

Aristotle's 'Cosmic Nose' Argument for the Uniqueness of the World

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David Furley's work on the cosmology, or rather, the cosmologies, of classical antiquity is structured around what he calls 'two pictures of the world.' The first picture, defended by both Plato and Aristotle, although on very different grounds, portrays the universe, or all that there is (*to pan*), as identical with our particular ordered world-system. Thus, the adherents of this view claim that the universe is finite and unique. The second system, defended by the atomists Leucippus and Democritus, portrays an infinite universe within which our particular *kosmos* is only one of countless *kosmoi*. According to Furley, none of the ancient disputants believed that this particular *kosmos* is infinite. Instead, the controversy is over whether this *kosmos* is all that exists, or whether something else exists too.¹

Aristotle's argument in *de Caelo* I 9 that the world is necessarily unique is an important contribution to this debate, but it has received relatively little attention. This argument holds interest because it shows Aristotle wrestling with an apparent inconsistency in his own philosophy, as deeply-held convictions within his cosmology collide with an equally deeply-held conviction within his metaphysics. The following three principles are inconsistent, but Aristotle seems committed to them all:

(a) *The cosmic uniqueness principle*. The world is necessarily unique.

¹ Furley (1989).

(b) *The cosmic form principle.* The world is an ordered, structured unity. As such, the world has a form.

(c) *The possibility of multiple instantiation principle.* For all Φ , if Φ is a form, it is possible that there exist multiple instances of Φ .

In *de Caelo* I 9, Aristotle argues that we can establish the uniqueness of the world, reject the possibility of multiple instantiation principle in this one case, yet still retain the distinction between this-world and world-in-general, if the following is true (as it is): the world takes up all the matter there is.² In order to illustrate this argument, Aristotle employs one of the stranger analogies in his corpus: imagine a giant aquiline nose that takes up all of the flesh in the universe. If this were so, then there could not exist any other aquiline objects whatsoever. (For this reason, we dub the *de Caelo* I 9 argument the ‘Cosmic Nose argument.’)

This paper is an interpretation of how exactly this argument is supposed to proceed, and an assessment of its success. We begin with an elaboration of the problem Aristotle is confronted with, and then sort through Aristotle’s various statements of the Cosmic Nose argument, which exhibit some sloppiness, and try to reconstruct charitably a single argument. We also will spend a little time examining the significance of Aristotle’s example of a gigantic aquiline nose. We will argue that, even charitably reconstructed, the Cosmic Nose argument appears to commit a serious modal fallacy. The remainder of the paper will consider whether this modal fallacy can be overcome from

² A terminological point: we use the word ‘world’ here and elsewhere to translate the Greek *ouranos*. Both the English ‘world’ and the Greek *ouranos* are ambiguous. Aristotle (*de Caelo* I 9, 278b9-21) distinguishes three different senses of *ouranos*: (a) the outermost circumference of the world which contains the fixed stars, (b) the region next to (a) which contains the sun, moon and planets, and (c) the body which is enclosed by the outermost circumference, i.e., the *kosmos*. Aristotle means *ouranos* in sense (c) in this passage, as do we by ‘world.’

within Aristotle's system. We conclude that, although not a cogent argument for the uniqueness of the world, it does succeed on its own terms. However, the Cosmic Nose argument should not be regarded as a free-standing argument for the uniqueness of the world, since it relies on premises established earlier in the *de Caelo*. Thus, we believe that with the Cosmic Nose argument Aristotle is primarily concerned to show how his cosmological view is consistent with his metaphysics.

1 Aristotle's commitment to the three principles and the resulting problem

One of the central motivations of the *de Caelo* is to make the motions of the *kosmos*, and indeed the *kosmos* itself, intelligible. But since the *kosmos* is perceptible and thus a particular (278a10-11), it is only *qua* form that it is intelligible. Thus, if we are to investigate the *kosmos* then we must assume that it has a form; otherwise, for Aristotle at any rate, there would be nothing to investigate. Aristotle's commitment to *the cosmic form principle* is also evident in his distinction between this-world and world-in-general. The latter is purely form or shape, whereas this-world is the hylomorphic compound of the world's form and its matter (278a12-15).³

Aristotle is also clearly committed to *the cosmic uniqueness principle*. In both I 8 and I 9 he sets out to prove that the world is necessarily unique. If so, it is not possible for the form of the world to be instantiated more than once.

