THE QUESTION OF PLACE IN ARISTOTLE'S PHYSICS

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The discussion of place in Aristotle's Physics contains one of the book's fullest statements regarding the manner in which one should conduct a scientific inquiry. This statement helps to elaborate on remarks in the opening chapter of the whole work, where Aristotle had said that while science itself must begin from the principles of the beings under investigation, the natural pathway to discover those principles is to proceed from what is better known and clearer to us toward what is clearer and better known by nature. He had mentioned there, as examples of what is better known to us, the beings as they appear to sense perception, and he had argued that our familiarity with these perceptible wholes is the natural beginning point for inquiry into their intrinsically more knowable principles. In the discussion of place, however, he makes it explicit that the pathway to science must also include some reliance on our beliefs about the matters in question, beliefs that we all bring with us prior to reflection, and that incorporate much of our initial grasp of the world. Now this reliance on our beliefs is not unproblematic, at least not in the case of our beliefs about place, since some of them give rise to such perplexities that the very existence of place must be called into question (209a29-30). And yet Aristotle still asks us to assume that those things that are truly believed to belong to place do belong to it in fact (210b32-34). Later, we shall examine in detail the attributes that he has in mind. But for now it is more important to note that he does not ask for our unqualified trust in the assumption that place possesses them. What he suggests, rather, is that by

beginning from the mere postulate that it does, i.e., a postulate regarding the kind of thing place is, we can hope to arrive at genuine insight into what it is, insight on the basis of which we could finally be certain, not only that it exists, but also that it possesses these very attributes. As he states the matter in his own words, "On the basis of these assumptions [namely, that place possesses the attributes in question], one must contemplate what remains. And one should try to make the inquiry in such a way that its 'what it is' will be given, in order that the perplexities might be resolved, that the things believed to belong to place will indeed belong to it, and also that the cause of our discomfort and of the perplexities regarding it will be manifest. For this is the most beautiful way in which each thing could be brought to light" (211a6-11). Aristotle does not assure us, however, at least not in this passage, that so thoroughly satisfactory an answer to our questions about place can be attained. All he has said is that "one should try" to inquire in such a manner that the truth about place would be brought to light in this "most beautiful" way. But can all this be done? The answer to this question would shed considerable light, moreover, on the more general question of how Aristotle understands the pathway from our initial beliefs about the world to a genuine knowledge of its true character. And it is with these questions in mind that I propose to try to interpret his discussion of the problem of place.

Aristotle begins his discussion by saying that the student of nature must know about place, that is to say, whether it exists or not, in what manner it exists, and what it is (208a27-29). This topic, he says, raises many perplexities, for despite

the universal assumption that the things that are are somewhere, or in some place, all the attributes that are thought to belong to place do not appear, upon consideration, to belong to any one and the same thing. Before turning to these perplexities, however, Aristotle presents the arguments that are thought to make it clear that place exists. The first of these is based on the replacement of bodies by one another. Water, for instance, sometimes departs from where it was, as from a vessel, and is replaced by air; or perhaps some other body comes to occupy this same place, which is thought, accordingly, to be something different from all the bodies that move into it or from it. A second argument, which seems to show that place, in addition to being something, has some power, is based on the motion of each of the natural elements to its own place. For the natural motion of light bodies upward and of heavy ones downward seems to show that at least these two places, the up and the down, are distinguished not merely by their position in relation to some arbitrary observer, but also in nature itself, by their having different powers or capacities. Aristotle goes on to claim that those who say that the void exists also imply the existence of place, since the void would be place deprived of body. And from these arguments, he says, one might come to assume that place is something apart from or beyond the bodies, and that all perceptible body is in place. One might even come to believe that Hesiod was correct to make Chaos, or the yawning chasm, the first of all things that came into being. Hesiod began his theogony in this way on the assumption that there must be a space or room for the beings before anything else can exist, an assumption rooted in the belief, which he shared with the many, that all things are in

a place. Aristotle adds that if Hesiod is right, the power of place would be something marvelous; for if nothing else can exist without place, while place in turn does not perish with the destruction of the things in it, it must indeed be the first of all things. Yet this magnification of the status of place would seem to be only an extreme consequence of the common view according to which place is a universal container for all moveable bodies, a container that itself remains unaffected despite the changes among the bodies it contains (208b1-209a2; cf.205b31-34).

After presenting these arguments that place exists, Aristotle then turns to the perplexities regarding what it is, perplexities, to repeat, that compel us even to wonder whether there is such a thing. With one exception, these perplexities are not arguments of his predecessors, to which he might feel he must respond, but rather they are difficulties that he raises himself because of their intrinsic importance. He begins by asking whether place is a kind of bulk or volume of a body or else some other kind of nature. He asserts that it has the three dimensions of length, breadth, and depth, by which all body is defined, so that it would seem to be something bodily; and yet he says that it cannot be a body, for in that case two bodies, the place and the body it contains, would coincide. Aristotle's second perplexity brings out the difficulty of distinguishing a place, or the space that a body occupies, from that body itself. He argues that if there is a place of a body, then so too must there be a place of a surface, a line, and a point. But a point, he continues, does not differ from the place of a point, and so neither should the place of any of these other things, including the body, be anything apart from the things themselves. Aris-

totle calls the existence of place into further question by arguing that as something bodiless that nevertheless has magnitude, it can be neither an element, whether bodily or intelligible, nor composed of the elements. For the elements of the perceptible beings, he says, are [also] bodies (cf. Metaphysics 1014a26-35; On the Heaven 306a9-11), while no magnitude comes into being from the intelligibles. His next claim, which calls into question the earlier argument that place is somehow responsible for the natural motions of bodies, is that none of the four kinds of causality belongs to it: it is, he says, neither the material of the beings, nor their form, nor their end or goal, nor an initiating source of their motions. Aristotle then brings up Zeno's argument that if place is one of the things that are, and if everything that is is in a place, then there would have to be a place of the place, and so on to infinity, which seems absurd. And finally, he raises a difficulty based on the common assumption that the place of each body is neither smaller than nor greater than the body itself. For this equality of place with the body it contains seems to entail that the place of growing bodies must grow along with them, and this too seems absurd (209a2-30; cf. 216b2-16).

We see that most of these arguments have fastened on the difficulties in the common view of place as a spatial extension, or a kind of room, which is occupied by the body that coincides with it at any given time.[1] But Aristotle has also argued that place is not the cause of anything, and in the course of this argument, he claimed, among other things, that it is neither matter nor form. He made these claims without discussion, as if they were evident truths; but in the immediate sequel he returns

to these suggestions that a body's place is its matter or else its form, and he now brings forward a number of arguments to show that it can not be either of them. He gives all these arguments, moreover, despite prefacing them with the remark that it is easy (οὐ χαλεπὸν, 209b22) to see that place is neither matter nor form. And what is more, even after this thorough refutation of the two suggestions, he returns to them again, and again rejects them, as part of the argument that leads up to his own proposal of a definition of place. The fact that Aristotle considers, and reconsiders, the notions of place as matter or else as form, in the face of his own assertion that it is easy to see that it is neither of them, is perhaps the most surprising feature of this whole discussion. Let us try to see, then, why he dwells at such length on these particular misconceptions.

Aristotle continues his account of the perplexities regarding place by distinguishing the common place, which contains all bodies, from the private or particular place in which each body is primarily located. Thus you, he says, are in the world (ἐν τῷ οὐρανῷ, 209a33) because you are in the air, which is in the world, and you are in the air because you are in (or on) the earth, and you are on the earth because you are in the place that surrounds nothing more than you. Now Aristotle seems to suggest that only this last, or utterly particular, place is the place of a body in itself, and that it is only by virtue of being in such a place primarily that it can also be said to be in a larger one. This assumption, at all events, is the basis of most of his subsequent discussion; and it leads, in particular, to the suggestion that if place is what first surrounds each body, it would be a kind of limit, so that the place of each thing could

be thought to be its form or its figure (τὸ εἶδος καὶ ἡ μορφὴ ἑκάστου, 209b3), by which the material of its magnitude is delimited. On the other hand, he continues, insofar as place is thought to be the extension of a magnitude, it could be thought to be its matter. For by the extension of a magnitude Aristotle means, in this context, an indefinite extension, one that is surrounded and made definite by form, as by a limiting surface. And such, he says, is matter or the indeterminate, on the grounds that nothing else is left -- in the sphere, for instance -- when its limit and its characteristics (τὸ πέρας καὶ τὰ πάθη, 209b10) are removed.[2] Aristotle adds that it is with these considerations in mind that Plato spoke in the Timaeus of matter, or of that which participates in the intelligible, as being the same as space or place (209a31-b17; cf. 207a21-26; 209b33-210a2; Plato, Timaeus 51a7-b1; 52a8ff).

