ARISTOTLE'S DEFINITION OF NATURE

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ARISTOTLE's definition of nature suggests that the special mark of natural things (by contrast with artefacts) is that they have an internal principle of movement. In this paper I ask what this doctrine really amounts to: what does Aristotle think is the difference between natural things and artefacts?

This is not usually felt to be very difficult: 'The difference is that natural things have an internal principle of movement.' But the question is really about this idea of an internal principle: about what Aristotle is saying about natural things when he says that their movements have a principle, and that this principle is internal to them. Even this is often thought to be more or less straightforward: 'He means that a thing's own nature is some kind of a causal-and/or/i.e.-explanatory principle of its movement.' But while this is true enough, it is not easy to make it articulate in a way that really does capture the difference between natural things and artefacts as Aristotle sees it. One sort of account includes too little: for example, it leaves out the inanimate parts of the world, the elements and the inanimate mixtures compounded of them. Another sort of account, sometimes felt to correct the shortcomings of the first, includes too much: the criterion it offers would count artefacts as natural too, leaving out only piles and heaps and other chance assemblages.

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Nor are these answers nearly correct, getting into trouble only with bizarre and out-of-the-way counter-examples; rather they go wrong over central and important cases. The first distinguishes (if anything) living from non-living; the second distinguishes incidental collocations from genuine unities, or (as I would put it) the chance from the real. Yet though both are interesting distinctions, neither is the distinction Aristotle draws between natural thing and artefact: for him, not only living things are natural, and not only natural things are real.

This paper has two parts. I begin with a review of existing interpretations, with a view to making clear what I regard to be the fundamental difficulties (Sections I–III). I then turn to develop a new proposal, which overcomes these difficulties in a way that seems to me at least both intuitive and promising (Sections IV–VI).

I

The first proposal I want to consider is an intuitive one, and it rests on a very natural interpretation of Aristotle's definition of nature. The definition states that nature is 'a kind of principle [*ἀρχή*] or cause of movement and rest' (*Phys.* 2. 1, 192^{b}21–2). Simplicius comments that the kind of principle Aristotle means here is the efficient cause (*In Phys.* 264. 10 Diels), and I think that most readers would at least initially be inclined to agree. It is not just that Aristotle standardly uses the expression 'principle of movement' to refer to the efficient cause. Later in *Physics* 2, in the discussion of the four causes, he introduces the efficient cause precisely as that 'whence [comes] the first beginning [*ἀρχή*] of change or rest' (2. 3, 194^{b}29–30); it is hard to read this without being put in mind of the definition of nature, and in particular of the thought that when Aristotle defined nature earlier as 'a kind of principle or cause', he was talking about the efficient cause. The view suggested by such an interpretation, that natural things effect their own movements, seems plausible enough on its face; for (you might think) while artefacts generally just sit there unless someone picks them up and uses them, natural things move of their own accord, under the influence and direction of some kind of internal force or impulse (cf. *ὁρμὴ ἔμφυτος*, 'native impulse', at *Phys.* 2. 1, 192^{b}18–19). Moreover, such a view sits nicely with other features of Aristotle's

thought: for example, his frequent analogies between nature and art (one of his star examples of the efficient cause), or his view that living things, which he arguably regards as natural things *par excellence*, cause some of their own characteristic movements (e.g. growth and locomotion).[1] These considerations make it tempting to conclude that Aristotle thinks the difference between natural things and artefacts lies in the fact that natural things effect their own movement.[2]

Natural and intuitive though it may seem, however, I believe that this proposal is untenable. The fundamental problem is that Aristotle believes there are many kinds of natural movement produced by efficient causes external to the things whose movements they are.[3] I give three examples. First, the movement of uniform bodies such as fire or earth to their natural place is natural, and has external efficient causes. For (Aristotle thinks) *something* must move these bodies to their natural place; since they cannot move themselves there (being uniform, they lack the requisite complexity and structure for this), they must be moved there by something else.[4]

[1] See also *Metaph.* Θ 8, 1049^{b}8–10, where Aristotle characterizes nature as a *motive* principle (*ἀρχὴ κινητική*).

