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ARISTOTLE ON THE ANALOGY BETWEEN ACTION AND NATURE

In *Physics* 2.8 Aristotle argues for his natural teleology by arguing for the goal-directed character of nature (or biology). The argument that he develops with the most care is directed against those natural philosophers, like Empedocles, who maintain that the results of natural processes which benefit organisms, such as teeth, come to be through chance (198b16–199a8). Aristotle counters by arguing that because the beneficial results of natural processes occur regularly, 'always or for the most part', they cannot be the outcome of chance, which would yield beneficial results only irregularly.[1] Thus such results must come to be only for the sake of some end. This argument against chance has received the most attention from scholars, but *Physics* 2.8 contains another argument for the goal-directed character of nature, which has received relatively little attention because it does not seem to offer much argument for natural teleology. The argument depends upon an analogy between action and nature, and it simply maintains that since human action (of which art is an example) and nature are analogous, and since action is goal-directed, so too is nature. The argument is of interest, despite its neglect, because it seems to prove nothing to us and yet Aristotle puts it forward confidently as advancing his view about the goal-directed character of nature. The argument from analogy should claim our attention because it provides important evidence for the basic spring behind Aristotle's natural teleology. The fact that Aristotle takes for granted the strength of the analogy with human action in his argument for the goal-directedness of nature suggests that he holds human-like goal-directedness to be a condition of intelligibility that must be met by any intelligible process of coming to be, whether human or natural. This indicates that the model behind Aristotle's teleology, whether natural or metaphysical, is not his biology, or even the arts, but his theory of action.[2]

The 'action' (*πρᾶξις*) of the analogy involves the achievement of an end external to the action itself, which serves as the limit of the action. It is what Aristotle will call

[1] In the interpretation of this argument against chance, I follow J. Cooper in maintaining that the results that Aristotle considers as occurring either teleologically or by chance are those that benefit organisms: 'Aristotle on Natural Teleology', in M. Schofield and M. Nussbaum (eds.), *Language and Logos: Studies in Ancient Greek Philosophy* (Cambridge, 1982), pp. 197–222, esp. pp. 207–9.

[2] An influential view is that Aristotle's metaphysics is based on his biology and that organisms provide the fundamental model for his metaphysical and scientific conceptions. Marjorie Grene has provided perhaps the most popular example of the 'biological' interpretation of Aristotle: *A Portrait of Aristotle* (Chicago, 1963). Montgomery Furth provides a recent defence of the 'biological' interpretation, and he maintains that Aristotle's metaphysics of substance is a 'deep theoretical foundation' for his biological sciences: *Substance, Form, and Psyche: An Aristotelian Metaphysics* (Cambridge, 1988), e.g. p. 5. Others, such as Wilfrid Sellars, have argued for the primacy of artefacts in the development of Aristotle's philosophical conceptions: 'Aristotle's *Metaphysics*: An Interpretation', *Philosophical Perspectives* (Springfield, 1967), pp. 73–124. William Jacobs argues *contra* Grene for the importance of artefacts in the development of Aristotle's overall philosophy: 'Art and Biology in Aristotle', *Paideia: Special Aristotle Issue* (1978), 16–29. Jacobs, however, refuses to align himself completely with Sellars, because he believes that some of Aristotle's philosophical concepts depend at least in part on observations of 'everyday human abilities' that may be exercised outside the arts: p. 27. Jacobs contends that organisms have ontological priority for Aristotle, but that artefacts are epistemologically more basic. Artefacts provide the point of departure, when it comes to making sense of reality, since Aristotle takes them to be 'more knowable to us': p. 26.