But Aristotle also seems committed to *the possibility of multiple instantiation principle*. In an argument against the definability of unique Platonic forms, Aristotle specifically brings up the case of unique and eternal astronomical entities, such as the Sun and the Moon (*Meta*. VII 15, 1040a27-b3). He says that, considered *qua* individuals, there can be no definition of them. If we think that 'Sun' and 'Moon' simply denote

individual substances, as do the names ‘Cleon’ and ‘Socrates,’ then ‘being-the-Sun’ is not a form, any more than ‘being-Socrates’ is. If the sun *does* have a definition, this definition would have to be a ‘general formula’ (a *koinos logos*), mentioning a set of characteristics such that, if another thing with those characteristics came into being, it too would be *a sun* (although of course not *the Sun*). Thus if the world is an eternal, necessarily unique entity, as Aristotle insists it is, then it too would have no definable form *qua* individual world. To avoid this problem, Aristotle needs his distinction between this-world and world-in-general, i.e., between the individual token ‘world’ and the general type ‘world’ of which it is a token.

But given his view of universals, this distinction produces an apparent conflict with the cosmic uniqueness principle. Aristotle notes the conflict near the beginning of *de Caelo* I 9, remarking that, ‘it is universal in our experience that, among things whose substance is bound up with matter, there are many, indeed an infinite number—of particulars similar in form, so that there either are or can be many worlds’ (278a18-21).⁴ Similarly, in the *Metaphysics*, Aristotle says that insofar as a form is a universal, it will be ‘said of many things’. For insofar as it is a universal, it is of a nature to belong to more than one thing (*Meta.* VII 13, 1038b11-12). And again, a universal is by its nature predicated of a number of things (*de Int.* 17a39-40). These remarks suggest that forms (insofar as they are universals) just don’t *happen* to be said of many things; it is part of their nature as universals. But all Aristotle means is that what it is for something to be a universal is to be the *sort* of thing that is (or at least, can be) said of many instances. Something can be the sort of thing that is said of many things while not actually being

³ See Matthen and Hankinson (1993) 417-35, and Matthen (2001).

⁴ All translations of *de Caelo* are from Guthrie (1986).

said of many things, just as every human being is by nature rational (rationality is part of our essence), even though many humans are not in fact rational. For all Xs to be by nature F need not imply that all Xs are in fact F, since some particular X may be not-F against its nature.

However, if all Xs are by nature F, this does seem to imply at a minimum that each X is at least *potentially* F. When some particular X is not-F against its nature, we can explain this by appealing to factors that prevent it from expressing its nature—e.g., a clod of earth is suspended high in the air by a zeppelin—and absent these impediments, it would express its nature. Thus, Aristotle’s doctrine that forms (insofar as they are universals) are by nature said of many things does imply the possibility of multiple instantiation principle.

From this principle we may derive the unwelcome conclusion that the world is not necessarily unique, as follows:

1. For all Φ , if Φ is a form, it is possible that there exist multiple instances of Φ .
2. *Being a world* is a form.
3. Therefore, it is possible that there exist multiple worlds.⁵

2 Aristotle’s response: the initial statement of the cosmic nose argument

Aristotle first gives his response as follows:

⁵ When Aristotle first raises the problem that all forms are at least potentially multiply instantiated, he responds that we may imagine a particular possessing a form that is the only instance of this form. For example, suppose that only one particular circle were apprehended. The distinction between the essential nature of circle, i.e. the form of circle, and the essential nature of the particular, perceptible circle would remain intact. But Aristotle’s example of the unique circle does not really show what it is supposed to show. What it establishes is a rather trivial conditional statement. *If* we were to apprehend, or even conceive, a particular possessing a form which is the only instance of this form, *then* we can still make the distinction between form itself and form compounded with matter (278a7-10). But Aristotle has not established the truth of the antecedent condition. All Aristotle says about this is that there is nothing to prevent us from apprehending such a thing, if it were to exist (278a6-7). But this does not establish that