While the authority of Plato seems to give a certain weight to the identification of place with matter, it is harder to see any merit in the suggestion that it is a body's form. But the need to be clear about what matter is in order to know whether or not it is the same as place, together with the intimate connection between matter and form, may be sufficient reason for considering both of these two suggestions. As Aristotle says, it would reasonably be thought difficult to know what place is if it is either matter or form, since these require the highest contemplation, or the keenest scrutiny (τὴν ἀκροτάτην ἔχει θέαν, 209b20), and it is hard in particular to know either of them without the other. Aristotle adds, however, as I have already mentioned, that it is easy to see that place cannot be either matter or form. For neither of these, he says, is [ever] sepa-

rated from that thing whose form or matter it is, whereas its place can be, as for instance when air and water exchange places with one another. Such displacements among bodies, he continues, show that the place of each thing is neither a part of it nor a condition that characterizes it (οὔτε μόριον οὔθ' ἕξις, 209b27), but instead is separable from it. Aristotle confirms this rejection of the two suggestions by adding that place is thought to be something like a vessel, which he calls a moveable place, and which also, he says, is nothing of, or belonging to, the thing (209b17-30).

Aristotle's argument has thus distinguished the place of each thing, as something separable, from its matter and its form, which are understood to be inseparable from it -- apparently on the grounds that they each belong to the thing, either as a part or else as a condition that characterizes it.[3] Yet though it is clear that a condition of a thing, as for instance the health of a body, cannot be separated from the thing itself (except in thought), this is not so obvious in the case of the parts. For a composite whole can sometimes be broken down into its parts without any damage to the parts themselves. And to return to our original question about matter and form, though it seems reasonably clear that the form of a thing cannot be separated from it -- at least not if we mean by "form" the kind of contour that could conceivably be identified with place -- there are doubts that arise with regard to matter. For though matter, according to Aristotle, is necessarily bound up with form, it might still be separable from any one particular form or thing.[4] Indeed, if air and water share a common material, as Aristotle himself sometimes suggests that they do, this matter would retain its identi-

ty in the transformation from the one element to the other, and it would thus be separated from the first one.[5] Now even if this were true, it would not show, of course, that matter is place. But the possibility does seem to show a weakness in Aristotle's argument as to why it is not.

This difficulty helps to explain why Aristotle proceeds to introduce a number of other arguments, beginning in particular with a partial repetition of the first one, in which the separability of a thing's place from the thing itself is used to distinguish it only from the form of the thing, and no longer from its matter. The distinction between place and matter is now said to be instead that a place surrounds or encompasses the thing whose place it is, whereas its matter does not. Now as Aristotle's analogy between a place and a vessel has already indicated, he does not mean that the place of a thing encompasses it in the sense that a circumference does a circle, but rather as something distinct from the thing itself. Accordingly, he adds that what is somewhere is always thought to be something that has something else external to it. And the thought that the place of a thing, as opposed to its matter or its form, is something external to it seems also to be the primary basis for Aristotle's next two arguments. Thus, he asks how anything could move upward or downward to its own, or proper, place if place were either its form or its matter. And he argues that if a thing's place were something in it, as its form or figure (μορφὴ, 210a6) and its matter both are, then there would have to be another place, i.e., a place in some other sense of the word, for this one; for whenever a thing moves from one place to another, its matter and

its form also move, or change place, along with it (209b30-210a9).

Aristotle has now repeated the claim that the form of a thing is inseparable from it, though he no longer says this about its matter, and he has also added a number of arguments that do not require the assumption that either of these belongs to the thing inseparably. But in the next and final argument of this series, he apparently returns to the claim of inseparability, with regard to matter as well as form. He begins this argument by asserting that when air is changed into water, the original place no longer exists. But what sort of perishing, he goes on to ask, can there have been? Now it is best, I think, to interpret this somewhat difficult argument in the light of its context, in which Aristotle has been arguing that place is neither matter nor form. Accordingly, its major premise, that the transformation of air into water entails the destruction of its place, is based on a view of place as matter or else as form. Aristotle would again be implying, then, that both the matter and the form of a thing are inseparable from it, and he uses the commonsensical assumption that place is not destroyed in the transformation of elements in order to reject these two hypotheses about what it is. Now whether or not I have correctly interpreted this argument, Aristotle's commitment to the inseparability of matter, in particular, is confirmed later, when he returns to the hypothesis that place is matter. For in again rejecting this suggestion, he merely asserts -- with a reminder that he has said this before -- that a thing's matter is neither separable from the thing nor does it surround it (212a1-2). But if Aristotle is so confident that matter is inseparable from the

particular thing that it belongs to, why did he seem to retreat from this claim earlier? And how would he respond to the counter-claim that is based in part, at least, on statements of his own?

Aristotle provides no explicit answer to this question about the basis for his assertion of the inseparability of matter. Instead, he goes on to supplement his account of the perplexities regarding place (210b31; cf. 210a11-13) with a summary of the various ways in which one thing is said to be in another, along with a lengthy discussion of whether anything can be in itself. He uses his account of the different senses of the word "in" in order to respond to Zeno's objection that place itself must be in a place. But the conclusion of this whole section suggests that it is also meant as a continuation of the preceding discussion, for it reasserts that place is neither matter nor form. And yet this conclusion is somewhat puzzling, since nothing in this new section has added any weight, or at least not evidently so, to the grounds for rejection of either of these hypotheses (compare 210b27-31 with 209b28-30). Let me propose, therefore, that this section might also have an ulterior purpose, namely, to strengthen the case against the view of place as matter by sketching -- between the lines, as it were -- the outline of an argument that the matter of a thing is inseparable from it.

To see that this is so, let us turn first to Aristotle's discussion of the question whether something can be in itself. He says that this is not possible, except in the sense that one part of a thing can be in another and that we sometimes speak, in such a case, of the whole thing being in itself. Thus, for instance, when a certain measure of wine (an amphora) is in a

certain kind of vessel (an amphora), the amphora of wine can be said to be in itself. Now this manner of speaking presupposes that we can apply a term (such as "amphora") to a composite whole although our primary reference is to one or another of its parts, and to help illustrate that this is done, Aristotle offers a pair of additional examples. He says that someone can be spoken of as white, although it is the surface of his body that is white primarily, and likewise that he can be spoken of as a knower because of the knowledge in the rational part of his soul. These two examples, moreover, turn out to be particularly relevant in connection with our unresolved question about matter, since they call attention to body and soul as such, which Aristotle regards as being related to one another as matter and form (cf. On the Soul 412a17-21; b6-9). Here, it is true, he speaks less precisely of the soul and the body as parts of a human being, and he even suggests an analogy between the soul in the body and the wine in the amphora (210a25-b4). And yet this very analogy leads us to raise the question of whether the human soul and the human body can exist apart from one another, as the wine and the amphora clearly can. And whatever we may think regarding the fate of our souls, we know that the human body can not exist separately, but rather begins to decompose once the human being has died. Thus we have found one case, at least, in which the matter of a being is clearly not separable from the being as a whole. More generally, since Aristotle understands the matter of a being as that in which form is immediately present, as distinguished from any underlying constituents into which this matter can be broken down (cf. 193a9-12 and Metaphysics 1014b26-32 with Metaphysics 1017a5-6), the matter of all living beings, at least,

is inseparable from those beings. Still, the question remains of whether what is true in these cases is universally true in nature, and in particular, whether it is true in the case of the elements -- such as water and air, for instance, which serve so frequently as illustrations in this discussion of place. Can Aristotle's claim that the matter of each thing is inseparable from it be justified even in these cases? Or must we say, as has been suggested earlier, that the elements share a single, common matter that retains its identity throughout their transformations into one another?

To answer this question, it is helpful to note that in the present context, in his listing of the various senses in which one thing can be in another, Aristotle uses the term "form" both in the sense of a condition or character present in matter and also in that of a species, as when we say that a species is in a genus (210a17-21). He thus reminds us that any form, including those of the simplest bodily elements, is the form or character of something particular, and of something, moreover, that belongs to a class or species whose members are all alike with respect to their form. Now since the members of each species do not differ in form, it must be something other than form that accounts, or accounts most directly, for the fact that each of them is the particular being or particular thing that it is. And if each such thing is a composite of form and matter, as Aristotle claims, then that something other than form would have to be its matter. This is not to say that matter can account by itself for the particularity within each species. For matter, according to Aristotle, is nothing determinate in itself, but is so, to the extent that it is, only in its togetherness with a definite form.

