ARISTOTLE ON THE PRINCIPLES OF NATURAL BEINGS

Physics Book I

David Bolotin
St. John's College
Santa Fe, N.M. 87501
March 7, 1995

In the first book of the Physics, Aristotle presents in outline his understanding of the principles of the natural beings. According to this account, natural beings come into being from form and from the underlying substrate, or in other words -- since the substrate is itself twofold -- from form, substrate, and the privation or lack which belongs to this latter when the form is not yet present.[1] Thus, for instance, to take an analogy from the arts, a bronze statue comes into being from its form as a statue, the bronze in which that form comes to be present, and the shapelessness of that bronze prior to its being made into a statue. Now after his initial sketch of these three principles, Aristotle goes on to say that only in this one way (μοναχῶς οὕτω, 191a23) can the perplexity of the ancients be resolved. The perplexity which he has in mind had led the early philosophers to the paradoxical conclusion that nothing either comes into being or perishes. For those, he continues, who first, in accord with philosophy, sought the truth and the nature of the beings were misled by their inexperience into making this claim, on the grounds that what came into being would have to do so either from what is or from what is not, and that both of these are impossible. For as Aristotle has said in an earlier passage, all those who are concerned with nature agree in the opinion that nothing can come from nothing, or from what is not. And the early philosophers seem also to have held that there is no coming into being from what is, or even of what is, since what

is, or that from which alone coming into being would be possible, already exists. By contrast, Aristotle says that his own account of the principles of the natural beings allows him to do justice to the appearance that there is coming into being. He explains that "we," i.e. he and his school, also say that nothing comes into being simply from what is not, but [say] that this nevertheless happens, as by concomitance, since beings do come into being from privation, which is not [anything] in itself, but which exists as a concomitant in the substrate from which a being comes to be. Likewise, Aristotle continues, [we say that] there is no coming into being from what is, or of what is, except by concomitance. There is no coming into being simply of what is, his argument implies, since that from which anything comes to be already is, so that the thing does not come into being insofar as it is; and yet it remains true in a sense that what is comes into being, and that it does so from what is, inasmuch as one kind of being comes into being from another.[2] Thus, there is coming into being from what is, though not insofar as it is, and also from what is not, though only in the sense that the eventual form is not yet present.

This response to the philosophers' perplexity about coming into being would be a straightforward application of the principles which Aristotle has laid out were it not for his choice of a most peculiar example to illustrate one kind of being coming into being from another. For rather than saying, for instance, that a statue comes into being from bronze, he asks us to consider what it would mean if one kind of animal, a dog, were to come into being from another kind, a horse.[3] This example is so bizarre that modern editors have been tempted to emend the text so as to

make it read "if a dog were to come into being <from a dog or a horse> from a horse," and a number of English translators have translated the passage in this way. However, the surviving manuscripts are unanimous in support of the former, more difficult, reading.[4] And this difficulty helps call our attention to another surprising feature of Aristotle's discussion. For he speaks of the response we have outlined here as "one way" (εἷς μὲν δὴ τρόπος, 191b27; cf. 191a36) of responding to the perplexity of the ancients, and he follows it with another suggestion (ἄλλος δ' 191b27), based on the distinction between potentiality and being at work, which he tells us has been elaborated more precisely elsewhere; and yet we recall that he had introduced the discussion by saying that "only in this <u>one</u> way" [emphasis mine] can the perplexity of the ancients be resolved. Now if we assume that our manuscripts are correct, and that Aristotle meant what he wrote, these two difficulties, taken together, invite the suggestion that he himself may regard his first response as inadequate, and the second one as the only genuine resolution to the perplexity.[5] The question arises, of course, if this is true, of why he would present at some length a "resolution" which he regards as inadequate, while only mentioning the answer which he in fact accepts. But in order to confirm the legitimacy of that question, we first need a clearer understanding of his account of the principles of the natural beings and of its relevance to the perplexity that had led the early philosophers to deny becoming.

