descartes 2000, 135-36]. Famously, the idea of matter is simply extension, and matter's motion is an extension's change of position relative to other extensions. The other sensible traits that we might have associated with matter, such as weight, hardness and, color (*Principles of Philosophy* 2.4 [2000, 254-55]) fall by the wayside because they are unintelligible. What remains are ideas of matter and motion that mind grasps through mathematics. In this way, the laws of nature – whose being and location had seemed so problematic – are located within mind, whereas the bodies that these laws characterize have their own separate and independent existence.

This separation is problematic because the laws that govern matter's motion do not belong to matter. Evidently, laws describe motions without causing them. That physical matter and its mental laws are connected depends on a God whose own veracity guarantees the truth of what belongs to our minds clearly and distinctly. We need only grasp clearly and distinctly the law of the motion of matter to be assured that matter

moves as the law describes. Even so, Descartes never imagines that he will be able to do without experiments: there are so many ways to deduce phenomena that he will need experiments to decide between them.[10] Although he gives mind a special status, his aim is not so much to do so, as to find a foundation for scientific knowledge, just as he says. It is the location problem that explains why science needs a foundation and why that foundation consists of separation and correspondence.

Descartes' correspondence between mind and matter is undercut if they each act on the other, as he claims they do in his *Passions of the Soul*;[11] for then matter's moving the soul and soul's moving matter could not come under laws of physics that account for matter's motions by describing matter-matter interactions. On the other hand, without some such body-soul interactions, the soul would have no way to come to perceive bodies. It could not even rely on the famous wax argument to know what does and does not belong essentially to body.

Spinoza remedies these problems by excluding matter-soul interactions and proposing a type of identity between mind and matter, both of which he takes to be attributes of the single, all encompassing substance that he calls God. This solves the location problem nicely. The laws of nature are just the physical motions of the body: the laws belong to the mental attribute, the motions to the extension (material) attribute of God. More specifically for each body, corresponding to any motion that it has, there is a thought of that body (which Spinoza calls a «mode») and a thought of its motion, thoughts that could be in a person's mind but always belong to God's mind (*Ethics* 2P13 [Spinoza 1994]). In this way, the physical relations between bodies are the same as the conceptual relation between the ideas of them (2P7). To speak generally about motions of bodies is to use a universal concept that signifies

[10] Descartes 2000, 75-76: «the power of nature is so ample and so vast, and these principles are so simple and so general, that I notice hardly any particular effect without at once knowing that it can be deduced in many different ways [...]. My greatest difficulty is to find in which of these ways it depends on them. For, to this end, I know no other expedient [...] except to search [...] for some experiments».

[11] Descartes 1989, art. 34, 37-38; cf. art. 35. Since Descartes does not claim to know how they can interact but that they must do so, he would not be persuaded by the usual assertion that the two could not interact.

multiple physical motions. The laws of motion are the conceptual counterpart of the movements of bodies (see the Axioms and Lemmas that appear after 2P13).

Spinoza provides demonstrations of all his claims, but it is hard to see what motivates his metaphysics – unless, that is, we appreciate that he is seeking a place for laws of nature that govern the relations of individual bodies and, therefore, cannot belong to any one body. Whereas Descartes locates laws in one substance and matter in a distinct, independent substance and leaves their connection external, Spinoza solves the problem of their connection by locating laws and matter in a single substance.

Although Leibniz accepts the main features of Spinoza's solution, he insists on distinguishing God from created substances (*Discourse on Metaphysics* [*DM*] 8).[12] In consequence, there are a plurality of created substances, each of which is a self-contained nature and, thereby, much like Spinoza's single substance. Leibniz argues that, from the nature of each substance, all of its other characters follow. In this way, «every substance is like a complete world and like a mirror of God» (*DM* 9). Complete in itself, each substance cannot be altered by another substance. Hence, there can be no real interaction. Even so, there is a kind of conjunction among substances based upon a Divinely arranged pre-established harmony (*DM* 14). Within each substance there is a body (or, at least, the idea of a body; that is, extension and motion) and a soul (*DM* 12). All this seems to be what Bertrand Russell once disparaged as metaphysics «designed to win the approbation of princes and princesses» in contrast with Leibniz's more serious work on logic and science [Russell 1945, 581]. However, Leibniz draws on this metaphysics when he launches into a discussion of the laws of motion and argues for the conservation of force, rather than the conservation of motion (*DM* 17-18). More important than the soundness of this argument is the way that his metaphysics allows him to make it. The soul/mind is able to think the relations between extended objects, that is, bodies, because within an individual substance the thoughts and laws about bodies belong to mind and indicate the way that the substance's own