Or in other words, matter is what it is only as that, apart from the form, which necessarily enters into the constitution of each particular thing.[6] Now this is hardly a complete statement of what Aristotle means by "matter," but it is sufficient for our present purposes. For if matter is what it is only as belonging to some particular thing, it is clearly inseparable from that thing, or in the case of the four elements, from that portion of the element whose matter it is. And we can understand why Aristotle speaks even of these elements as having matter without our having to imagine it as some characterless substrate that maintains its "identity," whatever that would mean, throughout their transformations into one another.[7]

The view of matter that I have outlined here justifies Aristotle's claim that the matter of each thing is inseparable from it; and we have thus completed our interpretation of his argument that place is neither matter nor form. But despite the importance of a discussion of form and matter, the question remains, given the ease of distinguishing either of these from place, of why this discussion is given such a prominent role in an account of place in particular. What of importance does it contribute to our understanding of place? Let us continue to keep this question in mind as we turn from Aristotle's treatment of the perplexities regarding place to his attempt to say positively what it is. This attempt, as we noted earlier, begins from the assumption that place does indeed have the attributes that are truly believed to belong to it in itself. We are asked to assume, in particular, that place surrounds or contains the thing whose place it is, and that it is not anything that belongs to the thing. Next, we are asked to assume that the primary

place of a thing is neither smaller than nor greater than it is, but rather, as Aristotle says elsewhere, that it is equal to it. We are also asked to assume, regarding this primary place of each thing, that it can be left behind by it, while remaining as something separate. And finally, we are asked to assume that all place includes the "up" and the "down," and that every body moves naturally either upward or downward to its own or proper place, where it then naturally remains (210b34-211a6; cf. 211a28, a33).

After listing these preliminary assumptions about place, Aristotle then presents the outline, which I quoted at the beginning of this paper (cf. page 2), of that "most beautiful" manner ín which one might hope to explain it. And he begins his attempt to carry out this program with the observation that there would be no inquiry regarding place if there were no locomotion, i.e., change of place. In the absence of such motion, he implies, we might speak -- if speech were possible -- of various parts in a larger whole, but we would never distinguish one thing from another so completely as to say that anything was in a place. Thus, he continues, it is chiefly because the heaven (τὸν οὐρανὸν, 211a13-14) is always in motion that we suppose it to be in a place. Aristotle goes on to say that what is in motion is so either in itself, and actually, or else only by concomitance. And of things that are in motion by concomitance, there are some, he says, such as the parts of a body or the nail in a ship, that have the potential to move in themselves, and others, such as whiteness or science, that do not. For these [conditions], he explains, change place [only] in the sense that that in which they are [ultimately] present does so (211a12-23).

Aristotle's emphasis on the connection between place and bodies that change their place is in keeping with our assumption that the primary place of each thing can be left behind by it. He next turns his attention to the additional assumption that this primary place is also equal to the thing in it, while still sharing with place in the broader sense the characteristic of surrounding that thing. We say, he tells us, that something is in the world (ἐν τῷ οὐρανῷ, 211a24) as a place because it is in the air, which is in the world; and we say that it is in the air, though it is not in all the air, because of the extremity of air that [immediately] surrounds the thing in question. For if all the air were its place, he continues, the place of each thing would not be equal to it, as it is believed to be. Aristotle adds, however, that when a container is continuous with what it contains, this latter is not said to be in the former as in a place, but is spoken of as a part in a whole. On the other hand, he says, when the container is divided from and contiguous with what it contains, this latter body is primarily in the extremity of the container. He contends that this extremity is neither a part of what is in it nor greater than its extension, but is rather equal to it, on the grounds that the extremities of contiguous bodies are together (literally, "in the same," ἐν ... τῷ αὐτῷ, 211a33-34; cf. 226b21-23). And finally, to help distinguish between these two kinds of containment, he goes on to say that what is continuous with its container, as the hand is with the body, does not move in it, but rather with it, whereas that which is divided from its container, as for instance water in a jar, does move in it, and does so equally whether or not the container is in motion itself (211a23-b5).

Though Aristotle has surely suggested in this passage that the extremity of a surrounding body, at which it is in contact with the one it surrounds, is the place of this latter one, he has not yet said so explicitly. Moreover, he does not say this in the immediate sequel, but rather treats this suggestion as only one of four alternatives, including even the previously rejected ones of matter and form, that he now mentions as the possibilities for what place might be. And it is merely on the basis of having rejected the three other alternatives that he finally concludes that it must be this remaining one (212a2-6; cf. 211b6-9). Now it is puzzling that Aristotle should use this argument by exclusion as the grounds for his proposal of a definition. He does, it is true, offer a kind of formal justification for it, since he begins with the claim that place must necessarily be one of a number of alternatives; but he does not explain how he came up with his own list of these, and he clearly suggests that it may not be exhaustive (σχεδὸν ... τέτταρά ἐστιν ὧν ἀνάγκη τὸν τόπον ἕν τι εἶναι, 211b6-7; emphasis mine).[8] He does not even explain, moreover, the basis for his disregard of the alternative he had mentioned previously that there might not even be such a thing as place. And so let me suggest that he deliberately employs a visibly inadequate argument for his proposed definition, and that he does so in order to call attention to some difficulties in the proposal itself. For even if it avoids circularity, i.e., if the togetherness of the extremities of the two bodies is not in the strict sense sameness of place,[9] the fact remains that the extremity of the surrounding body is not equal, as Aristotle has claimed it is, to the extension of the body that it surrounds. For the extremity of a body, or a

two-dimensional surface, is not even comparable in terms of size to a whole body, which is three-dimensional. Thus, a definition of place as such an extremity does not truly correspond to our assumption that the place of a body is equal to it.[10] Secondly, there is a difficulty, at least whenever the surrounding body is not a solid, regarding the premise that place is separable. For even though the surface of air, for instance, in contact with a moveable body can be left behind by that body, it does not survive, as a distinct surface, after the body has moved away. To the extent, then, that such fluid surfaces are meant to be covered by the proposed definition of place, it fails to correspond to another one of our preliminary assumptions. And finally, Aristotle has explicitly allowed that the container in whose extremity a body is primarily found might itself be in motion. But if this extremity is the place of the contained body, then it would seem to follow that place could be in motion, even if only by concomitance, and this seems odd. For we tend to think of place as something unchanging (cf. 212a18-19). That these are genuine difficulties with the proposed definition is confirmed, I think, by the character of the one new alternative that Aristotle considers here before proposing it explicitly. For this new alternative at least claims to make of place something equal to the body it contains, as well as being both permanent and unmoved. What it says is that a place is an interval or extension between the extremities around a body, an interval that remains forever and into which various bodies can enter in turn (211b7-8; b14-20; 212a3-5). Now this view of place, though it is here stated explicitly for the first time, is of course not really new to Aristotle's discussion. It was already suggested by the

initial arguments that place exists, and many of the subsequent perplexities have presupposed that something more or less like this is what people mean by the term. It is not surprising, moreover, that this view of place should be widespread, since it is indeed plausible or seductive. And given the difficulties that we have pointed to in Aristotle's own account, it at least makes sense that he should delay his proposal until after he has provided a critique of this alternative.

Aristotle says that there are, roughly speaking, four alternatives of which place must necessarily be one. It is, he says, either form (μορφὴ, 211b7), or matter, or a certain interval -- namely, the one between the extremities -- or else it is the extremities, if there is no such interval apart from the magnitude of the body that comes within them. And it is manifest, he continues, that place can not be any of the first three of these. Now Aristotle prefaces his arguments against these views of place with a brief account of why they might seem persuasive. Thus, he begins by saying that it is because it [also] surrounds that form (ἡ μορφὴ, 211b11) is believed to be place. For the extremity of the surrounding body, he continues, is coincident (literally, "in the same," ἐν ταὐτῷ, 211b11; cf. a33-34) with that of the one it surrounds; and as a consequence, they might appear to be the same thing. But Aristotle replies that these extremities differ by their not belonging to the same thing, since the form is the limit of the thing in place, whereas the place is that of the surrounding body (211b5-14; cf. note 8).

Having thus again dismissed the suggestion that place is form, Aristotle now turns to the one that speaks of it as the interval between the extremities. He says that because the

surrounded body often changes [its place] while the one that surrounds it remains -- as for instance when water flows from a vessel -- what is in between is believed to be something, an interval, on the supposition that this is something apart from the moving body (211b14-17). Now it is not at all clear why such an occurrence should lead people to believe that there is some interval within the vessel apart from the body or bodies that it contains. But for now let us pass over this difficulty, since Aristotle will offer much the same account of this belief a bit later, and his additional explanation there, in conjunction with the intervening argument, makes it easier to understand his assertion.