[The distinction between two definitions of form, without matter and in the matter] does not carry with it the necessity of the plurality of worlds, not even the possibility of their coming into being, provided that (as is the fact) our own world contains all the matter there is. (278a25-28)⁶

But then he admits that maybe he could put things more clearly, and he gives the ‘cosmic nose’ example to illustrate:

Suppose ‘aquilinity’ (*grupotês*) to mean a curvature in the nose or in flesh, and flesh to be the matter appropriate to aquilinity. Now if every particle of flesh were made into one mass, and that mass were aquiline, nothing else would be aquiline nor would there be a possibility of anything becoming so. (278a28-32)

Aristotle then gives a slightly different example:

Suppose, again, that the material of a human being is flesh and bones; then if a man were made out of all the flesh and bones in existence, and if they could not be broken up again, then it would be impossible for there to be another man. (278a32-35)

Aristotle finally puts forward the general principle underlying the previous three statements of his argument:

This holds good in all instances, and may be put generally thus: of the things which have their substance in an underlying matter, none may come into being unless a certain quantity of matter already exists. (278b1-3)

This general principle seems correct: in the case of things like noses and *kosmoi*, there must be matter available to constitute them in order for them to come into existence.

there are such unique particulars with their own forms or, if there are, that their forms are not at least potentially multiply instantiated.

⁶ For further discussion of the distinction see *Metaphysics* VII 3, 1029a30; VII 8; VII 11, especially 1037a6.

Nonetheless, Aristotle could have been a bit more careful in his statements of the argument. In the first two statements of it, he says that it's impossible for a world (or a Cosmic Nose) to 'come into being' (*genesthai*) if all of the matter is taken up by the world (or the Cosmic Nose). But this is obviously invalid, since, even if all of the matter is currently taken up, it does not follow that a new world (or Cosmic Nose) cannot come into being in the future—there would still be the possibility of serial Cosmic Noses. This problem is fixed in the third statement of the argument. Aristotle switches from there 'coming into being' to there simply 'being' another person, and he also adds that the person taking up all of the flesh and bones cannot be 'broken up.' One could quibble even with the argument amended in this way—if a man took up all of the fleshy stuff in the universe and were never broken up, it might be possible for another man to be generated if new matter were generated.⁷

Still, we can leave these quibbles aside and take Aristotle to be asserting that the world at all times takes up all the matter that exists at that time; read in this way, the argument avoids the problems mentioned above. With a bit of charity, we construe the argument to run as follows: 'It's not possible that, if the world always takes up all of the matter that exists, there ever exists another world. The world always takes up all of the matter that exists. Therefore, it's not possible for another world ever to exist.'⁸

3 Why use a giant aquiline nose as an example?

⁷ Hankinson and Matthen (forthcoming) point this out, but correctly note that having new matter generated would not be a possibility for Aristotle.

⁸ Plato claimed on quite different grounds that the world takes up all of the matter that exists—primarily because extraneous parts would detract from the perfection of the world, either by rendering it vulnerable to corruption from outside forces, or by allowing for the possibility of the construction of another world out of these parts (*Timaeus* 32c-33a, cf. also 30c-31b). Cornford remarks on this passage, 'He [Plato] is not offering a proof that there cannot be more than one world; he merely asserts that only one was made, because it seemed better that the copy should be unique, like the model.' (Cornford (1997) 42)

Before assessing the cogency of this argument, let's pause for a moment to consider the example of a cosmic nose that Aristotle uses to illustrate his argument. In some ways, it is strange and inappropriate.

For one thing, it would be impossible for there to be a single giant nose taking up all of the flesh in the universe, according to Aristotle's own rhino-ontology: noses are functional items, which are noses only when they are parts of a living body. Detached from bodies, they are noses only homonymously.⁹

Aristotle does use noses as examples fairly often, but the property he standardly associates with noses is 'snubness,' his stock example of a type of form that already has involved in its definition being embodied in a certain type of matter. 'Snubness' is unlike 'concavity' because it means 'concavity *in a nose*.'¹⁰ Aquilinity, as *convexity in a nose*, is a good example to use, insofar as a crucial step in Aristotle's argument for the uniqueness of the world is that the *ouranos* does have, as part of its essence, a special relationship to the five elements, such that it takes up all of each of them. But still, why use 'aquilinity' in this case, instead of 'snubness'?