in *Metaphysics* Θ.6 a 'motion' (κίνησις) in contrast with an 'actuality' (ἐνέργεια) (1048b18–36). 'Action' most properly is 'actuality', and it is a complete action in comparison with actions that are motions. An actuality is an action that is its own end: seeing, thinking, understanding and the like. In the very performance of the activity the end of the activity is achieved: in seeing we have seen. The action of the analogy, however, is not its own end, or for its own sake, but it is for the sake of the end of the action. It is a process that has some limit that also serves as its end or goal, and the stages of the process are for the sake of the end and made intelligible in terms of it. Aristotle indicates that he has this sort of 'action' in mind when he opens the passage on the argument from analogy with the general comment that, 'Further, among those things where there is some end, for the sake of this the prior and successive things *are done* (πράττεται)' (199a8–9).[3] And Aristotle follows this comment with his statement of the analogy in terms of 'action': 'Surely, as things *are done*, so are things by nature, and as things are by nature, so each thing *is done*, unless something should impede' (199a9–11). 'Action' or 'doing' in this sense has a broad application, and it includes, for example, dieting, walking, learning, and building. It covers, then, actions such as dieting and walking, which are not artistic in character. If Aristotle meant to limit action to artistic action, he would most likely have spoken about 'action' in terms of 'making' (ποίησις), instead of 'doing', since in the *Metaphysics* he contrasts artistic processes with those of nature by calling them 'makings' (1032a25–6). Yet the only example Aristotle employs to illustrate the argument from analogy is from the arts, the production of a house (199a12–13), and after the statement of the argument he also moves immediately away from speaking of 'action' to speaking of 'art'. He shifts, then, in the analogy with action to the narrower action of art. This suggests that Aristotle thinks of nature as closer to artistic action than to action in general, and the passage on the analogy provides additional reason to think that this is his view. None the less, it is clear from the opening of the argument from analogy that Aristotle has in mind action, whether artistic or not, as the basic analogue of nature.

The trouble with the argument from analogy is that there is no reason to believe that the analogy between action and nature has sufficient strength to establish the parallel of goal-directedness between action and nature. It might be conceded that action and nature, that is, natural processes, are analogous. They are both processes that yield results. An action encompasses a finite series of states, events, or stages, which results in some state, event or object that comes into being. The construction of a house is an artistic action that comprises a sequence of stages of construction which continues until a finished house comes into being. The non-artistic action of dieting consists of a series of events, in which the dieter continues to lose weight, until finally the desired weight comes to be. In natural processes too a finite series of stages or states occurs until some result comes to be. The development of a chick consists of a sequence of events or stages of development in the chicken egg which ultimately culminates in a chick's coming into being. Even if it be allowed that each stage in both sorts of series in some sense benefits each subsequent stage of the series or that each stage benefits the object or state that is the result of the series, this admission is not sufficient for establishing that each series is equally goal-directed. The series would be goal-directed only if *the reason* for the existence of each stage in the series is that it contributes to the existence of the result of the series.[4] The analogy has sufficient

[3] The translations throughout are mine.

[4] An item in a series is 'for the sake of' the end (or subsequent stage) of the series only if its reason or explanation for being in the series is that it contribute to bringing about or maintaining

strength for establishing the goal-directed character of nature only if we have already granted its goal-directed character, but this would be to beg the question.

Aristotle extends consideration of the analogy with the introduction of another argument, which concerns directly the analogy between artistic action and nature, and not the more general analogy between action and nature (199a15–20). 'In general, art completes some things that nature is unable to complete, and some things it imitates' (lines 15–17). Aristotle seems to use this comment as a premiss from which to infer that nature is goal-directed; for he says immediately after the passage: 'If, then, the things according to art are for the sake of something, clearly also are the things according to nature' (lines 17–18). But he expands upon the argument by adding what appears to be another premiss: 'For it holds in the same way for both, among the things according to art and among the things according to nature, the posterior as regards the prior' (lines 18–20). This other premiss perhaps makes explicit just where the imitation lies between art and nature, and thus where the focus of the analogy is located: in the *character* of the sequences that make them up. The argument would go, then, something like this: since art is the imitation or completion