In response to this view of place as an independently existing interval, Aristotle begins by denying that there is any such thing between the extremities of a surrounding body. Rather, he says, some chance body, among those that move and whose nature it is to be in contact [e.g., with the surrounding body], falls within it. He continues by arguing that if there were some interval that existed by nature and that remained [permanently] -- as those who believe in these independent intervals suppose that they do -- there would have to be infinitely many places within the same one. For when the water and the air move (μεθισταμένου, 211b21), he says, [as for instance when air displaces the water in a vessel, or when the vessel is merely carried to a new place,] all the parts within the whole [of the moving body or bodies] will do just what all the water in the vessel does, i.e., they will change place (211b18-23). And though Aristotle does not say so explicitly, it would seem that these infinitely many places of the infinitely many parts would

have to be an actual infinity -- the kind that he argues elsewhere does not exist (cf. 206a9-207b15) -- even though the parts themselves would not. For the claim that the interval within the vessel is independent of it, and thus actually in existence, whether or not the vessel remains there to surround it, implies that the places of the parts of the moving bodies are also actually in existence, even though these parts themselves exist only potentially until they are somehow marked off from the whole.[11]

Aristotle continues his rebuttal by asserting that the view in question would make of place itself something that moves, or changes its place, so that there would be another place of the first one and many places would be together. The situation he has in mind here is that of a vessel with fluid in it being carried as a whole to another place; when this happens, he argues, the interval within the vessel -- or the place of the fluid, as it is claimed -- would also move to another place, and thus the two places would coincide. Now the advocates of place as an independent interval might indeed refuse to acknowledge that such a place is ever moved along with a body.[12] But though there is no internal inconsistency in this refusal, it does not correspond to our experience of the world. For it would compel us to deny, for instance, that equipment stored in a moving vehicle could ever remain in the same place, and this doesn't make sense.[13] Or as Aristotle goes on to say, "when the whole vessel moves, the place of the part, in which it moves (μεθίστηται, 211b26), is not different [from moment to moment], but the same. For the air and the water or the parts of the water move (or, 'displace one another,' ἀντιμεθίστανται, 211b27;

cf. 209b25) in the place in which they are, and not in the place in which they come to be, which is a part of the place that is the place of the whole world" (211b25-29).

Now though Aristotle has here criticized a view of place that would make of it something that moves, he acknowledges himself that this is true of it, at least in a sense. For the place that remains the same as the whole vessel moves must, if only by concomitance, be in motion as well. Still, his main argument here against those who think of place as an interval is that on their view the moveable place must be in, i.e., coincident with, another place (cf. ὥστ', 211b24; 216a26-b12), and this he is not compelled to admit. For if a place is the adjacent surface of a surrounding body, it is not, unlike the body to which it belongs, surrounded by another body or in a place (cf. 210b22-27; 212b27-29). But if, on the other hand, it is an independently existing interval -- and thus ultimately, as Aristotle has shown, an actual infinity of such intervals -- any moveable place would presumably coincide with a place of its own just as much as would a body or of a part of one.[14]

There is, however, at least one further difficulty in Aristotle's response to this view of place as an interval. For in his account of the moving vessel he has not said precisely that its contents remain in the same place, but rather that they "move" in it, and yet their motion would seem to be a change of place. Now if their motion were exclusively motion by concomitance, as the whole vessel is moved from place to place, this statement would not create so much of a problem, or at any rate not a new one. But Aristotle suggests that he also has in mind cases in which the contents of the moving vessel move on their

own, whether through the displacement of water by air or else though reciprocal displacement among the parts of water (see, again, ἀντιμεθίσταται, 211b27). And yet if this is so, how can these contents be said to move in the same place, at least in the primary or truest sense of the term "place"?

We will return to this difficulty shortly. But for now, let us continue with Aristotle's consideration of the alternative views of place. The third and last alternative that he rejects here is of place as matter. He says that matter might be thought to be place if one were to consider [the transformations] in something continuous and at rest. "For just as [we imagine that] if there is alteration, there is something that is now white that was previously black and now hard that was previously soft (for which reason we say that matter is something), so also place is believed to exist because of some similar imagination (διὰ τοιαύτης τινὸς ... φαντασίας); except that the former [is believed to exist] because [we imagine that] what was air is now water, whereas place [is believed to exist] because [we imagine that] where there was air there is now water. But matter, as was said before, is neither separable from the thing nor does it surround it, whereas place has both [of these attributes]" (211b31-212a2). Now in reasserting that matter is inseparable from the particular thing that it belongs to, Aristotle confirms that he does not believe that there is a common matter of the four elements. But what is new here is his explicit suggestion that the notion of such a permanent substrate is an imaginary one. We imagine, he suggests, that there must be a substrate that remains unchanged in every alteration, including even those, such as the transformation of air into water, where no percepti-

ble body remains the same. And though Aristotle does not say so explicitly, he also invites the thought, it seems to me, that our belief in this imagined substrate stems from a certain wish for security, a wish for security for our world, or for the certainty that at least the simplest of the perceptible bodies are rooted directly in a permanent and wholly unchanging substrate. If this is Aristotle's thought, moreover, the parallel that he draws between the imagination that leads to the belief in matter, in this sense, and the one that leads to the belief in place would suggest that this same wish for security is also at the root of the belief in place, or of the belief, at any rate, that it is something entirely free from change.[15] And the importance of this suggestion would allow us finally to understand why he has given such a prominent role in his account of place to a discussion of form and, more particularly, of matter. Now to be sure, these suggestions of mine about the significance of the wish for security for our world are only speculative. But in the sequel to this discussion of matter, Aristotle points to the need for at least some such speculation, as we shall see in our examination of the text.

Aristotle now concludes, on the basis of having rejected the first three of his alternatives, that place must be the remaining one, or the limit of the surrounding body, at which it is in contact with the moveable body that is in place. Although we have seen that place, on this view, does not fully correspond to all our initial assumptions about it, Aristotle's refutation of the alternative notion of an independently existing interval suggests that he has at least put his finger on something that corresponds to them more nearly than anything else that really

exists. And to the implicit objection that this view of place as the mere limit of a surrounding body does not give to it the importance it seems to have, Aristotle goes on to suggest that we are deceived in believing that place is something great and hard to grasp (δοκεῖ δὲ μέγα τι εἶναι καὶ χαλεπὸν ληφθῆναι ὁ τόπος, 212a7-8; cf.211a7-11). He says that this belief about place arises in part because matter and form appear along with it (cf. 209b17-21) and also because the change of the body in locomotion occurs within a surrounding body at rest. "For it appears possible that there is some interval in between other than the moving magnitudes" (212a10-11). Now we recall that Aristotle has already suggested that the fixity of the body surrounding the one in motion is what leads to the belief in an independently existing interval, and in discussing that suggestion I said that it did not make evident sense. But now, I think, we are in a better position to understand what Aristotle has in mind. The rest or fixity of the body that surrounds the one in motion does not, in fact, give rise by itself to the belief in an interval apart from bodies. Indeed, Aristotle implies as much in the immediate sequel, for he adds that the apparently bodiless character of the air in an "empty" vessel is also a contributory cause of this illusion. But even these two causes taken together do not suffice to explain the prevalence of the belief in place as an independent interval. And by the inadequacy of his explicit account of the origin of that belief, Aristotle invites and even compels us to supply some additional cause on our own. Now this other cause, in my view, is the wish for security that I referred to earlier, the wish to believe in something independent and wholly unchanging as the container of our world. The wish for

security for our world is the crucial factor, I contend, in engendering the belief in place as an independent interval, as well as the more general belief that it is something "great and hard to grasp." And what the fixity of the surrounding body contributes is only the manifest and partial stability that first makes it possible for us to imagine, and thus actually to believe in, a completely stable interval behind the scenes.

Throughout his discussion Aristotle has frequently used the example of a vessel, or its inner surface, to illustrate what he means by place. He has called a vessel a moveable place, and he has at least suggested that these moveable places are a subclass of place in the broader sense (209b28-30, 210a24, 211a34-b5; cf. 210b27-30, 211b25-29, 212a13-14). But now, however, he takes the argument in a new direction by insisting that place, as opposed to a vessel, must be immoveable. He says that just as a vessel is a moveable place, so place is an immoveable vessel. And accordingly, he continues, when something moves or changes in a surrounding body that is in motion -- as a boat, for instance, moves in a river -- it uses this body as a vessel, rather than as a place. Aristotle goes on to claim that place wishes to be immoveable (βούλεται δ'ἀκίνητος εἶναι, 212a18), and that therefore the whole river is rather the place [of the boat], since the whole is immoveable. And on the basis of these claims, he proposes a revised definition of place as "the first, immoveable limit of the surrounding [body]," i.e., the immoveable limit at which it is in contact with the body it surrounds (212a20-21).