Aristotle's account of the principles of the natural beings takes its cue from the way we speak about coming into being in general. Our speech suggests, in the first place, that beings do

come into being. For if the beings which we speak of according to their various forms -- such as dogs, cats, or even statues -- are truly beings, and not mere modifications of some other substance, then there are at least some beings that come into being. And a sign that a statue, for instance, is indeed a kind of being is that we do not say that bronze becomes "statuey," or even a statue, as we do say that a man becomes healthy or a general, but rather that <u>from</u> bronze there comes into being a statue. In other words, even though bronze persists as such in its transformation into a statue, we do not speak of being a statue as a mere modification of the bronze.[6] Our speech also suggests, in the second place, that there must always be some underlying thing from which a being comes to be, and that this substrate, though one in number, is more than one in kind. We say, for instance, that it is an unmusical (i.e. uncultured) human being who becomes a musical one; and his unmusicalness, which does not survive his becoming musical, is different in kind from his being human, which persists throughout the change. Now this illustration is not, to be sure, a case of the simple coming into being of a new being, but rather of the qualified coming into being of a new attribute in a being that persists. But having begun from the way we speak in these more evident cases, Aristotle adds that it would become clear to one who reflects that even beings themselves always come into being from an underlying thing, as animals and plants do from a seed, and that this thing is both what it is as such and also something lacking in the eventual form. Thus, he says it is clear, "if there are causes and principles of the natural beings, from which primarily they are and have come into being, not by concomitance, but each

[as] what it is called according to its being (κατὰ τὴν οὐσίαν), that everything comes into being from the substrate and the form."[7] And he goes on to repeat that this substrate, though one in number, is both what it is as such and also that which contains, by concomitance, the privation of the eventual form.

Now Aristotle does not give a thematic account of the mode of being of these principles, or of the way in which they are responsible for natural beings. But it appears at first, at any rate, that the principles are elements into which composite beings can be broken down, and that form, if not also privation, is an active element, while the substrate is passive.[8] And in keeping with Aristotle's claim that "the principles ought to remain forever,"[9] it also appears that these principles are unaffected by the changes to which they give rise. Thus, the form -- or each form, if there are several -- fashions the substrate by its presence, or else by its absence allows it to be deformed, while itself remaining eternally unaffected. And even the substrate, though it is said to become and perish, in a sense, by virtue of the presence or absence of this or that form, is nevertheless also treated as a single nature that remains imperishably throughout all these changes.[10]

This initial interpretation of the principles of the beings is consistent with Aristotle's first response to the perplexity of the early philosophers. For it allows him, as we have seen, to say that things come into being from what is not, in the sense that the substrate is not yet shaped by the eventual form, and also from what is, in the sense that it is at least something even then. This view also allows him to respond, moreover, to a further perplexity of the early philosophers. For Aristotle

tells us that they went on to say that there is no multiplicity, or that nothing exists except for "that which is itself" (αὐτὸ τὸ ὄν, 191a33), apparently on the grounds that each of many beings would have to be an impossible combination of what is and of some particular determinant, which, not being what is, therefore is not.[11] But if, as our speech suggests, "that which is itself" can be meaningfully understood, in each case, only as that which is precisely some definite being, rather than another,[12] then there can indeed be a multiplicity of beings.

Despite the merits, however, of this account of the principles, its very consistency with Aristotle's first response to the perplexity of the ancients points to a difficulty. For the bizarre illustration which troubled us in that response, namely, that of a dog coming into being from a horse, calls our attention to the fact that nothing in this account of the principles would seem to rule out such an event. If the forms are elements whose mere presence in the substrate gives rise to natural beings, there would seem to be no reason why the form of a dog could not supplant immediately that of a horse. For the notion of a single substrate that receives in turn the various forms offers no way of explaining why a certain being must come to be from definite antecedents; or in other words, it offers no way of explaining why the privation that is succeeded by a certain form must be present in the substrate along with some definite form, rather than others. This interpretation of the principles, then, though it may allow us to deny that something can come from nothing, does not rule out, or at least not evidently so, the notion that anything, among the possible beings, can come into being from anything else.[13]