the end. This is a consequence of Aristotle's idea that the end 'hypothetically necessitates' the items or conditions that bring it about and support its existence. Their hypothetical necessitation by the end *explains* their presence in the series, because when an end hypothetically necessitates its conditions it necessitates them as *means* to the end (e.g. *Phys.* 2.9): cf. J. Cooper, 'Hypothetical Necessity', in A. Gotthelf (ed.), *Aristotle on Nature and Living Things* (Pittsburgh, 1985), pp. 151–67. In the case of human action it would seem obvious to most of us that the explanations for actions are the projected ends of those actions. It is not obvious that in nature the processes that bring about natural results are explained by those results, even if processes of the same sort always yield results of the same sort and always prove to be beneficial to those results. This is because most of us today are teleologists about action but not about nature. Therefore, an analogy between the processes of action and of nature, which only acknowledged that in both sorts of processes there are series that yield results and that the series benefit or support the results, would not be impressive in establishing the goal-directedness of nature. David Charles perhaps thinks that Aristotle's argument from analogy is successful because he thinks that Aristotle has only a modest goal in mind in drawing the analogy between action and nature, 'Teleological Causation in the *Physics*', *Aristotle's Physics*, ed. L. Judson (Oxford, 1991), pp. 101–28, esp. pp. 114–15. Charles finds two major forms of teleology in the *Physics*: agency and functionality. In agency the goal is an object of an agent's desire and choice, the value of which the agent is aware of, and also the means for achieving it. Nothing of this sort holds in the case of organisms, which engage in no psychological states in the development of, e.g., their bodily parts. Parts of organisms exist for the sake of the whole because they serve a 'function' of some sort in the life of the organism, and for Charles having a function within an organism seems to amount to contributing 'to the survival or flourishing of that organism' (p. 107), or being 'beneficial to the organism's survival or flourishing' (n. 5). Functional teleology seems to allow that if an item in a system is beneficial to the system as a whole, it is for the sake of that system. 'Being for the sake of' could mean, then, as little as 'being beneficial for'. When Aristotle draws his analogy between action and nature, Charles thinks that what is common in the analogy to both action and nature can accommodate both sorts of teleology. Thus the analogy need accommodate nothing more than functional teleology. This neutral common character consists in merely sharing two features of teleology: (a) in sequences where there is a goal, the items of the sequences are for the sake of the goal; (b) the order of the items is for the sake of the goal (pp. 114–15). For Charles there is no deciding in the *Physics* between the two modes of teleology, agency and functionality, over the issue of which of them is the more basic mode of teleology for Aristotle, because the key to deciding between them lies in the meaning of 'for the sake of', which Aristotle leaves unanalysed in the *Physics* (p. 116). Yet, *pace* Charles, functional teleology is not a kind of teleology Aristotle would recognize, since for Aristotle 'being for the sake of', whatever it may ultimately amount to, could not simply be something as weak as 'being beneficial for'. It is true that 'being for the sake of' entails 'being beneficial for'. But, as is indicated by the notion of hypothetical necessitation, what it is for something to be for the sake of an end is that it exists only because it is the means to that end and only thereby is it also something beneficial for that end.

of nature (lines 15–17), art and nature are analogous with regard to their sequential stages (lines 18–20); therefore, since sequences in art have an end, so too do those in nature (lines 17–18). What Aristotle may have in mind is that art in the *production* of its products mimics nature in the *generation* of organisms, so that, for example, in the manufacture of artefacts art follows a sequence that is analogous to the sequence found in the development of organisms. Aristotle may have more in mind than simply the fact that each stage of the sequence is for the sake of each subsequent stage, which is a feature nature shares with *any* action involving a sequence. He may also mean that the production of the products of art and of nature takes in each case much the same form: the stages in which artefacts and an organism come to be may be similar. For instance, both artefacts and organisms come to be from unorganized or indeterminate material that progressively increases in organization or determination throughout the course of development. Actions, such as walking, do not have this feature. Aristotle may also mean that art additionally imitates the ends of nature.[5] Imitation of the ends of nature surely should be a feature of the completion of nature. If nature is unable to achieve a certain end on its own, then art in carrying nature forward to completion would imitate nature by taking up nature's end and pursuing its achievement. It is plausible, then, that the imitation of nature by art involves two features: (a) the adoption of some of the ends of nature, and (b) the achievement of these ends in a manner that resembles in a general way the manner in which nature achieves its ends.

What, then, might artistic imitation and completion look like? In the *Meteorologica* Aristotle holds that the boiling of food in the activity of cooking is the imitation of digestion (381b3–9). Digestion occurs when the food ingested is heated in a moist state within the body, and the boiling of food in the artistic action of cooking is also the moist heating of food. Although Aristotle does not say that boiling and digestion have the same end, he may believe that they both prepare food, through analogous means, for the sake of nourishment. Agriculture might be another example of imitation. Just as in nature, plants are brought to their maturity from their seeds through a sequence of stages for the sake of providing food for humans. But in agriculture plants are also brought to their maturity (and harvested) under the supervision of farmers. Perhaps completion is the development by an art of the raw material provided by nature, so that the material may become suitable for the