Now the demand that place be immoveable, though it is presented here explicitly for the first time, is not so surprising in itself, since we do tend to think of place as a stable

background for locomotion. Still, my account of the argument that has led up to this demand makes us wonder whether it can be met. And Aristotle's revised definition of place, as the immoveable inner surface of the surrounding body, presents this difficulty in an especially acute form, coming directly as it does after an example in which he has more or less told us that there is no such surface.[16] Since the water that surrounds a moving boat in a river is continuously in motion (so that the surface at which it touches the boat is also in motion by concomitance), Aristotle has suggested that the place of the boat is not this changing surface, but rather the immoveable river as a whole. At least in this case, then, he has preserved the view that place is immoveable only by abandoning the requirement that each place must be the place of only one particular body. And even the requirement of immovability is met only in a sense, since the river that remains unmoved as a whole does so despite the fact that each portion of its water is continuously in motion and is being replaced (cf. Politics 1276a34-b1). Moreover, this example of a boat in a river is by no means an unusual one, for the air that surrounds us is also in constant motion. And even though we can stand still, so that the inner surface of this air remains unmoved -- in a sense similar to that in which a whole river, despite its flowing, remains unmoved -- we have already noted that this surface ceases to exist as an actual surface as soon as we walk away.[17] More generally, if we disregard for the moment the special cases in which moving bodies do not change places as wholes, at least part of the surface at which a surrounding body or bodies are in contact with the moveable body must be moveable or changeable itself (consider 216a26-33 and context). And to

this extent, at any rate, Aristotle's definition of place as the first, immoveable limit of the surrounding body looks more like a statement of what we might wish for it to be than a definition of anything real. For we do not merely wish that there be an independent and wholly unchanging container of our world; we also want this comprehensive place to include equally unchanging parts that fit exactly to each body, including our own, and in which we can be at rest.[18] But Aristotle suggests that this wish for stability is unattainable. And from this perspective, I think, we can understand why he says here that place "wishes to be immoveable," rather than that it is immoveable in fact.

Even once we accept, however, that place in general is not wholly unchanging, it is still not clear in what sense we are to understand Aristotle's claim that the whole river is the place of a moving boat. For since, as we have noted, this place contains more than the one boat, it would seem not to be a particular place in the sense that Aristotle has laid out, but rather a common one, in which a body is found only by virtue of being primarily in one of the other kind. If, however, we look back to the passage in which he first distinguished these two senses of place, we note that the only thing that he spoke of as the common place was the place of all the bodies [in the world], and that he did not say in general -- as opposed to suggesting it through his example -- that the particular, or primary, place of a body must fit it exactly (209a31-b2; cf. page 6). Thus, his claim here that the whole river is the place of the moving boat need not imply that there is another, more primary place -- whether moveable or not -- in which it is found.[19] And it makes sense that there is none. For since a moving body is not, according to

Aristotle, ever actually at any midpoint along its path, neither is it actually at any place during its motion other than the whole place in which it moves (cf. 263a23-b9). And from this point of view, we can perhaps also answer our earlier question as to why Aristotle had suggested that the contents of a (moving) vessel displace one another in a single place (211b25-28; cf. pages 22-23). For if we consider, for instance, the portions of water that move randomly and splash about, it makes little sense to say that they remain "in" a surface with which they are only occasionally in contact. But it does make sense to say that they displace one another while remaining within the vessel as a whole.[20] And more generally, the notion of place as the inner surface of a surrounding body gives a sense of exactness that is at least in many cases untrue to the phenomena. It is often better to think of a place as a bodily being, and even a moveable one, considered as a whole.[21]

Although the definition of place as the first, immoveable limit of the surrounding body is not a correct statement of what place generally is, and although it fails even in principle to correspond to our assumption that a place is equal to the thing in place, this is not to say that there is no truth to it. This definition may still give the most satisfactory possible sense of the term place, a sense that is more or less fully realized in some actual places, however uncommon these might be. Thus, for instance, the unchanging surface of a depression in the earth would be the place of the air or of the rainwater that this earth surrounds, even though it does not surround them completely. And if we ask about the places of the four elements considered as wholes, it would seem -- since these wholes do not move from

their places -- that they are each completely surrounded by a body whose inner surface, as a whole, remains unmoved. Accordingly, Aristotle turns his attention to the places of some of these elements. He says that his definition of place explains why the middle of the world and the extremity toward us of the circular locomotion (i.e., of the revolving heavenly sphere) are believed by everyone, more than anything else is, to be the up and the down in the chief sense: for the one, he says, remains forever, and the extremity of the circularly [moving body] remains situated in the same way. Now of course whatever is meant by "the middle of the world," this would not seem to be a limiting surface, and perhaps partly for this reason, Aristotle goes on to restate in his own name what is meant by "up" and "down." Since, he says, the light and the heavy are what move up and down, respectively, by nature, both the limit that surrounds toward the middle and the middle itself are down, and both that [which is] toward the extremity and the extremity itself are up. He may mean by this difficult statement that the surface of whatever body surrounds the heavy one at the middle of the world is the place that is down, and that "the middle itself" -- i.e. the earth (since no center point exists in actuality) -- is also spoken of as being down; and since by contrast to the midpoint of the world, the extremity (toward us of the heavenly sphere) is a surface, what he speaks of as "the extremity itself" may be this place of the lightest body, and that which is toward the extremity may be the body (i.e. the element fire) in this place.[22] On this view, the places of the earth as a whole and of the sphere of fire as a whole are the inner surfaces of the immediately surrounding bodies, which surfaces remain always unmoved or at

least situated in the same way. Accordingly, Aristotle goes on to say that for this reason place is believed to be a kind of surface, and as it were a vessel, and a container. And he adds that place is also together with the thing [in place], since the limits are together with the limited (212a21-30; consider, however, the reading of GIJ^{1}PST at 212a30).

My interpretation of Aristotle's statement about what is down and what is up has denied the apparent parallelism between the expressions "the middle itself" and "the extremity itself," since I took the former to refer to the lowest body and the latter to the highest place. If instead we try to preserve this parallelism, as well as the parallelism between "the limit that surrounds toward the center" and "that [which is] toward the extremity," the latter of these two expressions would also refer to a limiting surface, and would designate the inner surface of the heavenly sphere as the highest place; but then "the extremity itself," if it is the body in that place, would have to be on this side of what is "toward the extremity" and that is difficult.[23] Perhaps, however, "the extremity itself" refers not to the body in the highest place, or to the fire within the concave surface of the lunar sphere, but rather to the body above it, i.e. the heavenly body (cf. On the Heaven 278b11-15). This suggestion has the merit, at any rate, of calling attention to this heavenly body, and to the difficult question of where it is, on the assumption that place is an extremity of a surrounding body. And this question will come to the fore in the following section of Aristotle's discussion, together with the related question regarding the place of the whole world.

Aristotle continues by saying that if a body has some external body surrounding it, it is in a place, and that if it doesn't, it is not. From this it follows, among other things, that the world as a whole has no place, and to drive home the truth of this paradoxical conclusion, Aristotle extends it to the imaginary case of a world wholly composed of water, i.e., of something that seems to require a containing body. Even if water, he says, should come to be such [i.e., not surrounded by an external body], its parts will move, since they are surrounded by one another; but the all will move in one sense, but in another sense not. "For as a whole, it does not change its place all together, but it moves in a circle -- for there is this place of its parts -- and some [parts] do not move up and down, but in a circle, whereas others, those that admit of condensation and rarefaction, move both up and down" (212a35-b3). Now in this last statement Aristotle seems to be speaking again of the real world, rather than of an imagined watery one, and his claim is that it does not change place as a whole, even though the heavenly spheres move circularly and sublunar bodies move up and down. In saying, moreover, that the world does not change place as a whole, he does not mean that it remains at rest in the same place, but presumably that it is neither in motion nor at rest, and that it thus has no place either to preserve or to change (cf. 221b12-14). However, this last suggestion, though it is clearly in keeping with the overall purpose of Aristotle's argument, is called into question by some ambiguity as to whether he thinks that the world moves in a circle. For first he says that it does, but in his restatement he refers only to some of its parts as doing so. Now since the earth, at least, does not move

in a circle (according to Aristotle), it would seem that this second formulation is the more precise one. But why, then, does he say in the first place that the all moves in a circle? The commentator Simplicius has suggested a possible answer to this question, namely, that Aristotle is here disregarding the earth, as well as the region immediately around it, on the grounds of its being too insignificant to be a genuine part of the whole.[24] Yet even if this suggestion is true, the problem remains of explaining how the world can move in a circle if there is no other body in relation to which it can move. Perhaps it is better, therefore, to interpret the claim that the all moves in a circle to mean merely that some of its parts do, as when we say that a man is injured because of a wound to his chest (cf. 210a26-30; 224a23-26). But even if it is only the heaven that moves in a circle, there is still the question of how it can do so, since according to the definition of place as a limit of a surrounding body, it would seem to have no place in which to move (cf. 211a12-14). We recall Aristotle's earlier assertion that locomotion is what leads to the thought of place, and that in particular it is chiefly because the heaven (τὸν οὐρανὸν, 211a13-14) is always in motion that we suppose it to be in a place.[25] Can we now deny that there is a place of the heaven, as his definition of place would seem to require us to do, without also denying that it moves? Let us keep this question in mind as we look at the continuation of the argument that the world has no place.