[12] Leibniz 1989, 35-68. Paragraph numbers of this work are cited in my text.

body or any other bodies actually move. Again, the laws that govern bodies are the mental counterparts to the bodies, both of which belong to each individual substance. Thus, each substance unfolds, as it were, in accordance with its nature and the laws that reside within that nature. Like Aristotle, Leibniz takes individual substances as basic units and he locates relations within individual substances, but to avoid a single relation's belonging to distinct substances, he denies that substances have external relations – a drastic expedient.

We can appreciate the significance of the problem of location if to solve it Leibniz is willing to deny interactions between substances. To put this point differently, it is hard to see what could have motivated Leibniz to advance a metaphysics that is so far from common understandings unless he were intent on responding to a very significant metaphysical problem. That problem is, I am proposing, the metaphysical problem of finding a place for laws of nature.

Seventeenth century rationalists are usually contrasted with British empiricists. Are the latter equally concerned with how there can be laws of nature and where those laws are located? Not ostensibly, but we should look closely. They advance empiricism in response to continental rationalism. If the latter is concerned to account for scientific laws, must not the empiricists advance alternative accounts of scientific laws to undermine it? They do consider scientific laws, and I suggest that they were dealing with the location problem. However, instead of showing what the world must be like if there are to be scientific laws located within it, as the rationalists try to do, the empiricists aim to show that we cannot grasp the world apart from our sensations of it and, importantly, that we need not address the location question to discover and use scientific laws. In other words, rather than radically revising metaphysics to account for laws, the empiricists set aside the problem and argue that scientific laws require no metaphysics. If this is right, the empiricists are not ignoring the problem of location: they are advancing a radically different solution. They are, as it were, making a point of *not* discussing the problem in order to show that we can grasp scientific laws without solving this problem and that the sort of knowledge rationalists sought is impossible for us to attain. I suggest that understanding that the empiricists are addressing this problem does much to explain their positions.

Consider, for example, the view held by all of them that thoughts are attenuated sensations and, thereby, less real than sensations. It follows that a scientific law could only be a correlation among sensation types. There is no possibility that such correlated sensations would reveal what Hume called the «ultimate springs» of nature, nor could we determine what these are.[13] Empirical correlations of sensations yield serviceable scientific laws. They are located in our minds; we cannot say how they exist outside our experience.

A few details suffice to round out this picture. Locke disputes the rationalist notion of the independence of thought by arguing that innate ideas are not found in children and idiots. If, then, our ideas must all come from experience what can we make of the underlying substance in which the sensed attributes must inhere? Since anything we might suppose ourselves to know about it would be a sensation and, thus, an attribute, the underlying substance could never be known, Locke argues [2004, 268-69]. He concludes that we can only say that it must be there, not what it is. This undermines all three of the rationalists' accounts of substance. But it also makes clear that we do not need to know what substances are to know their attributes.

Berkeley chides Locke for assuming the existence of an underlying matter that is not empirically accessible. Without the existence of something to anchor sensations, every sensation must be true, and scientific laws become simply a prediction of sequences of sensations. It follows that when a straight stick is placed in water, it really does bend, and it becomes straight when removed, just as we see it [Berkeley 2009, 219]. That, too, is a law of nature. However, Berkeley still needs to account for the regularity of the sequence, and in the absence of matter, he proposes that God is its cause.