Another difficulty with this account of the principles of the beings is that it leaves it unclear what a being is. To be sure, Aristotle has spoken of the coming to be of "each thing [as] what it is called according to its being (κατὰ τὴν οὐσίαν)" (190b19), thus suggesting that the being of each thing is what it is called, or its form as it comes to light in speech. But his presentation also invites a quite different account of it. For if there is a single substrate that remains imperishably throughout all changes of form, it could well seem, despite our habits of speech, that this is the true being of everything, and that the so-called forms are mere attributes of the one substance.[14] On this view, it would not be beings in the strict sense that come into being, but only various attributes of the one persistent being; and Aristotle's account would not differ significantly from that of the earliest philosophers, at least some of whom allowed for changes in the attributes of the underlying substance.[15] Now clearly enough, Aristotle has been trying to avoid this position. But he acknowledges that he has not simply succeeded in ruling it out by telling us, near the end of his general statement about the principles, that it is not yet manifest whether the form or the substrate is [in the paramount sense] being (οὐσία, 191a19).

Still another difficulty with this interpretation of the principles concerns privation, which Aristotle also calls the opposite to form. Aristotle has said, we recall, that beings do come into being from this third principle, though only by concomitance. His grounds, apparently, for limiting himself to this qualified claim are that the privation or lack of form is only a concomitant in the substrate, and one which ceases to exist there

in any sense once the completed being has come to be.[16] But if privation is merely this temporary lack of form in the substrate, one wonders why it is even treated as a principle at all. The mere fact that form cannot come to be present in something without its having not been there before hardly seems a sufficient reason for elevating its initial absence to the status of a principle of becoming. And Aristotle himself suggests at one point that there is no need to speak of a principle opposed to form, since the form itself suffices, by its absence and by its presence, to bring about change in the substrate.[17] Still, he does not follow up on this suggestion, and he continues his account as if it had been established that privation is to be included among the principles. Now this difficulty as to whether, and in what sense, privation is a principle may help to remind us that when Aristotle had first spoken of an opposite to form -- before he had even introduced the terms "form" and "privation" -- he argued that it was <u>not</u> merely by concomitance that something comes into being from its opposite. He also stressed at that time that the true opposite to an ordered arrangement (or "form") is not the mere absence in general of that order, but rather a definite kind of absence, such as the particular manner in which the materials for building a house must first be available.[18] And since a house can be put together only after the materials have been prepared in the appropriate way, it indeed makes sense to speak of this particular kind of absence of its form as a true principle, and not merely one by concomitance, of its coming to be. But by thus helping us to understand the importance of what is opposed to form, Aristotle only adds to the puzzle of why his thematic account of the

principles presents a view, or so it appears, according to which this opposite is at most a principle by concomitance.

The difficulties with this initial interpretation of the principles suggest that we should look for another way of understanding them. To this end, it is of help to note that Aristotle has never explicitly even asserted that beings all come to be from a single, persistent substrate (such as might receive, for instance, the form of a horse and then that of a dog). To be sure, he has invited us to assume that he thought so, first by arguing that the passive principle is only one, and then by claiming, in the course of the development of his own account, that the substrate, insofar as it is not opposite to the new form, persists throughout the process of coming to be.[19] And yet he has also made it clear that we sometimes speak of a single principle in reference to a number of principles that are one in kind; and though he does later characterize the substrate as one in number, he is referring there, at least primarily, to the particular substrate of a particular being -- indeed, of an artifact -- or to that of a particular attribute. Furthermore, in his first thematic reference to the substrate from which a being, as distinct from a mere attribute, comes to be, he uses as an illustration the seed of a plant or animal, and this clearly is not something that persists.[20] And if the substrate from which a being comes to be need not persist, then we must abandon the interpretation of this principle of becoming as a single something that receives in turn the various forms.