After distinguishing between being potentially in place and being so actually, and between things that in themselves are in place and those that are so only by concomitance, Aristotle now

says explicitly that the world (ὁ δ' οὐρανός, 212b8) as a whole is not in any place, at least on the assumption that there is no body surrounding it. He means by this that it is not in itself in any place, for he goes on to mention both the world and the soul as examples of things that are in place by concomitance. The phrase "by concomitance" is apparently used here -- in reference to the world, at any rate -- as an equivalent to "by virtue of its parts" (cf. 254b8-10; contrast 224a21-28). For its parts, Aristotle continues, are all in a sense in place, since one surrounds another on the circle. Now it is presumably the difficulty regarding the heavenly motion that explains why Aristotle limits himself to the claim that it is only "in a sense" that "all" the parts of the world are in a place. And the commentator Themistius has suggested that the outermost sphere of the heaven, the sphere of the fixed stars, is the one that is only in a sense in place, since it is not truly surrounded by any body, but only surrounded in the qualified sense of being in contact with the sphere of Saturn at its inner extremity.[26] And there is some merit to this suggestion. For just as we speak of a vessel as surrounding the fluid in it, even though it does so from below, and only in part, so we can speak of a lower sphere as surrounding, in a sense, a higher one (cf. On the Heaven, 310b7-14; Physics 209a33-b1). However, this suggestion fails to explain how the place of this outermost sphere will be unmoved, since the sphere of Saturn, like all the heavenly spheres, has (approximately) the same daily revolution as the fixed stars do. If the sphere of Saturn moves circularly in this way, how can its outer surface be the unmoved place for the revolution of the sphere of the fixed stars? Merely to say that this inner sphere

remains as a whole in the same place is not sufficient, since this is equally true of the outermost sphere, whose rotational motion requires a place that does not rotate. Must we not say, rather, in order to make sense of the daily revolution of the heavenly body as a whole, that it is the sublunar region, and ultimately the earth or its surface, that provides the fixed place in or around which this motion occurs?[27]

Now it is true that Aristotle never says all this explicitly. But as we shall see, his explicit discussion gives no satisfactory answer to the question regarding the place of the heavenly motion. And he has reason, moreover, to be reticent about his answer to it. For if my suggestion is correct, not only do the sublunar sphere and the heavenly sphere provide the places for one another, but the former of these places is the more important one, since only the earth or its surface has the ultimate fixity presupposed by all motion, including that of the "fixed" stars. And this is not to say that the earth is simply "beyond" the realm of the moveable, since every portion of it is moveable and even perishable (cf. Posterior Analytics 89b29-31). Rather, we find that the attempt to interpret the experienced fixity of the earth, and the experienced motion of the heaven, in relation to some absolutely fixed place turns out to be futile. And thus precisely this experienced fixity of the earth becomes the ultimate perspective in relation to which motion and rest exist. Accordingly, when Aristotle says that the right and the left and the other differences of place exist not only in relation to us and arbitrarily (πρὸς ἡμᾶς καὶ θέσει, 205b33-34; cf. 208b12-22), but also in the whole itself, the whole that he has in mind is a whole that exists as such only in relation to our

human experience. And yet his formulation points to this understanding of the whole without openly challenging the popular understanding or openly threatening the sense of security that we sought support for when we first asked the question about place.[28]

I said that Aristotle's explicit discussion gives no satisfactory answer to the question regarding the place of the heavenly motion. To see that this is so, and to see how he both conceals and calls attention to the difficulty, let me begin by quoting him. "Therefore the upper [part of the world] moves in a circle, but the all is not anywhere. For what is somewhere is itself something, and there must also be something else beyond this, in which [it is and] which surrounds it. But beyond the all and whole there is nothing external to the all, and for this reason all things are in the world; for the world (ὁ ... οὐρανὸς, 212b17) is perhaps the all. Yet the(ir) place is not the world (ὁ οὐρανός, 212b18), but something belonging to the world (τοῦ οὐρανοῦ τι, 212b18-19), its extremity, [which is] also in contact with the moveable body. And for this reason the earth is in the water, and this is in the air, and this is in the aether, and the aether is in the world (ἐν τῷ οὐρανῷ, 212b21), but the world (ὁ δ' οὐρανὸς, 212b22) is no longer in anything else" (212b13-22). Now an obvious question regarding this passage is what Aristotle means by "the extremity" of the world, which he seems to say is the place of all things, and which he characterizes as being in contact with "the moveable body." It might appear from his language that what he has in mind is an immoveable outer sphere, whose inner surface would be primarily the place of the moveable sphere of the fixed stars.[29] On this reading, in the subsequent

claim that the aether is in the world, the word "aether" would refer (as it popularly does) to the circularly moving heaven (cf. On the Heaven 270b16-24); and Aristotle would be suggesting that its place, within the world, is the inner extremity of this immoveable body beyond it. Now this interpretation does, to be sure, provide an answer of sorts to the question of the place of the heavenly motion. Yet there is no evidence at all for the existence of an immoveable body beyond the visible and moving heaven, and Aristotle never says that he thinks there is one. Accordingly, an alternative interpretation of these last two sentences has generally prevailed.[30] On this interpretation, the word οὐρανός, which I have here translated as "world," and which almost certainly did mean "world" earlier in this argument, is translated instead as "heaven," as indeed it often must be; and its extremity in contact with the moveable body is interpreted as the lunar sphere, or its inner surface, which Aristotle had earlier said is believed by everyone to be the place above. In keeping with this suggestion, "the moveable body" in contact with the extremity is interpreted as the totality of the sublunar bodies, i.e., those whose motion is rectilinear. And in the concluding sentence, the word "aether" is interpreted as having the Anaxagorean sense of "fire," so that Aristotle's assertion comes to mean that the element fire is in the heaven and that the heaven is not in anything else. Now although Aristotle elsewhere disapproves of Anaxagoras' use of the word "aether" to refer to fire (cf. On the Heaven 270b24-25; 302a28-b5), this interpretation does have the advantage of not omitting a reference to this fourth of the sublunar elements, and it also of course has the great advantage of avoiding the rash hypothesis of an immoveable

outer sphere. But it gains these advantages at the price of disregarding the whole question of the place of the heavenly motion, as if the only moveable bodies, or the only ones that needed to be in a place, were those of our sublunar region. And Aristotle's equivocation as to whether he is talking about the heaven or the whole world invites the reader, or at least those readers whose doubts are too easily put to rest, to pass over this difficulty. For his studied equivocation allows him to give the impression that the question of the place of the heavenly motion can be dismissed on the grounds that there is no place of the immoveable whole. And yet the reader who resists this temptation and who continues to ask the question will be led, I think, to answer it in the way I have proposed.