Assigning to God the unifying role that matter had had scarcely seems a good way to avoid metaphysical accounts of scientific law, at least so Hume thinks (sect. 7, pt. 1 [1975, 219]). Instead, he draws the conclusion that we have no experience – nor could have any experience – of any substance that, though itself unsensed, holds sequences of sensations together. We can say, at best, that we have regularly experienced similar

[13] Hume 1975, 30. He compares his own investigation of our minds with Newton's study of nature [1975, 14-15].

sequences. This notion is the basis of Hume's famous treatment of causality. Assuming that our knowledge comes from experience and that we can have no experience other than an association of impressions, Hume reasons that our idea of causality can contain nothing more than the regular conjunction of impressions of the same sorts, with the prior sort being designated the cause (sect. 7, pt. 2). The argument is bolstered by earlier arguments that impressions are matters of fact and that we cannot infer one matter of fact from another: «When I see [...] a billiard ball moving towards another [...] may I not conceive a hundred different events might well follow from that cause» (sect. 4, pt. 1 [1975, 29]). His point is that scientific laws are matters of association, not inference. They are also limited: «Our senses inform us of the color, weight, and consistency of bread, but neither sense nor reason can ever inform us of those qualities which fit it for [...] nourishment» (sect. 4, pt. 2 [1975, 33]). Why bread is nourishing is now well understood, but Hume's point is rather that science needs only the conjunction of impressions, not an account of the whole of nature like the rationalists tried to give.

If this is right, the familiar dispute between rationalists and empiricists in the modern period is rooted in a disagreement over whether philosophers should or, even, could account for a unit of intelligibility that would accommodate scientific laws that relate one body to another. Rationalists insist on providing accounts, however challenging they may be. Empiricists insist that the project could never be completed and that it is unnecessary to try.

In short, empiricists direct their attention to showing that the problem of locating principles that the rationalists address is either not a problem at all or one that is intrinsically insoluble. However, neither Berkeley nor Hume can acknowledge the problem because it requires referring to what we cannot, in principle, experience or, therefore, know, a substance behind what we sense. Still, we should not be taken in: empiricism is as much a response to the location problem as rationalism even if it is carefully crafted to show that the problem simply could not exist. To make a point of showing that it cannot be a real problem is tacitly to acknowledge that it is a problem. Ironically, they, like the rationalists, reject Aristotle's notion of a single substance as the basic unit, even though they continue to use his language of substance.

Do the empiricists tacitly endorse a solution to the problem of locating relational principles? Although they all speak of laws as relations of sensations and, therefore, as in our minds, even Hume recognizes that there must be «ultimate springs» within nature. Of course, he denies that we can know what they are. If, though, we have no access to them, there is no ground to suppose them to be confined to a single substance, as Aristotle did. Nor need there be any other strictures on their character or their location. We cannot say that these «ultimate springs» are common to the entirety of nature as the rationalists did, but nothing prevents us from seeking laws that apply to the entirety of nature. Whether such laws can be discovered is an empirical determination, but all the empiricists assume that Newton indeed did succeed in finding such laws, and they model themselves on Newton. So, for practical purposes the empiricists do assume that the entire cosmos is the unit in which the principles of being and of knowledge can be located. Again, the empiricists utterly reject the search for ultimate principles in nature, principles that would ground the relations of sensations that we can experience but that cannot themselves be experienced. Consequently, they reject the entire problem of the location of those principles as well as the problem of what the fundamental unit of knowledge and being is. Ironically, though, in rejecting these problems, they eliminate the metaphysical obstacles to treating the cosmos as the unit of knowledge and being – which is just what they do in practice, when it is possible to do so. I suggest that in refusing to address the issues, the empiricists do tacitly address it.

IV

This paper has argued that whereas Aristotle's basic unit of being and intelligibility is an individual *ousia*, modern philosophers must expand this basic unit to accommodate what Aristotle takes to be relations between *ousiai* because the laws of nature are relations. They do so in one of two ways. The rationalists introduce radically new ontologies according to which either all matter is a single substance, or all matter and thought constitute two attributes of a single substance, or, third, each substance contains within itself all of its apparent relations with

every other substance, actually interacts with no other substance, but moves with all others in a pre-established harmony. Alternatively, the empiricists reject the possibility of giving a metaphysical account, but insist that we do not need to have one to discover scientific laws which are, after all, only relations between measurable, sensible characters. In throwing off metaphysical restrictions limiting these empirically discoverable laws, the empiricists accept that relations and «ultimate springs» are indeed located in the cosmos even if they cannot assert that this is so and even if these springs may also belong to individual substances.