One plausible guess is that 'snubness' has connotations of lasciviousness and low birth which would be unfitting to the dignity of a cosmic nose. The pseudo-Aristotelian *Physiognomics* discusses the associations of nasal-types with character-types in chapter VI, 811a28-b4, and says that the snub-nosed are salacious.¹¹ Snubness is associated in

⁹ Aristotle makes similar points regarding hands (*Parts of Animals* I 1, 640b35-641a5, *Meta.* VII 11, 1036b27-33) and eyes (*de An* II 1, 412b19-22).

¹⁰ *Meta.* VII 11, 1037a32-35.

¹¹ The testimony of the *Physiognomics* on aquilinity is mixed. Those who have aquiline noses with a marked separation from the forehead, like an eagle, are magnanimous, but those with somewhat hooked (*epigrupos*) noses that rise straight from the forehead are shameless. One of the few other places where Aristotle brings up aquilinity is in the *Rhetoric*. While discussing the destruction of democracies by pushing them to oligarchic and anarchic extremes, he says, 'the aquiline and the snub nose not only turn into normal noses by not being aquiline or snub enough, but also by being too violently aquiline or snub

Greek art with satyrs, who are noted for their lasciviousness. Since no actual satyrs were around to model for their depictions, chances are that they were given snub noses (along with their other stereotypical bodily characteristics) because snubness had a pre-existing association with lasciviousness. The person who most famously instantiates snubness in his nasal matter, Socrates, is explicitly compared to a satyr (*Symp.* 215b), and his lascivious nature alluded to (*Symp.* 216d and *Charmides* 154b-c) although, of course, being Socrates, he was able to overcome this temperament through the use of reason (see e.g., *de Fato* V 10-11, *Tusculan Disputations* IV xxxvii 80-1).¹² On the other hand, aquilinity has much more suitable connotations. Plato has Socrates say in the *Republic* (474d) that a lover praises whatever features his beloved has—snub noses are called ‘cute’, aquiline (*grupos*) noses are called ‘regal’, whereas the nose in between is called ‘well-proportioned’.

Finally, snubness, as a type of concavity, represents a deficiency in matter. The Aristotelian *Problems* states that young children often have snub noses because they have a scarcity (*ekleipsis*) of matter left over from which to produce cartilage for the nose. (33.18 963b10ff.) Since the universe is a plenitude that has no void and contains all the matter that exists, an ample nose is more fitting. Moreover, since the universe is spherical, a surface section of which would be convex, Aristotle would naturally prefer a nose shape that has the correct curvature to model it.¹³

arrive at a condition in which they no longer look like noses at all.’ (*Rhetoric* 1360a26-31, trans. Kennedy (1991))

¹² Similarly, Alcibiades alludes to Socrates’ coarseness of manner in *Symp.* 221d-e. We thank Nick Smith for furnishing the references to Socrates and the tip on satyrs.

¹³ We thank Mark Warren for some of these ideas about the manifold implications of snubness vs. aquilinity.

Even though the cosmic nose example serves a serious purpose—aquility is a good example of a form involved in its definition with a certain type of matter—it is likely that Aristotle is also using it as a joke. He is playing around with one of his standard examples, but (maybe winkingly) switching the predicate, and the notion of one really big cosmic nose evokes a rather strange and comical image, especially since the nose is among the least dignified of bodily parts. Although Aristotle's *corpus* is not generally a rich vein for comedy, many of Aristotle's writing were probably originally lecture notes, and Elders asserts that *de Caelo* I 9 'supposes intercourse with an auditorium' (149). In this sort of situation, it would make sense to liven things up with a bit of humor, and Hankinson (1987) has convincingly argued that some of driest sections of the *de Interpretatione* contain intentional double entendres for precisely this purpose.