Let me suggest, therefore, that the true substrate from which a being comes to be is in every case something particular and perishable, such as a seed, which in addition to being

whatever it first shows itself to be also has the potential to give rise to a new being of some definite kind. This interpretation of the substrate from which a being becomes can help us, as the other could not, to speak properly of unqualified becoming, or the coming into being of a new being, in its distinctness from alteration and the other changes in which a being merely acquires a new attribute (cf. page 7). And a closer look at what we mean by unqualified becoming confirms the superiority of this interpretation. Later in the Physics, Aristotle will tell us that unqualified becoming, as opposed to the other changes, is the coming into being of something that is, i.e., is signified by an affirmative expression, from what is not, or is not signified by any affirmative at all.[21] This account, by the way, makes it all the more difficult for us to be satisfied with his first response to the perplexity of the ancients, according to which coming into being from what is not (understood as privation) occurs only by concomitance (on the grounds that privation is only a concomitant of something that is). But in this same later passage, Aristotle will propose an interpretation of "what is not," an interpretation that builds upon our new view of the substrate, that allows us to see it as a genuine source of becoming. He says there that what is only potentially a being simply or a being at work is in one sense -- and in a truer sense than privation, as he also suggests -- what we speak of as what is not.[22] Of course, Aristotle does not mean by this claim that a seed, for instance, is not something; but he does mean that what the seed is, above all, is its unfulfilled potential for the being that has not yet come to be. Accordingly, it makes sense to deny that it is any being in the fullest sense of the word,

and even, therefore, to speak of it as what is not.[23] Moreover, as we have noted, it is not merely by concomitance that a being comes to be from something with the appropriate potential. And so my interpretation of coming to be from a particular substrate or potential being has allowed us to understand how unqualified becoming can both require a substrate from which the thing becomes while still being a true emergence from what is not.[24] And this interpretation also helps us to see the strength of Aristotle's second response to the perplexity of the ancients, which he had told us was based on the distinction between potentiality and being at work.

Now if the substrate from which a being comes to be does not persist, as at least in the case of natural beings it does not,[25] then the being can not consist of a form in that substrate. Indeed, it does not make sense to describe it as a form in anything else. For what there is, is just the being with various aspects. The form of the being is of course fundamental among these aspects, for it is in terms of form that we give the being its name. And the very fact that we give to it the name of some species -- i.e., a class of beings whose members are the same in form -- shows that there must be other aspects to it as the particular being it is. But none of these other aspects is related to the form as a substrate in which the form exists. And accordingly, we are in a position to begin to resolve Aristotle's question as to whether the form or rather the substrate is being [in the paramount sense] (οὐσία; cf. page 7). For to the extent that we mean by "substrate" something belonging to the being in question, then it now appears that the form <u>is</u> the substrate, i.e. the being itself, though considered in abstraction from its

other aspects. And to overcome this abstraction, or to give a fuller characterization of what the being, or the substrate, is, we may call it a particular instance of that form.[26]

A further advantage of this new interpretation of the principles is that it allows us to understand, as the earlier one did not, what Aristotle can mean in saying that form is an active principle in the production of a natural being. According to the earlier view, we recall, the forms are independent beings that produce embodiments of themselves by somehow becoming present in (a portion of) the substrate, and that eventually cause the perishing of these embodiments by becoming absent from it, while themselves remaining eternally unaffected. On this new view, by contrast, a natural form is the principal aspect of a being that becomes and perishes, and it is this being that has the power to produce others of its kind, as for instance through the production of seeds like the one from which it came itself. And Aristotle helps direct us to this thought by an otherwise puzzling feature of his treatment of the perplexity of the ancients. For he restates the perplexity to include not only the original question of how there can be coming into being from what is or from what is not, but also the question of how what is not or what is can act or be acted upon so as to produce something.[27] And now that we have interpreted form as what [a being primarily] is, we can understand this newest question as a way of asking what it means to say that form acts upon what is not [that being] so as to produce something. Aristotle responds to his question by reminding us that when we say that a doctor, for instance, acts or is acted upon so as to produce something, we mean that he does so insofar as he is a doctor, even though he might also be a

