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NATURE AND NECESSITY IN ARISTOTLE'S *PHYSICS*

Abstract. In *Physics* II.8 Aristotle claims that the type of necessity found in natural processes is not simple necessity as the ancient physicalists maintained, but hypothetical necessity. The article first considers the textual context within which this issue arises. Then it examines two basic elements of Aristotle's conceptual apparatus, nature and necessity. It considers his understanding of nature as an inner source of activity and calls attention to the ontological problem of the location of this source within the very entity whose source it is. Next, it examines the various sorts of necessity that Aristotle distinguishes, identifies the sense of necessity that is at work in the ancient physicalist account of natural coming to be, and contrasts it with the hypothetical necessity he proposes. It points out that there remains the unresolved problem of Aristotle's use in the natural domain of the simple necessity that he elsewhere explicitly reserves to the realm of the unchanging and eternal.

Key words: Aristotle, ancient philosophy, metaphysics, teleology, hypothetical necessity, nature, physicalism.

1. Introduction. 2. Nature as inner principle. 3. The varieties of necessity. 4. Difficulties with necessity in nature. 5. Conclusion.

1. INTRODUCTION

Aristotle opens *Physics* II.8 with a statement of the view of thinkers whom we may for convenience collectively call the "physicalists" about the way in which natural things come to be and develop. Briefly put,

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they hold that the material parts out of which such substances are made, acting necessarily according to their natures, cause those substances to come into being and determine their qualities and behavior. The necessity, which they attribute to nature, is simple or absolute necessity.[1]

Opposed to this position is the view, espoused and defended by Aristotle, that such necessity alone is insufficient to account for all of the actual features of natural substances. He held that we must rather look first to the whole, which is prior to the parts both in being and in generation. In opposition to the physicalists, Aristotle invokes and gives primacy to a necessity which he calls hypothetical: the necessity that the materials out of which an object is composed be present if that object is to exist. In this view the parts are subordinated to and determined by the whole which they constitute.

The distinction between these two kinds of necessity corresponds to the division of the four Aristotelian causes or modes of explanation into material and moving on the one hand, and formal and final on the other. Those who ascribe natural development to simple necessity emphasize the role of the materials out of which a substance is composed and their motions. The proponents of hypothetical necessity, however, give the first place to the form of the whole entity and to the action of the parts for the sake of that whole. In their view, all natural substances possess a form which is proper to them and is irreducible to anything more fundamental and all natural processes, particularly those of living organisms, are directed internally to the good of the product.[2]

The aim of the present paper is to set out the overall framework of the problem of necessity in nature in the *Physics* and point out some difficulties that arise. I will first consider Aristotle's basic conception of nature in the *Physics* and then turn to his understanding of necessity in general and its particular application in nature.

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[1] Simple or absolute (*haplôs*) necessity is not mentioned explicitly in Chapter 8. It does, however, appear at the beginning of the next chapter (Aristotle, *Physics* II.9 199b34–35).

[2] Such an interpretation of Aristotle's position, in which form is ultimately irreducible to the materials, is proposed by Allan Gotthelf, *Aristotle's Conception of Final Causality*, Review of Metaphysics 30(1976), 226–254.

2. NATURE AS INNER PRINCIPLE

Natural things and phenomena are the subject matter of the *Physics*, and in the first chapter of Book II Aristotle explains what they are, giving examples of things that are "natural" or "by nature": animals and their parts, plants, and the simple bodies, earth, fire, air, and water.[3] These things have in common a feature that distinguishes them from those that are not constituted by nature; each has within itself, he claims, a principle of motion and of rest.

Nature is the name he gives to this principle and it acts in those things both by constituting them to be what they are and by causing their activity once constituted. Thus the growth of a plant from a seed to a mature individual is initiated by such a principle in the seed and is directed by the same principle in the tree that sprouts from it. It is not acted upon by external agents in the way that a house or a statue are in their coming to be; there the architect or the builder is the source of the coming to be of the artifact and is external to it. In the case of the tree there is something like the builder at work. It is nature. For just as a builder gathers stones and other materials and arranges them into the form of a house according to a plan he possesses, so too nature, also acting according to a plan, causes the tree to take in nutrients and arranges them into the form of a living tree.