4 A modal fallacy?

But let's return to the argument. Reconstructed and tidied up slightly, it goes as follows:

1. Not possible (if the world always takes up all matter that exists, there exists another world.)
2. The world always takes up all of the matter that exists.
3. Therefore, not possible that there exists another world.

We've considered above Aristotle's argument in favor of the first premise. He supplies the general principle that all things which have their substance in an underlying matter must have matter available to them in order to exist. The minor premise is that a world has its substance in an underlying matter, and the conclusion that a world must have matter available to it in order to exist.

We'll consider later Aristotle's argument for the second premise. Aristotle says that in order to show that the world is unique, he needs to demonstrate the following: that our own world is composed of 'the whole sum of natural perceptible body' (278b8-9). Unfortunately, at least as Aristotle presents it at this point, this argument is invalid. It has the same logical form as the following argument, which moves from true premises to a false conclusion:

4. Not possible (if Bjorn is always a bachelor, Bjorn is married.)
5. Bjorn is always a bachelor.
6. Therefore, not possible that Bjorn is married.

If it's impossible both for Bjorn to be always a bachelor and be married, as the first premise asserts, and if he always is a bachelor, as the second premise asserts, it follows that Bjorn is not married, but not that it's *impossible* for him to be married. Likewise, even if Aristotle is right that it would be impossible both for the world always to take up all the matter that exists and for another world to exist, and that the world always does take up all of the matter that exists, all that follows is that there *is* not another world, not that there *cannot* be one. In order to fix this problem, Aristotle needs a stronger second premise, viz.,

2*. *Necessarily*, the world always takes up all of the matter that exists.

5 Reconstruction of the cosmic nose argument

If Aristotle can establish this stronger second premise, it's clear enough how he would have a cogent argument for the necessary uniqueness of the world. But if this argument were to go through, how does it relate to his general metaphysical principle that form is always, at least possibly, multiply instantiated? Would the argument cause serious

problems for his metaphysics elsewhere? And how can he allow that the world is necessarily unique and still maintain that we can distinguish between ‘world in general’ and ‘this world’?

Aristotle’s thinking can be illuminated and shown to be plausible by making analogous points about an Anselmian God, who is ‘that than which no greater can be conceived.’ In *some* sense, we can distinguish between ‘this God’ and ‘God in general,’ that is, between pointing out some particular God and talking about what it is to be a God. Now, normally, once something has a definition, it’s possible for that universal to be multiply instantiated—that’s what it is for something to be a universal. The definition of God is a ‘universal’ in the requisite sense. We can put it like this: Suppose that we assert the following: ‘*x* is a God’ *dff.* ‘*x* is omnipotent, omniscient, all-good, [etc.]’ Since ‘*x*’ is an open expression, we’d normally think it at least *possible* for multiple individuals to fill in for ‘*x*’: ‘Osiris is a God,’ ‘Amon is a God,’ etc. But there’s a quite good (and non-*ad hoc*) reason to think that ‘God’ is a special case, as far as that’s concerned.¹⁴ When we think of what’s involved in e.g., being omnipotent, we should see that, once there is a God (let us call Him ‘Yahweh’), it would be impossible for there to be any Gods in addition to Yahweh.

The pressing question, of course, is how Aristotle’s line of thought can be fit into a similar mold. In the case of an Anselmian god, uniqueness is a happy consequence of His definition, but in the concepts of *ouranos* or *kosmos* there doesn’t seem to be

¹⁴ That is, God’s uniqueness follows naturally from other characteristics in His definition; it’s not just arbitrarily stuck into the definition, unlike the way in which ‘existence’ is arbitrarily part of the definition of the term ‘Remartian’ (which is, by definition, a ‘really existing, intelligent creature native to the planet Mars’), which Mackie makes up in his discussion of Descartes’ version of the Ontological Argument (Mackie (1982) 42-3).

anything that would provide an analogous limit and thus produce the same happy consequence. Surely, it seems that multiple *kosmoi* are not conceptually impossible.