builder, a man of fair skin, and many other things as well. By analogy, then, when we say that what is acts upon what is not so as to produce something, we are not thinking of what is, or even of what is something definite, as a form that exists or acts independently. Rather, we mean, in the case of natural beings, that a being, insofar as it is, i.e., is characterized by its form, acts upon what is not, in this sense, but has the appropriate potentiality, so as to produce another being of the same kind. Thus, a mature animal or plant, insofar as it is characterized by its form, acts upon its nourishment so as to produce a seed of its own kind, and this seed may produce changes in the appropriate material from which a new member of the species comes to be.[28] Or a mass of air, insofar as it is characterized by the form of air, which involves heat, may heat the cooler water beneath it so that it fulfills its potential to be transformed into air.

Now my claim that the substrate from which a being becomes does not persist as a substrate of the being itself, along with the related claim that the form does not, strictly speaking, produce anything, does not appear, of course, on the surface of Aristotle's account. But to say nothing of the hints to which I have already called attention, this account is explicitly based on the assumption that there are principles from which natural beings are [constituted as what they are] that are also those from which they have come into being.[29] And Aristotle presents this assumption in a hypothetical clause, thus helping to call attention to its possible weakness. So we should not be too surprised that the argument as a whole has led us to conclude that there are no such principles. And since the difference

between Aristotle's preliminary interpretation of substrate and form and the one that his argument has now led to is largely the difference between their being regarded as imperishable or not, our preference for the latter of these interpretations receives support from a striking suggestion that he makes, in On the Heaven, that the principles of the perishable beings may well have to be perishable.[30]

We have now seen, I think, that Aristotle's surface account of the principles, along with the first of his two responses to the perplexity of the ancients, is not a true expression of his own serious view. And he never gives a thematic presentation of that view, not even to the small extent that I have tried to do here, but he limits himself to scattered remarks and to hints that help direct us to it. Thus, the question arises of why he chose not to present his view in a more straightforward way. Now to begin to answer this question, we should recall Aristotle's observation that all the students of nature agree in the opinion that there can be no coming into being from what is not, i.e., from that which does not exist in any sense.[31] This opinion is in fact a basic presupposition of the study of nature (in its original meaning), for if something can come from nothing, then anything could come from anything, and there would be no natural, or necessary, origin of any being. Yet we know from Hesiod's Theogony that it was possible for a thinker of stature to deny this opinion. For Hesiod says that at first Chaos, and then Earth, Tartaros, and Eros, came into being, but he does not say, as he does with regard to the subsequent generations, that they came into being from anything or from anyone.[32] And the Theogony's assumption that all the gods have come into being and yet

will never perish is compatible, to say the least, with the view that those first beings did come into being from nothing. But if it is truly an open question whether there can be coming into being from nothing, then the study of nature, or of the beings of our world as being natural beings, remains itself a questionable enterprise. Yet the earliest philosophers seem not to have been troubled by the thought that there might be coming into being from nothing. For they claimed to have knowledge of a substance or of substances whose nature or natures remain forever the same, and whose changes in density or whose separations and combinations give rise to everything that could possibly be said, popularly, to come into being.[33] Now, if these philosophers were correct in their claim to have knowledge of an unchanging substance that delimits the possibilities of change, then the study of it, or of nature, would make evident sense. For there would still be unanswered questions about this substance (or substances), and in particular, the question regarding the precise manner in which the composite things around us are constituted from it. And yet this inquiry into nature could proceed in the confidence that the radical challenge that we saw presented in the Theogony could be safely ignored. But on the other hand, if as I have suggested, there is no unchanging substance, or at least none that is knowable, underlying all the changes that we see around us, or if in other words we have only our experience of the world as a guide to tell us what can come from what, then this radical challenge to what is presupposed by the study of nature becomes a serious one. And let me suggest, then, that the chief reason for Aristotle's reserve in discussing the principles is that he did not want to expose his students to