It is not hard to see how whole organisms might be by nature in the sense described above. However, Aristotle includes among the things which are by nature not only whole living organisms, but also their parts: limbs, organs, flesh, bone, etc. These parts are also by nature, but not in the same way in which the whole organism is. For organisms are capable of independent activity and possess their own natures. Organic parts, however, cannot exist independently and do not possess natures properly speaking. Apart from the organism the parts cannot either bring themselves into existence or continue to function normally. For example, a detached limb cannot come into existence by itself and one cut off from the body has no power to move itself. Yet to be able to move oneself by oneself seems to be what it means to have one's own

[3] Aristotle, *Physics* II.1 192b8–13.

nature. Nevertheless, although the parts do not have their own natures, they may still be said to be by nature or natural because the nature of the organism to which they belong caused them to be formed and maintain them in existence.

Finally, he also includes the simple bodies in the class of things of things that are by nature. These things are not constituted by nature, since they are simple and have no constituents. Yet they still qualify as natural because they have proper motions – changes of place – which do not originate from a source external to them. Earth, for example, is heavy and falls by itself when it is released; its downward motion when the obstacles are removed is not imposed upon it but originates from within and belongs to it properly. The horizontal motion of the same piece of earth, on the other hand, is not natural since it will not take place by itself but does have to be imposed upon it. Thus a stone will fall when it is released but will not travel horizontally without being thrown. If someone were to object that it is the gravitational attraction of the planet earth which acts externally upon the stone, we can still make a distinction between the natural and the non-natural. For there is something about the stone, which in some sense is in the stone, that makes it susceptible to the attraction of the earth, whereas nothing similar in it causes it to rise or move horizontally. Thus earth and the other simple bodies or elements are natural in that they have within themselves principles of motion.

Now the natural things considered above are clearly different from things, such as a statue, a bed, or a coat, which come to be by art, that is, through the activity of a craftsman. These are all made or constituted in their being by something outside of themselves and any self-motion they exhibit is due not to their being products of art but to their constituents. They do not have any inner principles of motion insofar as they are products of art, for they do not have any motions which belong to them as a whole apart from those due to their parts. For example, in a statue made by an artist, what makes it be what it is – its shape – is not the result of the activity of anything in the marble.

Such things, of course, are not entirely unnatural either, for the materials out of which they are made are natural, and the wholes do possess some of the properties of these constituent. However, the essential

feature of products of art, the form imposed upon the materials by the maker, is entirely artificial. Thus a statue does indeed possess an inner tendency to move, insofar as it is made out of marble, which itself has such a tendency. But it does not have any tendency to move in virtue of being a product of art. So a statue will indeed fall when it is released, just as a wooden bed might sprout when planted, but we cannot for this reason call them natural or attribute natures to them. These motions are not proper to them as products of art but belong to them because of their constituents. Such observations lead Aristotle to conclude that "nature is a principle and a cause of being moved or of rest in the thing to which it belongs primarily, and in virtue of that thing."[4]

The critical problem, however, and one of the main issues at stake in *Physics* II.8, is whether the reality to which the term nature refers is, as Aristotle would have us believe, a first and original principle in each specifically distinct entity, something "novel" in every natural substance with respect to the materials in which and out of which it comes to be, or whether it is "merely" a numerical sum of sorts of the activities of the material constituents. In the latter case, however, while the reality to which the term nature refers is indeed to be found in things, it would turn out to be of a peculiar sort, for on the one hand it would be offered as an account of *one* particular kind of thing – its coming to be and its specific behavior – but on the other hand proper unity would be denied to it by maintaining that a multiplicity of principles is at work.

Sarah Waterlow, who presents a detailed analysis and interpretation of Aristotle's notion of nature in her work *Nature Change and Agency in Aristotle's* Physics, makes substantially the same point. According to her, Aristotle believes that natural substances are characterized by *per se* unity and that this sort of unity can only be accounted for teleologically. Opposed to such unity would be a *per accidens* combination of material elements, where accidentality means that there is no one distinct factor really responsible for the collective activity of those elements and hence nothing that bestows unity upon it.[5] Paradoxical as it may seem, the

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[4] Ibid., II.1 192b21–23.

[5] S. Waterlow, *Nature, Change, and Agency in Aristotle's "Physics"*, Clarendon Press, Oxford 1982, 69–70.

physicalists in the end claim that apart from the elements there are no *per se* unities in nature and that complex beings are merely accidental combinations of the activities of the elements. Yet in doing so they seem in fact to deny the existence of nature as Aristotle understands it, for they claim that there is no *one* distinct source of natural coming to be and activity.