[5] David Sedley has recently argued for this view in 'Is Aristotle's Teleology Anthropocentric?', *Phronesis* 36 (1991), 179–96. Sedley's thesis is that nature as a whole is basically centred on human beings and that in various ways natural processes are ultimately for the sake of humans. Even the weather is for the sake of humans, since among its goals is the promotion of the crops that are themselves for the sake of human consumption. Part of Sedley's defence of his thesis seems to depend upon an argument of something of the following sort: since art imitates nature, art and nature have common ends, and since art is for the sake of humans, so too must nature be for the sake of humans. Sedley's argument is not merely concerned with the relatively uncontroversial view that art imitates the ends of natural human activities, as would be the case in the art of weaponry, which imitates the end of the natural human activity of fist-fighting. In such cases of imitation, art and nature could easily be seen to aim in common at the good of humans. He also argues for the much more controversial view that art imitates the ends of non-human processes, such as the growth of certain plants, which then on his view must too be ultimately for the sake of humans. Agriculture in the cultivation of certain crops completes what nature is unable to complete, and in so doing agriculture takes up the end of nature: the nurture of certain plants, which ultimately is for the sake of human consumption. In his defence of this view of agriculture, Sedley appeals to fr. 11 of the *Protrepticus*, in which Aristotle defends his belief that art completes nature by maintaining that some seeds require the assistance of agriculture to come to maturity (p. 188). My speculations about the examples of art's imitation and completion of nature owe a great deal to Sedley's considerations.

construction of artefacts. Trees are transmuted into lumber through cutting and curing. Perhaps completion even includes the application of the art of cabinet-making to the lumber, so that cabinet-making carries further the end of nature by manufacturing furniture, which is for the sake of human beings, from material provided by nature. Humans in their actions of walking, hiding, hunting, providing themselves with food, shelter, and the like do not use nature as their guide in taking up these goal-directed actions. They engage in them by virtue of their own human nature. Humans, however, when they use weapons and traps in their hunting, are engaged in the art of hunting for the sake of producing game; and, although hunting is natural to humans, the art of hunting might be thought to borrow its goal from the natural goal of the human hunter, and it may be thought to imitate the means of the natural hunter when it uses traps and weapons in a fashion that is analogous to the natural hunter's use of his hands for catching and striking his prey.

The argument based on the imitation of nature does not pretend to provide an explanation for the basic analogy between action and nature. It does, however, reveal Aristotle's explanation of the more specific, and presumably closer, analogy, between art and nature, namely, the imitation of nature by art. That is perhaps why Aristotle narrows action down to artistic action in his prosecution of the analogy between action and nature; because the analogy is closer between art and nature, and he could offer a reason for this closer agreement, in the form of art's imitation of nature. Yet Aristotle offers no argument for the truth of the more basic and more general analogy between action and nature, nor does he try to defend what he takes to be the strength of that analogy. If humans never developed art through the imitation of nature, the analogy would still hold for Aristotle between non-artistic action and nature.

Yet Aristotle need not even be arguing for the truth of the narrower analogy between art and nature when he appeals to the fact of imitation. He offers no argument for the imitation of nature by art, and it is also unlikely such an argument would do him any good in establishing the goal-directed character of nature. He might have ventured to argue for the imitation by maintaining that since nature is more basic than art,[6] and since art produces its end in the same fashion as nature generates its ends, art must be an imitation of nature. But such an argument would prove nothing about nature's goal-directedness, since it already presupposes its goal-directedness. Furthermore, Aristotle could not even recognize that art imitates nature unless he recognized that art and nature *already* shared the same mode of production, and thus were already *analogous* in significant ways. The argument based on imitation does not, then, support the analogy between art and nature, since the assertion of imitation depends upon the analogy for its own support. Aristotle may appeal to the fact of imitation in his argument for nature's goal-directedness, because by so doing he also makes clear how the close analogy between art and nature might have arisen, not because he believes that he has any need to defend the truth of the analogy.