a premature confrontation with this challenge to the notion of nature. He thus offered a view of the substrate and of its relation to the higher principle which, if true, would guarantee at least that nothing can come from nothing. And yet by calling attention to the inadequacies of this view, and by pointing in the direction of the one he thought was true, he combined his primary education with a secondary one, while also leading his readers to the fundamental question of what, if anything, is the adequate basis for his own view.

* *

As an appendix to my argument that there are these several levels to Aristotle's thought regarding the principles, I would like to call attention to his discussion of what seems to me to be the somewhat similar case of the philosopher Anaxagoras. To appreciate this discussion, we should first note that it is Aristotle's habit to present his preliminary doctrines as what "we say," i.e., what he says as the spokesman for his school. Thus, we have already seen, for instance, that he introduces his first response to the perplexity of the ancients by calling it what "we say" (ἡμεῖς δὲ λέγομεν, 191a34; cf. page 2). And there are other examples in the Physics of this usage. One of the most noteworthy of these examples occurs in his discussion of void, where he introduces the claim that the matter of hot and cold -- which in the context means, especially, of air and water -- is one in number by saying that this is what "we say on the basis of what has been laid down" (ἡμεῖς δὲ λέγομεν ἐκ τῶν ὑποκειμένων, 217a21).[34] Now in the light of this usage, we are prepared to

remark that Aristotle's discussion of Anaxagoras contains an unusual density of references to what "they," i.e. he and his followers, say. It is true that he first mentions Anaxagoras in the singular as the author of a doctrine according to which the permanent substrate consists of infinitely many kinds (including all the uniform bodily parts such as flesh and bone, together with the contraries). But when he goes on to speak explicitly of what Anaxagoras thought (οἰηθῆναι, 189a27), as distinct from what he authored (ποιεῖν, 187a24), he uses an ambiguous expression that could mean that he merely "seemed" (ἔοικε δὲ ..., 187a26-28) to have thought this.[35] And the continuation of Aristotle's account of this view of the substrate, with its further claim that there is some of everything in everything else, presents it only as what "they" say (φασι, 187b1) or as what "they believed" (ἐνόμισαν, 187a36), and there is no reference to Anaxagoras in the singular. Another sign, moreover, that Anaxagoras may not have accepted this doctrine about the substrate is the claim which Aristotle attributes to him, both here and in On Generation and Corruption, that coming to be of such and such a sort is alteration.[36] For alteration involves the emergence of new characteristics in a substrate, but at least with regard to the characteristics of the infinitely many original kinds, that is precisely what this doctrine is meant to deny. Yet one can understand, on the basis of what we have seen in the case of Aristotle, that Anaxagoras might have taught this doctrine without accepting it. For those who do accept that some of everything, including even flesh and bone and the like, has always been present in every portion of a permanent substrate, are therefore sheltered from doubts regarding their philosophic

claim that life arose without a miraculous emergence from nothing. And yet it seems to me that no genuine philosopher could have accepted this bizarre doctrine about the nature of the substrate.[37] Thus, I propose that it plays much the same role in Anaxagoras' thought as does Aristotle's own preliminary account of the principles. At all events, it makes sense that at least some of the early philosophers would have shared Aristotle's awareness of the value of such a preliminary account.