Susan Sauvé Meyer's interpretation of the argument in *Physics* II.8 takes this issue one step further. In *Aristotle, Teleology, and Reduction* she claims that what the physicalists propose is not merely the reduction of the natures of complex substances to those of their constitutive elements, but the elimination of such natures altogether. The rival to Aristotle's natural teleology and his belief that such entities possess proper natures, which she identifies as overdetermining intrinsic efficient causes, is not the reductive claim that such natures consist of the collective simply necessary activity of the elements. The true rival, she argues, is the more radical eliminative claim that there is no phenomenon to explain; there is no legitimate substance and hence no nature that corresponds to it. The physicalists achieve this by maintaining that complex substances come to be by chance: through the coincidental intersection of the naturally necessary activities of the elements. Yet if their genesis is attributable to chance, this means that there is really nothing to explain scientifically, since products of chance are not repeatable and are not as such susceptible to epistemic analysis. She calls this position "eliminativism".[6]

Aristotle argues that natural coming to be is not the product of chance and that complex natural substances therefore do possess proper natures, internal sources of coming to be and behaving. Products of chance do not come to be with regularity, while living things, the paradigmatic instances of complex natural substances, are notoriously recurrent. The regularity and frequency of their occurrence requires a proportionate source or efficient cause, and this is what he understands by nature. And since no such cause is to be found outside of them, in the ordinary physical sense of the term "outside", it would appear reasonable to conclude

[6] S. Sauvé Meyer, *Aristotle, Teleology, and Reduction*, The Philosophical Review 101(1992), 825.

that it is present within the confines of the physical object that is first in the process of coming to be and later exhibiting its proper activities.

This having been said, and in spite of the cogency of Aristotle's conception of nature, I would like to call attention to one serious ontological difficulty that remains to be adequately resolved. A fully satisfactory understanding of nature would require an explanation of precisely what this principle consists of, of precisely how and where it is present in things, and of exactly how it operates. Such an account is not to be found in Aristotle's works, though they certainly do contain much detail about the inner structure and workings of living organisms. It might appear that modern physical and biological science has finally achieved precisely this by giving us ever more accurate descriptions of the processes that take place in living things. Such accounts would seem on the one hand to be internal in the desired physical sense that is suggested by Aristotle, and on the other hand to be sufficiently detailed to satisfy our modern scientific sensibility.

Yet there is one issue that continues to cause unrest, though it is by no means new. It has to do with the distinction between source and effect in nature. For Aristotle, as we have seen, nature in the strict sense is an internal principle or source of the motion and rest that are proper to a given entity; i.e. it is responsible for the original coming to be and the later behavior of a thing. In this sense it is an intrinsic efficient cause. Yet nature also can be and usually is construed more generally and less precisely as the manifest behavior of a given thing and as the manifest progressive results of the developmental process. This sense of nature refers more to the phenomenal features of a given thing and has more affinity with the ontological categories of form, substance, and being in the essential sense, though it is the synthetic noetic counterpart of the temporally extended and fragmented sensible or empirical thing.

The difficulty that I would like to call attention to here is that Aristotle identifies these two senses of nature with one another. This is in itself a well-known fact and is usually expressed in terms of causes: in natural substances the formal and moving causes, as well as the final cause, coincide with one another. For example, in the case of the coming to be and activity of an oak, the same principle, the oak, is the mover or source, the form or reality, and the end or consummation. In particular,

nature as source is identified with nature as result, whether as form or as end. The distinction may be formulated as one between generative nature – *natura naturans* – and generated nature – *natura naturata*.[7] We may ask, first of all, how is it ontologically possible for these two to coincide with one another at all, since the former would seem to be the source of the latter? Secondly, and perhaps more pointedly, how is it possible for generative nature to be located in any way within something that belongs to the category of generated nature? There would appear to be no "room" for it there.

3. THE VARIETIES OF NECESSITY

The term necessity (*anankê*, *to anankaion*) has several senses, and Aristotle considers these in the philosophical lexicon in *Metaphysics V*.[8] He begins by giving several common senses. He calls necessary first those things without which a thing cannot live, and secondly the conditions without which a good cannot be attained or an evil eliminated.[9] It is in these senses, for example, that food is necessary for life, marble for a statue, medicine for health, and exercise for fitness. These two sense would appear to be instances of what is elsewhere called by him hypothetical necessity.