[2] See F. Solmsen, *Aristotle's System of the Physical World* [*System*] (Ithaca, NY, 1960), 95 ff., 232 ff., and also those scholars who feel that, at least prima facie, there is a tension between Aristotle's definition of nature and his view that uniform bodies are moved to their natural place by an external mover (e.g. D. Furley, 'Self-Movers', in G. E. R. Lloyd and G. E. L. Owen (eds.), *Aristotle on Mind and the Senses* (Cambridge, 1978), 165–79; S. Waterlow, *Nature, Change, and Agency in Aristotle's Physics* [*Nature*] (Oxford, 1982), 204 ff.; S. Cohen, 'Aristotle on Elemental Motion' ['Aristotle'], *Phronesis*, 39 (1994), 150–9; D. Graham, 'The Metaphysics of Motion: Natural Motion in *Physics* II and *Physics* VIII' ['Metaphysics'], in W. Wians (ed.), *Aristotle's Philosophical Development* (Lanham, MD, 1996), 171–92; I. Bodnár, 'Movers and Elemental Motions in Aristotle' ['Movers'], *Oxford Studies in Ancient Philosophy* [*OSAP*], 15 (1997), 81–117; M. Matthen, 'Holism in Aristotle's Cosmology' ['Holism'], *OSAP* 20 (2001), 171–99).

[3] I would add that the proposal rests on an interpretation of the definition of nature that does not sit very well with the subsequent course of *Physics* 2. 1, where Aristotle discusses the respective claims of matter and form to be called nature. The immediate shift to matter and form is perhaps a little surprising, on the assumption that nature has just been identified with the efficient cause; definitely surprising is the complete absence, in adjudicating their claims to be nature, of any appeal to their being efficient causes.

[4] The point is familiar; see e.g. Waterlow, *Nature*, 205–6; Cohen, 'Aristotle', 151. For the idea that every movement is effected by *something*, see *GC* 1. 10, 337^{a}17–18; *Phys.* 7. 1, 241^{b}34 (also Plato at *Tim.* 57 E 3–5); for the idea that inanimate bodies cannot move themselves, see *Phys.* 8. 4, 255^{b}29–31; *MA* 5, 700^{a}16; 6, 700^{b}6; for the rationale for this (they lack the requisite complexity and structure), see *Phys.* 8. 4, 255^{a}12–18; *Metaph.* Θ 1, 1046^{a}19–29; *IA* 3, 705^{a}19–25; *De anima* 1. 4, 409^{a}1–3,

Second, Aristotle believes that uniform bodies change in other ways as well (for example, water and oil change qualitatively when put to fire); these changes are also produced by external efficient causes, and at least some of them are natural (it is in part by their susceptibility to such changes that uniform bodies are differentiated into kinds).[5] Third, Aristotle holds that living things also change naturally under the influence of external causes; the clearest case of this is perception, which he regards as a kind of 'being affected' on the part of the sense organ by the agency of the sense object (see e.g. *De anima* 2. 5, *passim*).

In my view, this objection is decisive; still, there are ways one might try to reply to it. The proposal again was that Aristotle believes that the distinguishing mark of natural things is that they effect their own movements (all of them);[6] the objection is that, on the contrary, Aristotle regards some kinds of natural movement as fundamentally passive in character, as produced by efficient causes external to the things whose movements they are. The way to deal with this objection is obviously by cases; in any particular case, one may reply either by denying that Aristotle thinks the phenomenon in question is natural movement, or by denying that he thinks it has an external efficient cause. Below I consider four particular replies which employ different versions of these two basic strategies.

Let's begin with the locomotion of uniform bodies. One way to deal with this example is to deny that this movement is natural—that it is the perfectly natural movement of a perfectly natural

10–14 (also Plato at *Tim.* 57 A 3–5, 57 E 5–6). The point is not just that the natural movement of inanimate bodies is not 'self-movement' in the narrow sense in which Aristotle reserves this for the locomotion of animals; their movement is not 'self-movement' even in the broader sense of being effected by the exercise of capacities belonging to its subject. (For an entry into the literature on self-movement see Furley, 'Self-Movers'; M. L. Gill, 'Aristotle on Self-Motion', in M. L. Gill and J. Lennox (eds.), *Self-Motion: From Aristotle to Newton* (Princeton, 1994), 15–34; and now S. Berryman, 'Aristotle on *Pneuma* and Animal Self-Motion', *OSAP* 23 (2002), 85–97.)

[5] See e.g. *De caelo* 3. 1, 298^{a}27–^{b}5, where 'alterations and reciprocal transformations' are explicitly counted as among the natural movements of simple bodies; also *Meteor.* 4, e.g. 381^{b}24–7: 'The passive principles of bodies [*αἱ ἀρχαὶ τῶν σωμάτων αἱ παθητικαί*] are wet and dry, and the rest are mixtures of these, and whichever there is more of, the nature will be more of that, e.g. some more of dry, others of wet.'