ENDNOTES

1. Physics 190b17-29.

2. Physics 191a23-b27; 187a26-35.

3. Physics 191b20-21; and contrast 190a24-26, 190b4-5.

4. The only support within the ancient tradition for distrusting the surviving manuscripts is a variant reading mentioned briefly by the commentator Simplicius. Simplicius, In Aristotelis Physicorum Libros Quattuor Priores Commentaria, in Commentaria in Aristotelem Graeca ix, ed. H. Diels (Berlin: 1882), 239.28-30; but contrast 239.18-19. Modern discussions of the passage include Aristotle's Physics: a Revised Text with Introduction and Commentary, ed. W. D. Ross (Oxford: Clarendon Press, 1936), 495, and Aristotle's Physics, Books I and II, edited by W. Charlton (Oxford: Clarendon Press, 1970), 80-81.

5. That this is so is also the view of Thomas Aquinas, though he does not draw all the implications that I do from the inadequacy of the first response. See Thomas Aquinas, In Octo Libros Physicorum Aristotelis Commentaria, ed. P.M. Maggiolo, (Rome: Marietti, 1965), Book I, Lecture 14, Paragraph 126. Aquinas' commentary has been translated by R. Blackwell, R. Spath, and W. E. Thirlkel as Commentary on Aristotle's *Physics* (New Haven: Yale University Press, 1963), p. 60.

6. Physics 190a24-26; cf. Metaphysics 1033a5-23.

7. Physics 190b17-20.

8. Physics 189b16-18, 27-28 (and cf. Metaphysics 1014a26-34); 189a20-26, 190b30-35, 191a6-7, and also 192a16-19.

9. Physics 189a19-20.

10. Physics 192a34-b2; 192a25-34. Aristotle says that the substrate can be considered both as "that in which" [there is privation] and also "according to potentiality." By this latter expression, he goes on to explain, he has in mind a nature from which something comes into being [and] which is [also] inherent [in the completed thing]; and he argues that the substrate in this sense (or matter, as he also calls it) is necessarily imperishable and ungenerated. It is, moreover, this latter view of the substrate that follows most readily from his earlier discussion of it (cf. Physics 190a13-25, 192a12-14).

11. cf. Simplicius, op. cit., 236.1-12.

12. cf. Physics 187a8-9.

13. Compare Plato, Cratylus 393b7-c6ff.

14. Physics 189a27-34; cf. Metaphysics 1029a10-27.

15. Physics 187a26-31; cf. Metaphysics 983b6-18ff.

16. Physics 191b13-17; 190b25-27. cf. Alexander of Aphrodisias, as quoted in Simplicius, op. cit., 238.8-14; Themistius, In Aristotelis Physica Paraphrasis, in Commentaria in Aristotelem Graeca v. part 2, ed. H. Schenkl (Berlin: 1900), 30.16-29.

17. Physics 191a5-7; cf. 192a14-16.

18. Physics 188a31-b21. The definiteness of this opposite to form strengthens the analogy between Aristotle's account of these cases, in which an ordered being first comes to be, and his account of those simpler cases in which change is between contraries in the strict sense (such as hot and cold), and in which privation is accordingly not the mere absence in general of some form, but rather one of the specific contraries in question. cf. On Generation and Corruption 318b14-18, 332a22-23; Metaphysics 1055a33-b11ff.

19. Physics 189b16-19; 190a13-19. Note, however, that this claim regarding the persistence of the substrate is explicitly based on the premise that we can consider Aristotle's first example of an unmusical man becoming musical as the model for understanding all coming into being.

20. Physics 188b36-189a9, 190b23-25; 190b1-5; cf. On Generation and Corruption 324b6-7. A further indication that Aristotle does not believe that there must be a single substrate for becoming is his use of the plural αὐτοῖς at 191a1. See also the valuable discussion by W. Charlton, op. cit., 74-79, 129-145, and also in his "Prime Matter -- a Rejoinder," Phronesis 28 (1983), 197-211. Charlton fails to recognize, however, how much Aristotle himself contributed to the traditional misinterpretation of his text, and thus he also fails to wonder why Aristotle might have chosen to do so.