The third common sense, significantly distinct from the previous two, is that of the compulsory or the forced: anything that hinders something from acting according to its natural tendency (in non-human entities) or according to its purpose (in the domain of human activity) imposes this kind of necessity upon the thing.[10] For example, a stone which is thrown upwards rises by this kind of necessity; it does so not because

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[7] Sarah Waterlow also draws attention to this distinction and the attendant difficulty, though she does not seem to attribute to it as much importance as I believe it deserves. S. Waterlow, op. cit., 59–66.

[8] For a more complete discussion of necessity in Aristotle see R. Sorabji, *Necessity, Cause, and Blame. Perspectives on Aristotle's Theory*, Cornell University Press, Ithaca 1980. In an appendix Sorabji lists the ten kinds of necessity that he has identified in Aristotle (222–224).

[9] Aristotle, *Metaphysics* V.5 1015a20–24.

[10] Ibid., V.5 1015a26–28.

of its own impulse, which is to fall, but because it has been forced.[11] Likewise a person who has been forced to act does so by necessity, for the action is contrary to his choice or purpose. This kind of necessity may be called the necessity of force.

In the *Posterior Analytics*, however, Aristotle mentions another sort of necessity: a stone is carried both upward and downward by necessity, but the two necessities are not of the same kind. While it rises by the above sort of necessity – constraint or force – it falls by a necessity that is said to work "in accordance with a thing's natural tendency."[12]

This type of necessity also appears in *De Partibus Animalium*, where we find an explicit distinction between hypothetical necessity, the necessity that the antecedents be there if the final end is to be reached, and a necessity connected with the fact that things are as they are "by nature". Respiration, he says, exhibits these two kinds of necessity. The inflow and discharge of air are necessary if we are to live. However, the process by which respiration occurs is necessitated by the elements that are involved in it.[13] The latter kind of necessity is the same as what he calls necessity "in accordance with a thing's natural tendency" in the *Posterior Analytics*, for in the example given there the tendency of a stone to fall is natural, that is, it results from the kind of thing it is.

Further along in the *Metaphysics* passage cited above, Aristotle explains the fourth sense of necessity, which he maintains is the primary one and the one from which the other senses are derived. The necessary, he asserts, refers primarily to that which cannot be otherwise.[14] In order to be called necessary a thing must have to be the way it is at least in some respect. In the strictest sense, what is necessary coincides with what is always or eternal and cannot possibly not be.[15] This primary sense of necessity may be called simple or absolute (*haplôs*) necessity.[16]

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[11] Aristotle, *Posterior Analytics* II.11 94b38–95a3.

[12] Ibid., II.11 94b38–95a1.

[13] Aristotle, *De Partibus Animalium* I.1 642a34.

[14] Aristotle, *Metaphysics* V.5 1015a33–36.

[15] Aristotle, *De Generatione et Corruptione* II.11 337b35–338a2.

[16] "Therefore the necessary in the primary and strict sense is the simple." Aristotle, *Metaphysics* V.5 1015b11–12.

The derivative senses of necessity then, given above, are hypothetical necessity, the necessity of force, and logical or demonstrative necessity.

Simple necessity in the strictest sense, then, is attributed to things which are necessary without qualification. Such necessity requires that the inability to be otherwise be due not to an external factor, but that it have an internal source. One may ask, however, whether the sort of necessity that Aristotle in various place calls "natural" or "by nature" can be included under the category of simple necessity, since natural necessity as such is curiously and conspicuously absent from the classification given in *Metaphysics* V.

It might appear that the final fragment of the passage can be of assistance. There Aristotle distinguishes between "things which owe their necessity to something other than themselves" and those which "are themselves the sources of necessity in other things."[17] Both the forced and the hypothetically necessary fall into the first category, since what is forced is necessary because of what compelled it, while the hypothetically necessary is necessary with a view to what is to come to be. Yet the second category seems to refer merely to the agents of necessity at work in the first category, so that the two categories seem to be simply and almost trivially complementary.

Alternatively, one can distinguish between two types of simple necessity, one having to do with substances in themselves, the other with accidents in relation to a substance. For Aristotle a substance is an independently existing entity; its mode of being does not involve any intrinsic relationship to anything else.[18] To say that a concrete substance is simply necessary means that it must exist. The only such substances for Aristotle are God and the simple substances; it is about them that he says that they are eternal and immovable and that nothing contrary to their nature attaches to them.[19] Such substances, however, are completely beyond nature as Aristotle understands it and therefore the sort

[17] Ibid., V.5 1015b9–11.