Although Aristotle takes for granted the truth of the basic analogy between action and nature, he does fend off two possible objections to the narrower analogy between art and nature. These objections concern monsters (199a33–b4) and the lack of deliberation in nature (199b26–28). Aristotle's comment about monsters might be his

[6] Aristotle might regard nature as more basic than art in more than one way. Natural kinds are metaphysically more basic than artificial kinds, because natural kinds are real and artificial kinds are not, since artefacts are not substances (*Met.* 1043b21–2). Also, Aristotle considers it probable that the sciences and arts have been lost and regained often over eternity (*Met.* 1074b10–12). Accordingly, nature is temporally prior to art because natural kinds are eternal and remain constantly and uninterruptedly in existence (e.g. *G.A.* 731b24–732a1), whereas the arts pass in and out of existence.

response to a counter-example to his teleology which might have gone something like this. If nature is goal-directed, why are there births so incapable of survival that they would seem to be pointless, or why are there births of creatures so crippled that their activity would be considerably hindered? Aristotle contends that in nature these are analogous to the mistakes any artisan might make in the course of exercising his art. The second objection concerns the lack of deliberation in nature, and Aristotle counters it by maintaining that the absence of deliberation is common to both art and nature, where doubtless he has in mind artistic activity of a purely routine nature.[7] These considerations about monsters and deliberation Aristotle perhaps took to establish that the analogy between action and nature applies more closely to artistic action. He may even have considered them as especially strengthening the analogy between art and nature because monsters and the lack of deliberation proved to be compatible with the analogy with the arts, even though at first they seemed to be evidence for the dissimilarity of art and nature. Yet monsters and the absence of deliberation do not support the goal-directedness of nature. The absence of deliberation in nature simply does not provide evidence against its goal-directedness on Aristotle's view, and his interpretation of monsters as mistakes presupposes the goal-directed character of nature.

Aristotle considers these two objections after the passage that contains the argument from the analogy with action and the argument from imitation. The passage in which he considers the objections contains a loose compendium of comments bearing on teleology in various ways, especially on the analogy with art. But none of them bears directly upon the analogy with action, and, aside from the comments on monsters and deliberation, nothing else in the passage strengthens the analogy with art. The passage opens with the assertion that natural ends are most obvious in the case of lower animals because of their lack of art and deliberation in, for example, the construction of their nests and webs (199a20–3). The passage moves on to take plants into the domain of teleology (lines 23–6), although a little later Aristotle admits that ends are 'less determinate' in the case of plants (199b9–10). The passage sums up with the statement that since the goal-directed behaviour of animals and plants is also due to nature, there is finality in natural productions (199a26–30); and the passage then concludes with the identification of finality with form rather than with matter (a30–2). These comments on plants and animals prove nothing about the goal-directedness of nature, since Aristotle regards it as obvious that lower animals and plants display goal-directedness; and this suggests that for Aristotle one could hardly help but recognize ends in nature, and thus presumably the analogy with art or with action. Other passages are asides directed against Empedocles (199b5–7, 7–9, 10–13), and one passage returns to the argument against chance (199b13–26). Finally, in the passage in which Aristotle maintains that art and nature equally lack deliberation, he also holds that art and nature are dissimilar in one respect. Art is in something other than its product, but in nature what serves as the analogue of art is in the natural object. But this circumstance in the arts too has its exceptions, as in the case of the doctor who doctors himself, and this exception is what nature is like (199b26–32).

In the analogy between action and nature, action and nature do not stand on an equal footing with one another, such that neither is more basic than the other in

[7] Because knowledge of the alphabet is exact and complete, the grammarian uses the letters of the alphabet in his writing without any deliberation (*N.E.* 1112a34). Aristotle seems, then, to regard the lack of deliberation in the arts to apply to cases in which the artistic activity has a fixed routine that is repeated in the same way every time it is engaged in.

Aristotle's thought. Action has priority over nature in Aristotle's thinking inasmuch as he uses the *analogy with action* to argue for the goal-directedness of nature, but he does not use the *analogy with nature* to argue for the goal-directedness of action.[8] Aristotle does not think that he needs to argue for the goal-directedness of human action, but only for the goal-directedness of nature. Thus he does not employ the analogy between them in a merely symmetrical fashion, and its explanatory value lies in one direction only, from action to nature. This explanatory asymmetry suggests that human action provides Aristotle with his model of *intelligibility* regarding processes that yield results. Any series of events, states, or stages must be like human action to be intelligible. Aristotle opens the *Nicomachean Ethics* with what he takes to be the obvious truth that all human action, of whatever sort, 'art', 'inquiry', 'every action and choice', is goal-directed, and the goal is good, or at least it is so taken to be (1094a1–3). Our actions would be 'empty and vain' if they were always for the sake of something else and did not have ultimately a limit, which Aristotle takes to be an end that is good in itself (1094a18–22). Goal-directedness endows human behaviour with intelligibility, and human actions that are sequential in nature must for their intelligibility be at least (a) finite, (b) terminate in a goal, (c) which is good. Aristotle applies these same features of intelligibility to nature (or biology) and to the universe at large, since he assumes that they too are intelligible.[9] Aristotle offers no support for the analogy between action and nature. Yet this is not because he has little faith in the analogy, but because he has so much. The lack of support Aristotle offers for the analogy between action and nature serves to reveal its strength in his thinking, and it would be only natural that it should possess such strength if action provided Aristotle with his basic model for the intelligibility of processes that yield results. If nature is intelligible, then it must be like action.