[6] I assume that Aristotle thinks nature is a principle of *all* natural movement, and therefore disregard as unmotivated the possibility that he thinks the difference between natural thing and artefact lies in the fact that every natural thing effects *some* of its own movements.

thing—on the grounds that inanimate uniform bodies are not perfectly natural things. The idea here would be to argue that inanimate bodies such as fire and water are not really natural substances, because (for example) they lack the unity and structure to be substances of any kind (see *Metaphy. Z* 16, 1040^{b}5–10). Such a view can allow that these bodies are natural in an extended sense, thanks to some relation they have (e.g. as parts or matter) to things that are natural in their own right; the crucial point is to insist that they are natural only in a derivative sense, because (unlike natural things properly so called) they do not effect their own movements.[7] Second, still on the locomotion of uniform bodies, another way to go is to allow that this movement is perfectly natural and deny instead that it has an efficient cause, strictly and properly speaking. Here the idea would be to argue that although we must grant that Aristotle does not think flames and stones move *themselves* up and down, it is not as if he thinks something else moves them up or down, except in an extended and attenuated sense; his view is rather that they just do move in these ways, 'of themselves': that is, they just move (intransitive), with nothing moving them. In this way we might try to capture the spirit of the original proposal; even if these bodies do not move themselves, they do move (intransitive) 'of themselves', and this is the idea Aristotle is driving at in the definition of nature.[8] Third, turning now to the qualitative changes of uniform bodies (e.g. of iron or clay at the hands of moisture or heat), even if one allows that these *bodies* are perfectly natural, and that these changes are wrought by perfectly good (and perfectly external) efficient causes, there is still room to deny that these *changes* are natural, on the grounds that they are not expres-

[7] So recently Matthen in 'Holism', who argues that the elements are natural in a derivative sense because they are parts of the whole cosmos, which unlike them does have the complexity and structure to effect its own movement.

[8] See e.g. A. P. D. Mourelatos, 'Aristotle's "Powers" and Modern Empiricism' ['Powers'], *Ratio*, 9 (1967), 97–104; Waterlow, *Nature*, ch. v; Graham, 'Metaphysics'; also W. Wieland, *Die Aristotelische Physik* [*Physik*], 3rd edn. (Göttingen, 1992), § 15 (though without the ban on full-blown external movers which I regard as characteristic of the line sketched here). The recent careful study by Bodnár is difficult to classify; his leading idea is that natural movement *can* have an external mover, so long as the movement is 'autonomous', but it turns out that 'autonomy' here is incompatible with being constantly powered by an external mover (Bodnár, 'Movers', 109–10). In this respect, he too shows a tendency to soften wherever possible the sense in which the natural movements of uniform bodies have genuine, full-blown external movers, as a way of protecting their status as natural.

sive in the right sort of way of the nature of the things in question.[9] Here the thought is that, for Aristotle, the 'natural' movements of a thing are those whereby the thing 'steps into its own', attains a kind of perfection as a specimen of its kind; by this standard, it is hard (one might argue) to see why such changes as the rusting of iron or hardening of clay would be reckoned as natural (indeed, in some cases they represent a positive corruption, a falling away from type). Fourth and finally, there is the case of perception. Here there is no question but that Aristotle thinks that animals are natural, and that perception is an expression of their nature, and that it has an external efficient cause. Nevertheless, even here there is a way out, inasmuch as Aristotle does not think that perception is strictly speaking and without qualification a kind of change or movement (his reason is that, unlike changes properly so called (e.g. from here to there or hot to cold), perception does not involve 'the destruction of a contrary').[10]

So, there are ways one might try to deal with the objection, by denying in particular cases either that the phenomenon in question is natural movement (e.g. because its subject is not natural, or because it is not expressive of its subject's nature, or because it is not really movement), or that it truly and properly speaking has efficient causes; it is possible that by some combination of these strategies we might be able to rescue the original proposal. My own view is that the proposal is not worth rescuing, for the following reasons among others. First, there are many passages in which Aristotle explicitly includes uniform bodies on his list of natural things, not the least of which is *Physics* 2. 1 itself.[11] In this chapter, not only does he include 'the simple bodies such as earth, fire, air, and water' on his list of 'things due to nature', and give 'moving upwards' as an example of something that holds *per se* of them (sc. of fire);[12] in addition, the very last thing he says before giving the definition of nature is that although artefacts as such do not

[9] There is a tradition that holds that the only movement natural to uniform bodies is locomotion: see e.g. Themist. 35. 15–16; Alexander ap. Simpl. *In Phys.* 265. 1–2 Diels (contrast Simplicius himself at e.g. 261. 24–8, 264. 10–15). Among modern commentators the view is explicit in Mourelatos, 'Powers'.