Where, then, does that leave us? The Aristotelian synthesis is very attractive, but it cannot account very well for the relations, that is, the interactions between the basic units nor, consequently, for the order of the cosmos. Recognizing the power of these relations, philosophers from the modern period solve this problem by making relations the basic units of being and knowledge and by locating them in the cosmos somehow. These relations are scientific laws. Aristotle has no scientific laws because his principles are either individual *ousiai* or located within individual *ousiai*. This identification or location answers the question of what the principles are. In contrast, the relations, that is, the scientific laws that are the principles of modern philosophy cannot be located within individual substances. So, modern philosophers struggle to understand where they could be located and, equivalently, what they are. Rationalists assume that the principles must exist in the world, and they try to articulate what the world must be like in order that they do. Empiricists locate the principles within our experience as relations of kinds of sensations. They deny that we could know how they exist in the world, but they tacitly assume that the laws do exist in the world somehow and, thereby, reject the Aristotelian notion that an individual is the unit of being and knowledge.

The choices are, then, stark: We can retain an Aristotelian ontology where individual units are understood, mostly, through themselves but where their relations cannot be adequately treated. Doing so, we give up modern science. Alternatively, we can take relations and, thereby, the laws of modern science as *realities* in the world, as most scientists do, or as merely empirically verifiable conjunctions of experience. Either

way of endorsing relations leaves us unable to understand how these relations exist in the world. So, we retain relations, but lose ontology.

There is another serious philosophical issue with making relations the units of reality, one that did not emerge until after the modern period of philosophy: in a world that is understood through relations, that is, through scientific laws, it is challenging if not impossible to account for an individual, including individuals such as ourselves. It is because each law applies to all of nature that neither it nor a conjunction of other laws can define an individual.[14] A sufficiently large conjunction of relations might delimit a single unique individual to which all belonged, but it could not exhibit the individual's nature. So, we either have a world of individuals in which relations cannot be properly understood or a world of relations in which an individual cannot be properly understood.

So far as I can see, the question of the fundamental unit of being and knowledge remains a crucial, but an as yet unresolved metaphysical issue. Scientists think about it, especially quantum physicists pondering whether so-called «quantum entanglement» makes the world «monistic».[15] The terms in which they pose the problem are technical, but I suggest that it is at its root the same problem and that it is one that philosophers should continue to contemplate.

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[14] For more discussion of this issue and others treated here, see Halper 2015, esp. 511-13.

[15] This is the theme of Päs 2023.

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Keywords

Aristotle; principle; cause; laws of nature; problem of location

Abstract

This paper proposes a framework through which to understand the difference between ancient and modern approaches to the principles of being and knowing, it shows how the limitations of the ancient approach led to modern approaches, and it explores some of the difficulties with modern approaches. Taking Aristotle as exemplary of the ancient approach, the paper argues, first, that he takes an individual *ousia* to be the unit of knowledge and being and that that allows him to locate principles within individual *ousiai* and, thereby, to explain what it is to be a principle. Although this Aristotelian synthesis is quite attractive, the paper argues, second, that it faces difficulties in accounting for relations between *ousiai* because such relations cannot properly belong to a single *ousia* but are, nevertheless, important for understanding the cosmos as a whole. Thomas Aquinas overcomes some of these difficulties by, as it were, strengthening the unity of the cosmos to allow the reality of proportions, but he retains *ousiai* as fundamental units. Third, the paper argues that it was philosophers from the modern period who overcame Aristotle's limitations by taking relations rather than *ousiai* to be the principles of knowledge and being. These relations are the laws of nature. However, since these laws must themselves have some sort of reality, modern philosophers then faced what the paper calls "the problem of location": How can these principles be located in the world? What must be the nature of the world if the laws of nature belong to it? The paper shows that a number of arguments made by modern philosophers become intelligible when we see them as solutions to this problem. However, the paper proposes, in the end, that neither the ancient nor the

modern approaches to principles yield adequate solutions to the questions of what it is to be a principle and what the fundamental unity of knowledge and reality is.

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