If Aristotle models the intelligibility of the universe in terms of human action and of human nature in general, then it makes good sense that he should praise Anaxagoras, as someone who speaks as a 'sober man' in comparison with the 'random talk' of his predecessors, for his view that 'reason' is present in nature, just as it is in animals, as the 'cause of order and arrangement' (984b15–18). This praise

[8] David Charles does not think that Aristotle gives any 'explanatory priority' to action or to nature in the analogy between action and nature (p. 115). But this seems to be false, since Aristotle argues *from* the goal-directed character of action to that of nature on the basis of the analogy between them (199a8–12). He does not simply draw a symmetrical analogy between action and nature, but he draws the analogy for the clear purpose of arguing for the goal-directedness of nature. As far as I know, he never argues for the goal-directedness of action, nor does he ever argue from the goal-directedness of nature to that of action on the basis of the analogy between action and nature or on any other basis. He provides no such arguments because he thinks that the truth of the goal-directedness of action needs no argument.

[9] David Charles finds no common teleological form shared by the teleologies of agency and functionality, or at least none of any interest (pp. 106–8 n. 25). Yet Aristotle must think that action and nature share enough features in common so that he may argue from the teleology of action to the teleology of nature on the basis of their analogous features. There would be no point to the argument from analogy unless Aristotle thinks that action and nature share enough in common so that he may argue for the teleological character of nature on the basis of the analogy. Aristotle could acknowledge a common teleological form for both action and nature without thinking that they were identical in every teleological feature, and he could even model the teleology of nature upon that of action without transferring every teleological feature of action to nature. He denies that there is deliberation in nature (199b26–8), and for that matter in art, but he certainly would not deny that action often involves deliberation in the pursuit of its goal. Deliberation is simply not relevant to the teleology that is common to nature and action. Rather, the features of teleological sequences, which are common to action and nature, and which Aristotle may borrow from action, are perhaps those I have suggested of (a) finitude, (b) termination in a goal, (c) which is good.

occurs in a well-known passage from the *Metaphysics*, but in another passage from the *Metaphysics*, which is little known but deserves much more attention, Aristotle brings out explicitly the parallel between reasonable human action and the universe by laying down an explicit parallel between the goal-directedness of the rational man in his actions and the rationality of reality. This passage is from Chapter 2 of A minor (994b9–16), and in this chapter Aristotle elaborates upon the nature of causality by arguing that no one of the four causes could involve an infinite regress. When he comes to final causality, he holds that there must be a final cause that serves as an end that is not for the sake of anything else, and there must be such a limit for sequences, in which one thing is for the sake of another, so that these sequences may not be infinite. If they were infinite then the good would be eliminated, which is just what is done by those who insist upon an infinite series of causes. Aristotle then pauses, by way of amplification, to point out that no one would 'do anything' unless he were to come to a limit, which is an end, and that the 'reasonable man' (*ὁ νοῦν ἔχων*) always 'acts' for the sake of something, a limit and an end.[10] Here Aristotle is thinking broadly of human actions, and not simply of artistic actions. In the course of making these comments Aristotle returns to his original line of thought, and adds that, in addition to the elimination of the good, those who eliminate the end would also eliminate 'reason among the things that are' (*νοῦς ἐν τοῖς οὖσιν*), or what the Oxford translation renders as 'reason in the world' (994b13–16).[11] Accordingly, Aristotle takes the universe to be comparable to the reasonable man in his actions. Just as there would be no reason in the actions of humans without an end, there would also be none in the natural processes of the universe. Through this parallel between the reasonable man and the universe, which Aristotle uses to shed light on the nature of