However, even though the route is much more circuitous, and the reasoning more tortuous (and open to dispute), the fundamental sort of argument is not that different from the Anselmian one given above. The key passage is 278b21-279a11. Aristotle's line of reasoning, in which he tries to establish premise 2*, goes something like the following:

1. If there cannot be any bodily mass beyond the heaven (i.e., beyond the outermost circumference of the world), then necessarily the world always takes up all of the matter that exists.¹⁵ (278b21-24)
2. If no simple body (i.e., a body made up of one of the elements) can be beyond the heaven, then there cannot be any bodily mass beyond the heaven. (278b25-27, 279a1-2)
3. The three simple bodies are the 'body that revolves around,' (i.e., the aether), the 'body that moves away from the center' (i.e., fire and air), and 'the body that moves toward the center' (i.e., earth and water).¹⁶
4. The aether cannot change its place and is in within the outer circumference of the world. (278b28-29)
5. Thus, the aether cannot be beyond the heaven. [from 4]

¹⁵ In their forthcoming commentary on 279a6, Hankinson and Matthen note that Aristotle seems to reverse the direction of inference at the end of his argument, which has caused some people to revise the text here. However, they correctly add that such a change isn't warranted, since the antecedent and consequent really turn out to be equivalent. For this reason, this premise could really have been replaced with a biconditional, but for simplicity of exposition, we won't do so.

¹⁶ It's quite awkward that, given Aristotle's main method in the *de Caelo* of defining elements by their natural motions, there really ought to be three elements instead of five--though he does sometimes speak of three elements (e.g., *de Caelo* III 1, 298b7-9). But being committed to five (if indeed he is) causes difficulties later on in the *de Caelo*, e.g., see book IV chapters 4 and 5. Questions are left unresolved, such as where exactly the natural place of water is—is water's natural place at the center, but it is simply forced out of that place by the heavier earth, or is its natural place the 'surface' of the sphere that would be formed

6. If fire, air, water, or earth were to be beyond the heavens naturally, then they would have to have their natural place beyond the heaven.
7. The natural places of fire, air, water, and earth are not beyond the heaven.
(278b31-32)
8. Therefore, fire, air, water, and earth cannot be beyond the heaven naturally.
(278b30-31) [from 6 and 7]
9. If fire, air, water, or earth were to be beyond the heaven unnaturally, then the region beyond the heaven would have to be the natural place of some other element. (278b32-b34)
10. The region beyond the heaven is not the natural place of any element.
(278b34-35)
11. Therefore, fire, air, water, and earth cannot be beyond the heaven unnaturally.
(278b29-30) [from 9 and 10]
12. If fire, air, water, and earth are beyond the heaven, they are there either naturally or unnaturally. (278b25-27)
13. Fire, air, water, and earth cannot be beyond the heaven. [from 8, 11, 12]
14. Therefore, none of the simple bodies can be beyond the heavens. (278b35-279a1) [from 3, 5, 13]
15. Therefore, there cannot be any bodily mass beyond the heavens. (279a6-7)
[from 2, 14]
16. Therefore, necessarily the world always takes up all of the matter that exists.
(279a7-8) [from 1, 15]

if all of the earth had gotten as close to the center of the *kosmos* as it could? Fortunately, none of these questions have an impact on the argument presently being considered.

The structure of the argument is quite clear, but as it stands, it's also quite unconvincing. Several of the premises are fairly straightforward or depend on fundamental points of Aristotelian cosmology and motion that he believes he has earlier established (1, 3, 4, 6, 12). Premise 2 is established by a sub-argument: any body beyond the heavens would have to be either simple or composite, and if a composite beyond were beyond the heaven, a simple body would need to be also, since a composite body is made up of simple bodies. Also, here at least, in the beginning and end of the passage, Aristotle does spell out the key premise of his overall argument with the proper modality attached—this world *of necessity* takes up all of the matter that there is.