[18] This is the case for both first substance (concrete individuals) and second substance (universal substance or essence), though I have in mind particulars here. Cf. Aristotle, *Categories* 2 1a20–1b6 and especially 5 3a7–8.

[19] Aristotle, *Metaphysics* V.5 1015b14–16.

of necessity that attaches to them cannot be the sort that Aristotle takes to be natural necessity.

In contrast to substance, an accident is according to the Stagirite something whose nature involves existing in something else;[20] its existence entails that of an independent entity to which it belongs and which constitutes its substrate. An accident's being simply necessary in this sense does not therefore require that it exist absolutely or independently. It means, rather, that it must exist in a substance if that substance is to be of a particular kind. For Aristotle, what makes a thing be of a particular kind is its essence, which is expressed in the definition of the thing. Certain accidents or features of a thing belong to the essence itself – these are the parts of the definition. Others follow directly from the essence but are not parts of it – these are the properties of a thing. Both, but particularly the latter, can be taken to be necessary in a second sense of simple necessity; they are simply necessary, but as accidents and not in themselves.[21] This necessity can still be construed as simple insofar as the features in question follow directly upon the being of the substance; in other words, nothing other than the substance mediates between it and these necessary features. If a given object is of a specified kind, in that it already possesses the constitutive features that permit it to be identified as belonging to a kind, it must exhibit the further features, the properties, of the kind. Yet features can be of many sorts; the characteristic activity of a thing is also one of its features, as is the way its acts or reacts in the presence of other things. It is in this sense that a given activity can be said to be necessary, naturally and simply.

The second above sense of simple necessity is clearly the more common one. It is thus also in this sense that what is "in accordance with a thing's natural tendency" belongs to a substance. A stone falls by simple necessity because it is a heavy object and it is the nature of such objects to fall if unobstructed. Likewise, fire rises of necessity; it is

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[20] By accident I have in mind here not features whose mode of inherence is accidental (*sumbebêkos*), but the non-substantial categories, i.e. features in general, regardless of their mode of inherence in a particular case.

[21] Aristotle does not make this distinction, but it seems that we must introduce it if natural necessity is to be construed as simple.

a consequence of its essence or a part of its nature. Respiration is said to share in this kind of necessity because it is the result of the mutual interactions of various parts of the body, each of which moves necessarily according to its nature.

We see then that Aristotle identifies a primary sense of necessity and two derivative senses, one of which is hypothetical necessity. It refers to what cannot be otherwise, not in itself, but in relation to something else. Such a hypothetically necessary thing must be or must possess certain qualities *if* something else is to be or to come to be. Things that are necessary in this sense owe their necessity to something other than themselves; their necessity is thus mediated and dependent and cannot therefore be called simple.[22] This applies to all of the examples of hypothetical necessity given above. The conditions for life, for the attainment of a good, and for the elimination of evil are not necessary in themselves but only because of the life, the good, or the absence of evil that they bring about.

In the case of simple necessity, a thing either exists necessarily itself because of what it is, or it belongs to or follows another thing necessarily because of what that thing is. In the case of hypothetical necessity the things which are necessary are so in part because of what they themselves are, for they are necessary because their nature and properties are needed in order for something else to be or come to be. But they are necessary primarily *for the sake of* something else. Hence their necessity is not simple but relative in that it depends upon the hypothetical existence of some other thing.

4. DIFFICULTIES WITH NECESSITY IN NATURE

As in the case of Aristotle's notion of nature, so too with his conception of necessity we encounter a number of difficulties. Some of these are of a textual nature; others are philosophical. I will limit myself here to outlining some of these and the solutions that have been proposed. Here too, however, I should like to call attention to one particular

[22] Aristotle, *Metaphysics* V.5 1015b10.

problem which to my mind has not received sufficient treatment or an adequate response.

As we have seen, the manifest philosophical issue in *Physics* II.8 is whether the coming to be, development, and activity of complex natural substances can be accounted for entirely in terms of the elements, or whether a distinct and irreducible factor is also at work. The former mode of explanation is formulated by Aristotle in terms of simple necessity: complex substances are nothing more than the fortuitous result of the random and simply necessary activity of the material elements. Aristotle counters that this is impossible; the regularity with which such substances occur precludes chance and requires the existence of a distinct and irreducible intrinsic efficient cause, the particular nature, which acts for the sake of an end, the fully developed natural substance. This issue may also be formulated as follows: are explanations in terms of simple elemental necessity fully explanatory? Aristotle's answer is clearly negative. In the case of complex natural substances considered as wholes and above all of living organisms, only explanations in terms of hypothetical necessity offer adequate accounts; in these cases proper and irreducible natures are at work.