[10] There is no reason to think that Aristotle intends by *ὁ νοῦν ἔχων* anything other than 'one who has reason' or 'sense', where 'reason' or *νοῦς* is broadly construed as 'reasonableness', and this is the standard way the passage is taken by its English translators: e.g., 'reasonable man' (Ross and Barnes); 'the man who has intelligence' (Tredennick); 'he who has an intellect' (Apostle); 'the man who has rational intelligence' (Wheelwright). The phrase *ὁ νοῦν ἔχων* is an ordinary way of expressing a person of reasonable nature as opposed to one of unreasonable nature. The *νοῦς* of the *νοῦν ἔχων* could not be the 'mind' that is the God of the universe, since in the context of this passage from A minor the actions under consideration are series that do not constitute an infinite series because they are limited by an end. God is not involved in any such serial action, since God's state of pure activity is its own end, which is infinite and unchanging (cf. *Met.* 1071b19–20, 1072b13–30, 1048b18ff.). Nor need Aristotle even intend by the *νοῦν ἔχων* the technical, psychological sense of *νοῦς* of *De Anima* 3.4–5, which itself might be thought to be modelled on the divine *νοῦς*. The activity of the human *νοῦς* in the psychology is the cognition of intelligible forms, which is an activity that has itself for its end, but the actions under consideration in A minor for the performance of the *νοῦν ἔχων* are those that constitute series that are limited by goals.

[11] J. Barnes retains W. D. Ross's translation of this passage in his revision of the Oxford translation. There is an alternative tradition concerning 994b15, in which *ἐν τοιούτοις* stands in place of *ἐν τοῖς οὖσιν*. The latter is the text of Laurentianus 87.12 (A^b) and of Alexander (Al); whereas *ἐν τοιούτοις* is the text of Parisinus 1853 (E) and of Vindobonensis phil. gr. C (J), and it can be inferred that *ἐν τοιούτοις* is also the Greek of the text used by William of Moerbeke in his Latin translation. The two readings are each grammatical, although *ἐν τοῖς οὖσιν* is more plausible or attractive, because it allows for a more forceful and clearer statement on Aristotle's part. E and J are close in their text overall, and Ross holds that they thus belong to the same family and that A^b and Al are each based on different originals, of which the 'traces of uncial corruption' in A^b argue for its being older than the original of EJ. Thus, in cases of divergent but plausible readings, Ross follows the principle that the agreement of any two, EJ, A^b, and Al, is decisive, and since A^b and Al both read *ἐν τοῖς οὖσιν* in disagreement with EJ, Ross decides in favour of that reading for his edition: *Aristotle's Metaphysics*, vol. 1 (Oxford, 1924), pp. clv–clxvi. In their editions of the *Metaphysics*, W. Jaeger and H. Tredennick agree with Ross in their reading of 994b15, and Tredennick follows Ross in his translation of *ἐν τοῖς οὖσιν*.

the universe, he clearly suggests that he models nature as a whole upon the actions of human beings. Since these are actions broadly construed, Aristotle is thinking more basically in terms of human action in general, and not merely in terms of artistic action, for his model of the character of the natural processes of the universe.[12]

Aristotle shares the optimism of the natural philosophers, who were his predecessors, about the capacity of humans for making sense of nature through the use of their reason. We make intelligible human action in terms of the ends of action, which provide us with explicable reasons for action, and Aristotle takes every process to be intelligible in the same terms as human action. He assumes that nature too is intelligible, and since every intelligible process gains its intelligibility through ends, a further dimension of which is goodness, nature too has ends and is thus endowed with goodness. Thus, on this interpretation of Aristotle's natural philosophy, the analogy with human action takes a more central role than Aristotle's analogy with the arts, in the development of his idea about the finality of nature. There is, then, good reason to think that Aristotle not only does not base his teleological metaphysics upon his biology, but even that the arts are only an illustration of the more basic model, which is that of human action.[13]

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[12] Perhaps another important indication of the primacy of human action in the development of Aristotle's teleology is the fact that he uses in his initial and definitive explanation of final causality in *Physics* 2.3 an example drawn from human action for his illustration: when someone's walking is for the sake of health (194b33). Perhaps, since this example has health as the end of the action, the action might be taken as the exercise of the medical art and thus as an example from the arts. Yet when we walk for exercise, and not for the sake of getting somewhere, we hardly think that we are engaged in the practice of medicine, nor need we be following the prescription of our physician.

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