[10] See *De anima* 2. 5, 417^a31 ff. (on this entire chapter see now M. Burnyeat, '*De Anima* II 5', *Phronesis*, 47 (2002), 28–90).

[11] See also *De caelo* 3. 1, 298^a27–$^b5$; *Metaph. Z* 2, 1028^b8–13; *H* 1, 1042^a4–11.

[12] See also *Phys.* 8. 4, 255^a2–4. These passages also tell against the idea that it is not natural to uniform bodies to move to their natural place, but only to *rest* there (so Cohen, 'Aristotle').

have an internal principle of movement, in so far as they are made of particular kinds of material, 'of stone or earth or a mixture of these', they *do* (see *Phys.* 2. 1, 192^b8–23). The immediate proximity of this remark to Aristotle's formal statement of the definition of nature very strongly suggests that the definition is meant to cover such bodies and their movements. This suggestion is confirmed (I believe conclusively) by Aristotle's discussion of these bodies in *Physics* 8, where the definition of nature is invoked explicitly, and in a context that emphasizes precisely their passivity in movement: 'That no [uniform body] moves itself is clear; but they do have a principle of movement—not of moving [κινεῖν] or acting [ποιεῖν], but of being affected [πάσχειν]' (*Phys.* 8. 4, 255^b29–31).[13] At a minimum, this passage shows that at some point Aristotle thought there was a way of reading the definition of nature so as to accommodate fundamentally passive natural phenomena; if you like, this is the reading I am after.[14] Second, if the proposal we are considering were correct, then any theory on which uniform bodies are moved by something external to them would be incompatible with the thesis that their movement is natural. But in those passages in which Aristotle considers such theories, he says not that they are incompatible with such a thesis but that they need to be supplemented by one.[15] Thus even granting for the sake of argument that Aristotle does not think the locomotion of uniform bodies has a proper

[13] Similar remarks apply to sense perception and the qualitative alteration of uniform bodies. On sense perception, see *PA* 1. 1, 641^b4–10, where the invocation of the definition of nature is explicit and the fundamental passivity of the phenomena is not in question: 'Not all soul is a principle of movement, nor are all its parts, but of growth the part that is also in plants is, *and of alteration the perceptive part*, and of locomotion some other part, i.e. not the intellective one . . . It is clear then that it is not all soul that [the science of nature] must speak about; for not all soul is nature.' On the alteration of uniform bodies, see *GC* 2. 2, where Aristotle identifies the 'principles and forms' (i.e. natures) of different kinds of body with the contraries whereby they are liable to act on *and be affected by* one another; see also *Meteor.* 4. 8, on the affections whereby uniform bodies are differentiated into kinds.

[14] For an entry into the literature on developmental accounts see Graham, 'Metaphysics'.

[15] See *De caelo* 2. 13, 295^b3–8, on Empedocles' suggestion that it is some kind of whirl that sends heavy bodies to the centre of the cosmos and light ones to the periphery, and also *De caelo* 3. 2, 300^b16–25, where Aristotle criticizes the *Timaeus* for characterizing the pre-cosmic movement of the pre-elemental traces, which tend to gather like to like, as 'disorderly'. (In the latter passage there is a dispute about the text, but on either reading Aristotle's reasoning implies that certain movements effected by a certain external mover would be natural; the textual dispute bears on whether this 'first' mover moves itself, but not on whether the movement it effects in other things is natural to them, which is the point at issue here.)

efficient cause, neither does he think that the fact that it did would undermine its status as natural.

For these reasons, I do not believe Aristotle can hold that the distinguishing mark of natural things is that they effect all their own movement. I turn then to consider other proposals.