Yet a second question may be asked: given that Aristotle maintains the need for explanations in terms of hypothetical necessity in the case of certain natural phenomena, does he believe that such explanations altogether exclude explanations in terms of simple elemental necessity? In other words, does he think that the two explanatory modalities are incompatible with one another? More generally, what is the relationship between them according to him?

This issue is not explicitly present in *Physics* II.8 or indeed in any other single passage. It arises as a textual problem because of apparently conflicting remarks made in distinct passages. On the one hand there are passages, such as *Physics* II.9 (200a15–30) and *De Partibus Animalium* I.1 (639b23–30 and 642a1–13), where Aristotle clearly argues for the primacy of explanations in terms of hypothetical necessity. Furthermore, in *De Generatione et Corruptione* II.11 he seems to deny unequivocally the existence of necessity in the natural realm. On the other hand, in other passages that are of a more practical nature he explicitly makes use of explanations in terms of simple elemental necessity, giving concrete

examples of such explanations. In *De Partibus Animalium* I.1 (642a32––642b2), as we have seen above, Aristotle claims that respiration is both for the sake of something and due to simple or natural elemental necessity. In *De Generatione Animalium* II.6 (743b5–17), while explaining the formation of the skin, he explicitly states that "all these things must be understood to be formed in one sense of necessity", where it is clear that he means simple elemental necessity because he contrasts it with the final cause, which involves hypothetical necessity. In *De Generatione Animalium* V.1 (778a32–b1), to give only one more example, he says that while an eye exists for the sake of something, i.e. again by hypothetical necessity, its blue color comes to be by simple elemental necessity.[23]

This problem has been the object of lively scholarly debate. Some scholars have argued that for Aristotle the two forms of explanation are incompatible with one another and that apparent references to simple necessity are really disguised forms of hypothetical necessity, thus eliminating the problem altogether.[24] Others have admitted that some form of conflict exists but ultimately believe that the two types of explanation are compatible: Aristotle did indeed allow for explanations that make use of simple elemental necessity, but believed that in the case of complex natural wholes explanations that make use of hypothetical necessity take precedence and are irreducible to those of the former sort.[25] Finally, some have postulated a more complementary form of compatibilism as an explanation of both the textual conflict and the

[23] A more complete list of such examples may be found in R. Friedman, *Necessitarianism and Teleology in Aristotle's Biology*, Biology and Philosophy 1(1986), 364 n.1.

[24] For examples of this view see David Balme's earlier work, *Aristotle's De Partibus Animalium I and De Generatione Animalium I (with passages from II.1–3)*, Clarendon Press, Oxford 1972 and A. Preus, *Science and Philosophy in Aristotle's Biological Works*, G. Olms, Hildesheim–New York 1975.

[25] This view is presented above all by A. Gotthelf, *Aristotle's Conception of Final Causality*, Review of Metaphysics 30(1976), 226–254. A very similar view, with more emphasis on the good, is held by J. Cooper, *Hypothetical Necessity and Natural Teleology*, in: *Philosophical Issues in Aristotle's Biology*, ed. A. Gotthelf, J. Lennox, Cambridge University Press, Cambridge 1987, 243–274.

underlying philosophical problem. Hypothetical necessity can coexist with simple elemental necessity in that, while the natures of complex wholes are strictly speaking irreducible to those of the elemental parts in virtue of the fact that they must be organized in a suitable manner – something that is passively allowed for by their natures but exceeds their active capacity – the nature of the complex whole as based upon an organization of the elements makes use of those elements and hence of simple elemental necessity.[26]

A related problem is the objection of superfluity. Once mechanistic explanations of natural phenomena become available, that is, explanations in terms of simple elemental necessities, are not explanations of those very phenomena in terms of hypothetical necessity, teleological explanations, rendered superfluous? This problem then is more philosophical than strictly textual, yet the question naturally arises when one examines Aristotle's doctrine and attempts to produce a consistent synthesis of his position. The obvious context for this sort of question is the one prepared by modern developments in the biological sciences, which offer ever more precise accounts of the mechanisms that stand behind natural life processes. This issue too has been debated in recent decades and the most adequate response would seem to be the position of complementary compatibilism described above.[27]