However, premises 7 and 10 are central to this argument, and they are not defended at all in this chapter of the *de Caelo*. Instead, Aristotle defends these claims in his earlier argument for the necessary uniqueness of the world in I 8. That argument goes, briefly, as follows: if there were multiple *kosmoi* that really had the same form as ours did (and were not simply called '*kosmoi*' homonymously), they would have to be composed of the same sorts of elemental bodies as ours is. But what makes each of the elemental bodies the sort of thing that it is is its natural place. So each of the elemental bodies has one natural place, from which it follows (through further argumentation) that there will be only one *kosmos* (276a22-b21). Aristotle then raises the objection that there could be many *kosmoi*, the elements within each having the same form because they each move toward the center, periphery, etc., of their *kosmos*, so that they have the same *sort* of natural place, even though these places are numerically distinct. Aristotle's response to this is obscure, but mainly involves asserting that mere change in location cannot be enough to account for change in form, where earth in one *kosmos* has a different natural

place than earth in another. If the elements really are identical in form, the ‘same rule’ must apply to all; i.e., each portion of that element must have the same—*numerically* the same—natural place (277a1-12). As Hankinson and Matthen (forthcoming) note, the considerations that Aristotle advances here and elsewhere in I 8 for such a strong conception of sameness of elemental form are ‘inconclusive.’ Thus, it seems that Aristotle’s defense of premises 7 and 10 is not adequate to convince the sort of opponent who admits that the world has a form (it is a unified whole), but then presses the point that there could be other worlds which embody the same sort of form—they too would be unified wholes whose materials exhibit the same sort of organization as does our world.

Let us then summarize our view of what is going in the ‘cosmic nose’ argument as a whole. What makes the world the sort of thing it is—a world, and not merely a jumble of stuff—is that it is an ordered unity of the various elemental materials. (That is why *ouranos*, like aquilinity, is a form that already has a certain type of matter involved in its essence.) And, just as the essences of the various organs of a human body can be understood (and are what they are) only in relation to their functional role within the organism as a whole, so too, each parcel of the elemental materials is the sort of thing it is only in relation to its natural place within the world.¹⁷ So, given the essence both of world and of the elements, it is necessary that the world take up all of the matter that ever exists. And from this, it does follow that necessarily the world is unique.¹⁸

¹⁷ See Hankinson and Matthen (1993), especially pp. 428-33, for a more extended discussion of how the form of the world as a whole determines the forms of each of the elements that constitutes the world and the way in which this type of non-reductionist ‘top-down’ explanation fits within Aristotle’s metaphysics and understanding of explanation generally.

¹⁸ Thus we disagree with Matthen’s claim that Aristotle begs the question against the atomists by defining the universe as ‘the totality’, thereby excluding the possibility of multiple worlds (Matthen (2001) 174). As we see it, Aristotle’s cosmic nose argument *is* an attempt to rationally establish the necessarily unique status of the universe—this is a consequence of the definition *and* crucially, his account of the natural places of the elements. But we should note Matthen also remarks (177) that Aristotle is not simply begging

The form of the world cannot be multiply instantiated, and so, formally speaking, Aristotle resolves the inconsistency between his three principles by rejecting the possibility of multiple instantiation principle. However, he is able to do so while still retaining the crucial tenet behind that principle: insofar as forms are universals, they have a logical form that makes them apt to be predicable of many things. Since forms are, by their nature, said of many things, in almost all cases a form is at least possibly multiply instantiated. However, in the case of the form of the world, the impediment that prevents it from expressing this nature is not something contingent, such as a zeppelin holding a clod of earth aloft. Instead, it is the essence of the world itself and the elements that compose it that necessarily prevent this form from being multiply instantiated. This is analogous to how the essence of the Anselmian God makes it impossible for more than one of Him to exist. If this is right, uniqueness *is* a happy consequence of the definition in both cases, contrary to what we say above. A person may believe that he can coherently imagine the possibility of multiple worlds, but as in the Anselmian case, this would involve having an incomplete understanding of what's involved in being a 'world' (or an Anselmian 'God').

Because Aristotle is not able to establish the crucial premises regarding the impossibility of formally identical but numerically distinct natural places, the Cosmic Nose argument is also unsuccessful. But granted the premises, the argument does succeed in establishing the necessary uniqueness of the world. And, perhaps even more importantly, Aristotle is able to show how he can regard the world as necessarily unique and still consistently maintain the distinction between 'this world' and 'world in general,'

the question; he is also proposing his definition of the universe as a first principle in order to facilitate the scientific study of the cosmos.

as well as his contention that, generally speaking—perhaps with the world itself as the only exception—forms can be multiply instantiated.¹⁹

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