21. Physics 224b35-225a20.

22. Physics 225a20-25, and contrast 225b1-5; cf. On Generation and Corruption 317b14-18, Metaphysics 1051a34-b1. In this section of the Physics, Aristotle speaks of privation as an opposite to form only in cases of qualified becoming, or of motion. In other words, he speaks of change from privation to its contrary form only if it is a change of attributes in a persistent substrate, as distinct from a change from what is not to what is. He even suggests, moreover, that privation can always be signified by an affirmation (as for instance, by "what is naked" instead of "what is not clothed"). See Physics 225b1-5, and compare 193b20-21; see also Metaphysics 1055a29-b16, especially a29-30 and b7-8.

23. A more precise analysis would require us to distinguish between the seed, as an active principle, and the materials, such as water and earth, which it transforms so as to produce the being, and which are therefore even more truly spoken of as what is not. Also, in the case of the four elements, which come into being from one another rather than from seeds, it is admittedly difficult to treat the coming into being of any one of them as a change from what is not to what is. Yet Aristotle suggests explicitly that it might be correct to do this, at least if the

new element is higher, or higher in rank, than the old one (Physics 213a1-8; cf. On the Heaven 310b11-15; On Generation and Corruption 318a35-b33, but contrast 319a29-b5). On the other hand, he does not regard the four elements themselves as beings in the full sense that plants and animals are, and so it is not wholly surprising if the character of unqualified becoming should be less clearly manifest in their case than it is in the case of those other beings (cf. Metaphysics 1040b5-10).

24. At Physics 225a27-29, Aristotle does not say, as it might appear, that there is coming to be only by concomitance from what is not. What he says, rather, is that even on this supposition (a supposition which he himself has encouraged in Book One, and which he might not wish openly to undermine), it is still that which is not that comes to be.

25. An acorn, for instance, does not remain as part of an oak tree, nor does air remain as part of the water that has been formed from it. I am disregarding here the secondary question regarding artifacts, which might be said to come into being from the reshaping of a substrate -- such as wood, for instance, or bronze -- which persists at least as long as the new beings do. Even in these cases, however, I do not think that the being is appropriately characterized as a form in a substrate. cf. Metaphysics 1045a7-b23.

26. Consider Physics 188b16-21, and cf. page 8.

27. Physics 191a34-36.

28. See On The Generation of Animals 724a14-726a28, 729a34-730b32, and throughout.

29. Physics 190b17-23; cf. page 4.

30. On the Heaven 306a9-11; consider, again, Physics 192a25-b4.

31. Physics 187a32-35. The reference, at 191b35-192a1, to a Platonic claim that there is coming into being from what is not should be compared, rather, to Aristotle's own later suggestion that what is not may be understood as what is only potentially a being in the full sense. See, again, 225a20-25.

32. Hesiod, Theogony 116-122.

33. Physics 187a12-26; Metaphysics 983b6-984a29.

34. Physics 217a10-31ff.

35. To be sure, the simpler interpretation of this sentence is that it "seems" to be for the two reasons that Aristotle here proposes that Anaxagoras thought that the substrate was thus infinite (without there being any further suggestion that it only "seems" to be the case that he did think so). But the reading that I have suggested is also possible, and it seems preferable in the light of the other factors discussed in the text.

36. See Physics 187a29-30. That this is a reference to Anaxagoras (and his followers) is confirmed by the explicit statement in On Generation and Corruption, 314a13-16, that Anaxagoras did identify coming into being and perishing with alteration. It is true that there is no evident support for this statement in the fragments that remain to us from Anaxagoras. Yet I see no reason to distrust what Aristotle says on this matter. And his use in both passages of the verb καθέστηκε(ν) strongly suggests that he had a specific Anaxagorean text in mind. It is worth noting that the passage in On Generation and Corruption stresses the inconsistency between Anaxagoras' claim that becoming is alteration and his doctrine about the substrate.

37. Consider the difference between the singular and plural subjects in On Generation and Corruption 314a24-b1.