The above problems have received considerable attention and some consensus has been achieved. I would like to suggest, however, that there is a third general problem that has not received sufficient treatment. It

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[26] This is the later, modified view of D. Balme, *Teleology and Necessity*, in: *Philosophical Issues in Aristotle's Biology*, op. cit., 275–285. Susan Sauvé Meyer, while not explicitly expressing such a view, offers significant support for it by clarifying the notion of intrinsic efficient cause and its relationship to the final cause. See S. Sauvé Meyer, *Aristotle, Teleology, and Reduction*, Philosophical Review 101(1992)4, 791–825.

[27] Representatives of this view are W. Wieland, *The Problem of Teleology*, trans. M. Schofield, in: *Articles on Aristotle*, vol. 1, *Science*, ed. J. Barnes, M. Schofield, R. Sorabji, Duckworth, London 1977, 141–160; M. Nussbaum, *Aristotle on Teleological Explanation*, in: *Aristotle's De Motu Animalium*, text with translation, commentary, and interpretive essays, M. Craven Nussbaum, Princeton University Press, Princeton 1978, 59–106; R. Sorabji, *Necessity, Cause, and Blame. Perspectives on Aristotle's Theory*, Cornell University Press, Ithaca 1980.

concerns not so much the need for hypothetical necessity as opposed to simple elemental necessity or the relationship between the two, but the very nature of simple necessity and whether it has a place in nature at all. It is not that the problem has not come up at all; it has been considered in the context of the previous problems. However, it has not to my mind been focused upon and addressed explicitly.

First of all, our earlier considerations regarding so-called natural necessity notwithstanding, in which we saw that natural necessity can be construed as a peculiar form of simple (*haplôs*) necessity, we may still ask what in fact is the nature of the simple necessity that both Aristotle and his opponents seem to take for granted. Why do they call it simple? In what way is it simple? And more importantly, in view of what Aristotle says about such necessity in *De Generatione et Corruptione* II.11, where he so rotundly and directly banishes it from the sublunar domain, how can we nonetheless condone it in nature and rest easy as he himself makes use of it?[28] We continue then to have the textual problem mentioned above, since in this passage he seems to deny the existence of any kind of necessity in nature, while in other places he allows for it and even gives examples of its operation. The denial in *De Generatione et Corruptione* II.11 is after all categorical.

5. CONCLUSION

Aristotle makes the general claim in *Physics* II.8 that the type of necessity found in natural processes is not simple or absolute necessity as the ancient physicalists maintained, but hypothetical necessity. The problem of the kind of necessity at work in organic processes arises at the end of the book of the *Physics* devoted to the issue of nature.

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[28] The entire chapter is dedicated to the problem and is a lengthy argument for the impossibility of simple necessity in the natural, sublunar world. An example of the tenor of the ideas presented is the following sentence: "Nor again will it be possible to say with truth, even in regard to the members of a limited sequence, that it is absolutely necessary for any one of them to come-to-be e.g. a house, when foundations have been laid." Aristotle, *De Generatione et Corruptione* II.11 337b29–31. The Greek expression that is translated here as "absolutely necessary" is *haplôs anankê*.

Natural things, above all organisms, are distinguished by him from those that are not natural, and such are the works of art, by having within themselves a principle of rest and motion, i.e. of coming to be and activity. It is this principle that Aristotle claims is irreducible to the natures of the material parts out of which such organisms are made and come to be. Yet it remains problematic how such a principle, internal to the natural thing itself, can at once be generative and what is generated.

As regards necessity, Aristotle explicitly distinguishes five senses in the *Metaphysics*. However, in addition to this he speaks elsewhere, in the *Posterior Analytics* and in *De Partibus Animalium*, of what may be called natural necessity, the necessity that things behave according to an inherent, "natural" tendency. This form of necessity can be understood to be a form of simple or absolute (*haplôs*) necessity. Yet his use of the simple necessity in explaining natural coming to be continues to be troublesome because of the compelling force of his theoretical denial of its possibility apart from the realm of the eternal.

REFERENCES

Apostle, Hippocrates G., trans. *Aristotle's Physics. Translated with Commentaries and Glossary*. Grinnell, Iowa: Peripatetic Press, 1980.