Having offered his definition of place, and having clearly spelled out the implication, at least, that there is no place of the whole world, Aristotle now asserts that all the perplexities regarding place can be resolved on the basis of this definition. We recall that he had listed these perplexities early in his discussion, and that it was part of the original goal of his inquiry to resolve them. In now doing so, he apparently relies on the broader version of his definition of place, the one that defined it as a limit of the surrounding body, but that did not yet insist on its being immoveable. For he begins by saying that there is no necessity for a place to grow along with the thing in place. And the implicit argument for this conclusion -- namely, that the increase in the size of the surface of the surrounding body is not growth, but a mere concomitant of some other change in that body itself -- is acceptable only if one does not have an immoveable surface in mind.[31] Aristotle continues with the

assertion that there is no necessity for there to be a place of a point, since, as he allows us to infer, a point is not surrounded by any body. The next perplexity that he turns to is the one he had originally mentioned first, which had argued from the apparent three-dimensionality of place that it must be a body, but that it could not be a body, since there would then be two bodies in the same place. His response to this perplexity is a partial repetition of his earlier response to the view of place that it presupposes, or the view that place is a spatial interval. He says that there is no necessity for there to be two bodies in the same place nor indeed for there to be any bodily (i.e. three-dimensional) interval [between the extremities of the surrounding body], since what is between these extremities is some chance body, but not an interval for a body (σῶμα γὰρ τὸ μεταξὺ τοῦ τόπου τὸ τυχόν, ἀλλ' οὐ διάστημα σώματος, 212b26-27). And finally, he responds again to Zeno's objection that since a place is somewhere, it must be in another place, and so on to infinity (cf. 210b22-27). Aristotle acknowledges that a place, since it exists, must be somewhere or in something. But this does not mean, he says, that it is in a place, but rather that, being a limit, it is in what is limited, i.e., in the body that surrounds the one in place. For not everything that is, he continues, is in a place, but only moveable body (212b22-29). We note that despite Aristotle's claim here that all the perplexities regarding place can be resolved, he has failed to mention two of them, the one that argued that place could be neither an element nor composed of the elements and also the one that denied that it could be any of the four kinds of causes. His reason for not mentioning at least the former of these perplexities is presum-

ably that he agrees with it, since it is a difficulty only for those who think that place is something more important than it is. For a surface of a body is not an element nor even a being composed of the elements, but merely an extremity of such a being.

The question, however, of whether place is one of the four kinds of cause, and in particular whether it is a final cause, is somewhat more difficult. For even though a bodily surface would hardly seem to have this status, the natural motion of the elements to their proper places and their natural rest once they arrive there might suggest to the contrary that at least being in such a place, if not strictly speaking the place itself, is that for the sake of which this natural motion exists.[32] And we recall that one of the requirements by which a definition of place was to be judged was its consistency with the assumption that there are natural motions of light and heavy bodies toward their proper places (211a3-6; cf. page 15). Accordingly, Aristotle continues his discussion with an attempt to show that it is reasonable that each thing should move toward and remain in its proper place. He bases his argument on the kinship between each element and the one that surrounds it, and he even likens the tendency of a lower element to remain in its place beneath the one above it to the tendency of a portion of one element to remain within the whole. In support of this striking suggestion, he makes the even more striking suggestion that the [element] in its place is a kind of part in relation to a whole. For since water, he continues, is potentially air (i.e., by evaporation), it is related to the air that surrounds it as material is to its being at work. And on the assumption, then, that the same water

is in a sense air, as well as water, it would be related to air as a kind of part to a whole. This is the reason, he adds, that there is contact between an element and the one above it, whereas there is natural fusion when they both become one in the full sense (ἐνεργείᾳ ἓν), e.g., when water is transformed into air (212b29-213a10). Now it is not worth dwelling at length here on the details of this argument, since Aristotle acknowledges that he has only touched upon it unclearly, and he says that he will have occasion to develop it more clearly elsewhere.[33] But two points are worth noting. First, this argument is not based on Aristotle's explicit definition of place as the extremity of a surrounding body, but it corresponds instead to his suggestion that place is often better understood as a bodily being or bodily region as a whole. For that in which the element water tends to remain, by this account, is not the lower extremity of the surrounding air, but rather the entire region made up of the bulk of both of these elements. We should not, however, be surprised, at this stage of our interpretation, that no single definition of place can meet all the requirements of his original attempt to explain it in the "most beautiful" way. The second feature of this account that is worth noting here is its suggestion that the natural tendency of a body is not simply to move toward and to remain in its proper place, but also to fulfill its remaining potential by being transformed into the higher element. And on this basis, we can better understand why Aristotle chose to leave unanswered the perplexity that claimed that place is not a (final) cause. For it hardly makes sense to say that the natural motion of water exists in order for it to come to a place where it can become air -- as if it would be better for water, or for

the world as a whole, that this lower element cease to exist.[34] And more generally, to the extent that there are final causes of the motions of the elements, they are not evident unless one focuses on the contributions these motions make to the welfare of living beings, and especially man (cf. 194a34-36; 198b17-199a8).

Now that he has offered his definition of place, and responded to most of the perplexities about it, and shown, to the extent possible, how the attributes it is believed to possess are indeed attributes of what he has defined, Aristotle does not continue to try to fulfill the remaining goal of his program of inquiry, which was to make manifest the cause of our discomfort and of the perplexities about place (cf. 211a9-11). But he has already touched upon this question with his account of our illusions about matter and of our corresponding belief that place is "something great and hard to grasp" (212a7-8; cf. 211b31-36; and see pages 23-26). And he has made it clear, I think, that the chief cause of all these illusions and of the ensuing difficulties is a wish for security on our part, a wish that leads, among other things, to the interpretation of place as a permanent and independently existing interval. Aristotle does not, however, address this point explicitly, since to do so in an adequate way he would have to acknowledge the extent to which his own definition of place, and in particular the version that insisted on its being immoveable, had made concessions to this very wish. Instead, therefore, he simply concludes his whole discussion with the statement that he has said both that place exists and what it is (213a10-11). But even this conclusion is less complete than we would have expected. For if we compare it to the beginning of this discussion, we see that Aristotle omits any reference to the

third of his initial questions, namely, the question of the manner in which place exists (or "how it exists," πῶς ἔστι, 213a12-14). And he calls attention to this omission in the immediate sequel, where he begins his inquiry regarding void by asking not only whether it exists and what it is, but also about the manner of its existence (213a12-14). It is true that later in this discussion of void Aristotle does say that he has already said "both how place exists and how it does not exist" (214a17-18). But this later statement only serves to confirm that its absence from the conclusion to the discussion of place was not a mere oversight. By stating belatedly that he has answered the question of how place exists (and of how it does not), but by not making this statement in the appropriate context, Aristotle is suggesting, I think, that he has both answered it and not answered it, or that he has answered it between the lines. For what he has shown is not merely what he says openly -- which is that place depends on body, and that it is not an independently existing interval -- but also that it is something far less than we had expected it to be. He has shown, if we have followed his argument, that there is nothing that corresponds to all of our assumptions about place, let alone to all of our wishes, and hence nothing that could be explained in that "most beautiful" way in which he had encouraged us to try to explain it. But even this negative conclusion, accompanied as it is by Aristotle's indications as to the reason for our expecting too much of place, is an important ingredient in our education about nature.

ENDNOTES

1. One indication that Aristotle does indeed regard this as the common view of place is that he accepts it himself as the basis for his own treatment of the subject in the Categories (5a8-14).

2. cf. Simplicius, In Aristotelis Physicorum Libros Quattuor Priores Commentaria, in Commentaria in Aristotelem Graeca ix, ed. H. Diels (Berlin: 1882), 537.32-538.14. The section on place from Simplicius' commentary on the Physics has been translated by J. O. Urmson in Simplicius: On Aristotle's *Physics* 4.1-5, 10-14 (Ithaca: Cornell University Press, 1992).

3. cf. Simplicius, op. cit., 544.1-5.

4. 214a14-15; On Generation and Corruption 320b16-17; cf. Alexander of Aphrodisias, as quoted in Simplicius, op. cit., 544.20-545.2.

5. 191a8-12; 217a21-b11; On Generation and Corruption 329a24-35).

6. cf. 191a7-13; cf. Metaphysics 1034a2-8; 1041b16-33.

7. The case that Aristotle did not believe in any such "prime matter" of the elements has been well made by W. Charlton, in Aristotle's Physics, Books I and II (Oxford: Clarendon Press, 1970), 129-145. I am here disregarding the somewhat looser sense of the term "matter" according to which water, for instance, since it can be transformed into air, is spoken of as being matter for it. cf. Physics 213a2-4.

8. An additional wrinkle to this argument is that Aristotle presupposes the truth of his own proposed definition of place in order to reject the alternative that place is form. And yet he does, nevertheless, go on to rest the case for his proposal on the elimination of the three other alternatives. This inconsistency in his procedure serves to highlight the question of what, if anything, is the true basis for his proposed definition. Compare Aristotle *Physics*, Books III and IV, translated with introduction and notes by Edward Hussey, (Oxford: Clarendon Press, 1993), 115.

9. cf. Simplicius, op. cit., 569.35-570.15; Simplicius In Aristotelis Physicorum Libros Quattuor Posteriores Commentaria, CAG x, ed. Diels (Berlin: 1895), 868.25-871.15. See also Hussey, op. cit., 114.