II

Suppose we allow, as I believe we must, that Aristotle holds that natural things sometimes play a passive role in the production of their own movement. Even so, there remains a sense in which the basic course and shape of their movement is primarily determined and explained by reference to considerations that are in a way internal to them. For example, the reason that the 'action' of colour on organisms of certain kinds (but not on stones) results in vision has to do with special facts about the make-up and structure of that kind of organism (at the crudest, that it has eyes). Similarly, the fact that iron and clay react in the different ways that they do to moisture and heat has to do with differences in their respective natures, in the kinds of material they are (for Aristotle, these differences will stem ultimately from differences in form, i.e. in the proportion of elemental ingredients). Again, the reason earth falls and air rises (Aristotle thinks) is that earth is heavy and air is light, and that is what heavy and light things do: 'this is what it is to be light or heavy, the one being defined by up, the other by down' (*Phys.* 8. 4, $255^{b}15$–17). These considerations suggest that Aristotle's definition of nature says not that natural things effect their own movement, but rather that they move in the particular ways they do thanks ultimately to facts about them, and in particular about their form or kind (εἶδος).

The basic idea here may be handled in different ways. For example, we might draw attention to how we explain natural movement, e.g. how we appeal to the 'nature' of the things that undergo those movements, and how we refuse certain requests for explanation beyond this as out of place: 'asking why fire moves up and earth down is the same as asking why the healable, when moved and changed precisely in so far as it is healable, arrives at health rather than whiteness' (*De caelo* 4. 3, $310^{b}16$–19). Secondly, we might point to facts about how the course of certain movements

is determined out there in the world; here the idea is that even if external factors play a role in producing natural movement, still the basic shape and course of that movement (e.g. that it is hardening or softening, or that it is perception) are fixed by a kind of structure internal to its subject. Third, we might highlight the fact that natural movement is a kind of fulfilment of certain potentialities characteristic of certain kinds of natural thing; here the thought is that to call a movement natural is to say that it is normative for its subject, that moving in that way (e.g. perceiving, or rising or falling) constitutes a kind of perfection for it as a specimen of its kind. Here I regard these as different ways of articulating a single idea, that natural things move as they do 'because' they exemplify certain forms or kinds;[16] in what follows I consider the proposal that Aristotle thinks this is distinctive of natural things.

It is an advantage of this proposal that Aristotle does think that all natural things carry on as they do because they exemplify certain kinds; even if Aristotelian kinds are (in the main) defined in terms of their form or structure, generally this form is conceived as a kind of capacity or power for certain kinds of activity or behaviour. The problem is that form is also explanatory of the movement of artefacts. This appears to be true on all the variations of the basic idea considered above. First, certain kinds of movement are normative for artefacts; their characteristic ways of moving constitute perfection for them as specimens of their kind (axes that won't chop and ships that won't sail are less-than-ideal axes and ships). Second, not only are certain kinds of movement normative for artefacts, but the shape and course of these movements are determined by their form and structure; it is thanks to this that axes chop (rather than pound) and ships sail (rather than sink) when acted on by or reacting to external forces in the normal way. Finally, in explaining why ships and axes move and rest in the ways they do, one appeals to their structure and function; to ask beyond this *why* ships sail or axes chop (rather than fly or slice or cook) is out of place—sailing and chopping is just what ships and axes do. At least in the respects mentioned, then, the form embodied in artefacts is explanatory of their movement in just the ways that the form embodied in natural

[16] For the first, see Wieland, *Physik*, § 15; for the second, Waterlow, *Nature*, ch. II; for the third, perhaps Zeller and Guthrie, who in this connection refer especially to the talk of matter 'yearning' for form in *Phys.* 1. 9, $192^{a}16$–25 (E. Zeller, *Aristotle and the Earlier Peripatetics* (London, 1897), 368, 379; W. K. C. Guthrie, *A History of Greek Philosophy*, vol. VI (Cambridge, 1981), 257–8).

things is explanatory of theirs. This point is sometimes raised as an objection to Aristotle's definition of nature.[17] However, the primacy of form in the explanation of nature is something the analogy between art and nature so pervasive in Aristotle is precisely supposed to illustrate; this fact is difficult to square with the charge that he has somehow overlooked or forgotten that we also appeal to form in explaining the characteristic movements of artefacts. Thus I will take the fact that artefacts move as they do because they exemplify certain forms or kinds as an objection to the interpretative proposal that Aristotle thinks this is distinctive of natural things.