Balme, David M. *Aristotle's De Partibus Animalium I and De Generatione Animalium I (with passages from II.1–3)*. Oxford: Clarendon Press, 1972.

Balme, David M. "Teleology and Necessity." In *Philosophical Issues in Aristotle's Biology*, ed. Allan Gotthelf and James Lennox, 275–285. Cambridge: Cambridge University Press, 1987.

Barnes, Jonathan, trans. *The Complete Works of Aristotle: The Revised Oxford Translation*. 2 vols. Princeton: Princeton University Press, 1991.

Bradie, Michael and Fred D. Miller, Jr. "Teleology and Natural Necessity in Aristotle." *History of Philosophy Quarterly* 1.2 (Apr. 1984): 133–146.

Boylan, Michael. "Mechanism and Teleology in Aristotle's Biology." *Apeiron* 15.1 (1981): 96–102.

Cooper, John M. "Aristotle on Natural Teleology." In *Language and Logos*, ed. Malcolm Schofield and Martha Craven Nussbaum, 197–222. Cambridge: Cambridge University Press, 1982.

Cooper, John M. "Hypothetical Necessity." In *Aristotle on Nature and Living Things*, ed. Allan Gotthelf, 151–167. Pittsburgh: Mathesis Publications, 1985.

Cooper, John M. "Hypothetical Necessity and Natural Teleology." In *Philosophical Issues in Aristotle's Biology*, ed. Allan Gotthelf and James Lennox, 243–274. Cambridge: Cambridge University Press, 1987.

Friedman, Robert. "Matter and Necessity in *Physics* B 9 200a15–30." *Ancient Philosophy* 3 (1983): 8–11.

Friedman, Robert. "Necessitarianism and Teleology in Aristotle's Biology." *Biology and Philosophy* 1 (1986): 355–365.

Friedman, Robert. "Simple Necessity in Aristotle's Biology." *International Studies in Philosophy* 19.1 (1987): 1–9.

Gotthelf, Allan. "Aristotle's Conception of Final Causality." *Review of Metaphysics* 30 (September 1976): 226–254.

Gotthelf, Allan. "Aristotle's Conception of Final Causality." In *Philosophical Issues in Aristotle's Biology*, ed. Allan Gotthelf and James Lennox, 204–242. Cambridge: Cambridge University Press, 1987.

Gotthelf, Allan, ed. *Aristotle on Nature and Living Things*. Pittsburgh: Mathesis Publications, 1985.

Gotthelf, Allan and James Lennox, eds. *Philosophical Issues in Aristotle's Biology*. Cambridge: Cambridge University Press, 1987.

Gotthelf, Allan and James Lennox, eds. Introduction to Part III: "Teleology and Necessity in Nature." In *Philosophical Issues in Aristotle's Biology*, 199–203. Cambridge: Cambridge University Press, 1987.

Lennox, James. "Teleology, Chance, and Aristotle's Theory of Spontaneous Generation." *The Journal of the History of Philosophy* 20 (1982): 219–238.

Meyer, Susan Sauvé. "Aristotle, Teleology, and Reduction." *Philosophical Review* 101.4 (1992): 791–825.

Nussbaum, Martha Craven. "Aristotle on Teleological Explanation." In *Aristotle's De Motu Animalium*, Text with Translation, Commentary,

and Interpretive Essays, *Martha Craven Nussbaum*, 59–106. Princeton: Princeton University Press, 1978.

Preus, Anthony. "Aristotle's Natural Necessity." *Studi Internazionali di Filosofia* 1 (1969): 91–100.

Preus, Anthony. *Science and Philosophy in Aristotle's Biological Works*. Hildesheim and New York: G. Olms, 1975.

Sorabji, Richard. *Necessity, Cause, and Blame. Perspectives on Aristotle's Theory*. Ithaca, N.Y.: Cornell University Press, 1980.

Waterlow, Sarah. *Nature, Change, and Agency in Aristotle's "Physics*." Oxford: Clarendon Press, 1982.

Wieland, Wolfgang. "The Problem of Teleology," trans. Malcolm Schofield. In *Articles on Aristotle*, vol. 1, *Science*, ed. Jonathan Barnes, Malcolm Schofield, Richard Sorabji, 141–160. London: Duckworth, 1977. Originally published as Chapter 16, "Zum Teleologieproblem," of *Die aristotelische Physik*. Göttingen, 1962 (2nd edition 1970).