10. cf. Simplicius, op. cit., ix, 604.33-605.5; Philoponus, In Aristotelis Physicorum Libros Quinque Posteriores Commentaria, CAG xvii, ed. H. Vitelli (Berlin: 1888), 564.3-14; H. R. King, "Aristotle's Theory of ΤΟΠΟΣ," Classical Quarterly 44 (1950), 87-88.

11. cf. Thomas Aquinas, In Octo Libros Physicorum Aristotelis Commentaria, ed. P.M. Maggiolo, (Rome: Marietti, 1965), Book IV, Lecture 6, Paragraph 461. Aquinas' commentary has been translat-

ed by R. Blackwell, R. Spath, and W. E. Thirlkel as Commentary on Aristotle's *Physics* (New Haven: Yale University Press, 1963). See also "Aristotle and Other Pre-modern Thinkers on the Existence of Vacua," an unpublished doctoral dissertation by R. Glen Coughlin (Université Laval, 1986), 238-246.

12. cf. Simplicius, op. cit. ix, 578.2-13; 621.20-30; Philoponus, op. cit., 562.1-563.2.

13. This position would also, of course, compel those who believe in the heliocentric hypothesis to deny that anything on earth can remain in the same place.

14. Compare the notions of "absolute space" and "relative space" in Newtonian physics. Isaac Newton, Principia, Volume I, The Motion of Bodies, Motte's Translation Revised by Florian Cajori (Berkeley: University of California Press, 1934), 6.

15. Aristotle clearly suggests, at all events, that there is some link between the illusion of an unchanging substrate and the common view of place as an independently existing interval. He points to the similarity between these two illusions by discussing the suggestion that place is matter only after the one that it is an independent interval, whereas his preliminary list of alternatives had mentioned these two in the reverse order (211b6-212a2).

16. cf. Aristotle's Physics: a Revised Text with Introduction and Commentary, ed. W. D. Ross (Oxford: Clarendon Press, 1936), 575-576; Matter, Space, and Motion: Theories in Antiquity and Their Sequel, Richard Sorabji (Ithaca: Cornell University Press, 1988), 188 ff.; Hussey, op. cit., 117-118. Sorabji gives adequate reasons, I think, for rejecting Ross' view that this definition abandons the requirement of contiguity between the place and thing in place, or that it treats place as "the nearest unmoved boundary of a container, the first you would come to in moving outwards from the thing." cf. 212a29-30.

17. Aquinas' suggestion that the extremities of surrounding bodies are immoveable places, despite the motions of those bodies themselves, by virtue of preserving a fixed "order or position (ordinem vel situm)" in relation to the immoveable world as a whole, fails to take account of this difficulty. On the other hand, Aquinas is right, I think, to suggest that the sameness -- such as it is -- of a given place is like the sameness of form in a being whose matter is constantly changing. (cf. Aquinas, op. cit., Book IV, Lecture 6, Paragraphs 468-469) This kinship between the (relative) permanence of place and the (relative) permanence of form in an enmattered being is a further reason for Aristotle's emphasis in this discussion on the views of place as form or as matter. [I owe this last observation to an unpublished paper, "The Immobility of Place in Aristotle," by R. Glen Coughlin.]

18. See, again, 209a33-b1, which includes the only example in the Physics of the second person singular pronoun, i.e., Aristotle's only direct address to each of his readers.

19. Aquinas' claim that the whole river is only the common place of the moving boat, and that its proper place [at each instant] is the "order or position" of the flowing water in relation to the whole river, has no basis in Aristotle's text. Aquinas, op. cit., Book IV, Lecture 6, Paragraph 468.

20. By "the vessel as a whole" I mean the containing body together with all its contents. Just as a river remains the same river despite the replacement of all the water in it, so a vessel, in this sense, remains the same vessel though all the fluid in it may change. Aristotle points to this view of the matter by referring, in his discussion of this example, to the vessel's contents as being parts of the whole vessel (211b25-26; contrast 211a29-b5).

21. From here we can perhaps understand Aristotle's odd expression that the fluids moving in the moving vessel do so in the place in which they are, "and not in the place in which they come to be, which is a part of the place that is the place of the whole world" (211b28-29). For the contents of the moving vessel do (by concomitance) come to be in a new place, or in a new region of the surrounding air, which place is a part of the larger place that is the air as a whole, and ultimately of the largest place that is the world as a whole. The claim, in other words, that a place is also a part of a larger place does not merely express the view of those who think of place as an independent interval. Their mistake is to imagine that place in the largest sense is something that contains the whole world, whereas in fact it consists of the whole world, and is the common place of every body (cf. 209a32, and see also 210a17).

22. cf. Simplicius, op. cit. ix, 585.34-587.16, especially 586.26-30.

23. cf. Themistius, In Aristotelis Physica Paraphrasis, CAG v part 2, ed. H. Schenkl (Berlin: 1900), 119.11-12; Philoponus, op. cit., 587.16-21; 591.14-25; Hussey, op. cit., 118.

24. Simplicius, op. cit. ix, 589.31-590.22.

25. That Aristotle regards circular motion as a kind of locomotion is clear from Physics 261b27-29 (cf. 261a27-28) and De Caelo 268b17-18, among other passages. cf. Simplicius, op. cit. ix, 602.8-603.22.

26. cf. Themistius, op. cit., 121.1-9. An interpretation suggested by some commentators is that all the parts of the outermost sphere itself are "in a sense," i.e. potentially, in place, since they all surround one another, i.e., succeed one another in the circular direction, though they are not actually divided from one another (cf. Alexander of Aphrodisias as reported by Simplicius, op. cit. ix, 593.7-23; Aquinas, op. cit., Book IV, Lecture Seven, Paragraph 484; and see Physics 212b3-4; 211a17-21, a29-31). This interpretation does give some significance to Aristotle's distinction here between being potentially and being actually in place, and it is also consistent with the language of the text (ἐπὶ τῷ κύκλῳ γὰρ περιέχει ἄλλο ἄλλο, 212b13, emphasis mine). Yet this view of the place of the parts

of the outermost sphere fails to make any sense of their motion. For these succeeding parts maintain the same relations to one another -- and thus remain in the same "places," by this account -- whether the sphere is in motion or at rest.

27. This suggestion about the surface of the earth provides some limited justification, I think, for Ross and those other scholars who interpret the "first" immoveable limit, as it is referred to in Aristotle's final definition of place, as the nearest unmoved boundary of a surrounding body, even though it may not be contiguous with the one in place. See Ross, op. cit., 575, and note 16; cf. F. M. Cornford, in Physics, Books I-IV, edited and translated by P. H. Wicksteed and F. M. Cornford, Loeb Classical Library (Cambridge: Harvard University Press, 1929), 314.

28. Aristotle's arguments in On the Heaven (296a24-b26) that the earth remains unmoved at the center of the world -- arguments that presuppose the interpretation that I am here challenging of what it means for it to remain unmoved -- can best be explained, I think, as further concessions to the popular understanding. [Consider the critique of these arguments in Galileo, Dialogue Concerning the Two Chief World Systems, second edition, translated by Stillman Drake (Berkeley: University of California Press, 1967), 32-36, 124-141.]

For a fuller discussion of the reasons for Aristotle's apparent concessions to popular belief regarding this and related matters, see my "Continuity and Infinite Divisibility in Aristotle's Physics," Ancient Philosophy 13 (1993), ???-???, and also my unpublished paper "Aristotle's Doctrine of Weight and Lightness."

29. This suggestion is supported by the fact that most of the manuscripts and one of the ancient commentators add to the phrase that refers to this extremity two additional words meaning "a limit that is at rest" (cf. 212b19-20).

30. e.g., Themistius, op. cit., 121.15-20; Simplicius op. cit. ix, 594.7-27; Philoponus, op. cit., 604.9-16; Aquinas, op. cit., Book IV, Lecture Seven, Paragraph 485; Ross, ed., op. cit. 578.

31. The suggestion that each place of the growing body exists only instantaneously, and is thus incapable of either motion or rest, is hardly a convincing alternative. See Sorabji, op. cit., 188-189.

32. cf. 208b8-22; Simplicius, op. cit. ix, 533.19-25.

33. Aristotle indicates that he will have to explain, for instance, why water is the material for air in a different, and presumably truer, sense than air is the material for water. cf. On the Heaven 310a31-b15 ff.; 312a12-21; On Generation and Corruption 318b1-33; 335a14-21.

34. cf. 198b8-9; and see Simplicius, op. cit. ix, 600.4-6 ff.; 606.16-20.