Here one might reply that although Aristotle does think form is explanatory of the movement of artefacts in the ways suggested, he thinks of the 'form' we appeal to in giving such explanations as located not in artefacts themselves but rather in the psyche of those who make or use them. (For example, in explaining the normal movement of a rudder, we appeal to 'art' (one might argue) not as a form embodied in wood, but as an expertise 'ensouled' in a craftsman, e.g. a pilot or shipwright.) If that were right, the fact that explanations in art and nature are parallel in the ways mentioned would be no objection to the proposal that nature is an explanatory principle; for the point of Aristotle's definition of nature is not to deny this parallelism but precisely to grant it, except with the proviso that in nature the relevant principle is located within the things whose movement is to be explained, while in art it is found outside of them. But although this reply appears to have some pull—Aristotle does say that natural things have a principle within them (call it an 'explanatory' principle if you like) which artefacts have outside them—it misses the point of the original proposal, which was precisely to translate this difference in 'location' into a difference we can understand, by explicating it in terms of a difference that surfaces in explanation: in explaining natural movement we appeal ultimately to the form or kind of the thing moving, while in explaining other kinds of movement we do not. The reply we are considering concedes that no such difference emerges (in the respects mentioned, explanations in art and nature proceed in parallel); it points to a difference not in 'why' natural things and artefacts move as they do, but in 'where' the forms we appeal to in explaining their movements are located. But in conceding that

[17] J. L. Ackrill, *Aristotle the Philosopher* (Oxford, 1981), 34; W. Charlton, *Aristotle's* Physics *Books I and II* (Oxford, 1970), 89.

this difference in location does not make itself felt as a difference in explanation, the reply essentially abandons the original proposal. It continues to say that nature is an explanatory principle, but now the 'explanatory' does no work; that is, it no longer functions to explain the *difference* between natural things and artefacts.

In saying this, I do not mean to imply that there is *no* sense in which Aristotle thinks natural things have in themselves a kind of 'explanatory' principle that artefacts do not—we may allow that there is—but just that we cannot explain what sense this is by pointing to how natural movement is determined and judged and explained by reference to natural form or kind. For Aristotle, this is precisely a point of analogy between art and nature, whereas our present task is to explain what he thinks the differences are.

III

If we look at those passages in which Aristotle explicitly *contrasts* nature and art, he appears to be thinking of art as a principle of genesis, i.e. as a principle of the movements and changes whereby artefacts are *produced*. In *Physics* 2. 1 he says that 'none of [the things produced by art] has the principle of production in itself'; in a discussion of embryology he says that art, by contrast with nature, 'is a principle and form of what comes to be, but in another'; in a discussion of natural teleology in *Physics* 2. 8 he writes, 'if the shipwright's art were in the wood, it would produce [ships] similarly [sc. to how it does now, except] by nature' (*Phys.* 2. 1, $192^{b}28$–9; *GA* 2. 1, $735^{a}2$–4; *Phys.* 2. 8, $199^{b}28$–9; see also *Metaph.* *Λ* 3, $1070^{a}4$–8; *NE* 6. 4, $1140^{a}10$–16). Such passages suggest that nature likewise is a principle of genesis, a principle whereby natural things come into existence. It is true that, in *Physics* 2. 1, genesis is absent from the list of movements of which nature is a principle ($192^{b}14$–15); indeed, this is just as we might have expected, given that it is hard to see how something could have in itself the principle of a process where the thing does not exist until that process is completed.[18] Still, the references to art as a principle of production are pervasive enough to make the suggestion that nature is a principle of genesis worth exploring a little bit further. In that case the first thing is to get clear about what Aristotle could mean by this.

[18] Cf. the dictum 'nothing generates itself' (*GA* $735^{a}13$; *De anima* 2. 4, $416^{b}16$–17).

One thought is that he means that natural things are produced by something the same in *kind* as themselves, the way that many animals (Aristotle believes) have their male parent as the principle of their genesis.[19] In favour of this interpretation it may be pointed out that there certainly are passages in which Aristotle speaks as if it were distinctive of natural generation that generator and generated are the same in kind (see e.g. *Metaph. Z* 7, 1032^{a}22–7; *EE* 2. 6, 1222^{b}15–18). It is true that it is difficult to see how he can think this is universally the case; however true it may be that 'man begets man', it certainly does not appear as if stone begets stone. However, let's set this aside for now and allow for the sake of argument that Aristotle does believe that all natural things are generated by something the same in kind as them. There remains the further question of whether this is the point he is trying to capture in the definition of nature. That is, when Aristotle says in *Physics* 2 that nature is 'a kind of principle and cause of movement and rest *in* that to which it belongs', does he mean to say that natural things are brought into existence by something the same in *kind* as themselves? On the face of it the answer seems to be 'no', and this initial impression is strengthened by the comparison Aristotle sometimes makes between nature and medicine in the special case where a doctor heals himself. This comparison says that when a man cures himself, nature is like that, except that in nature it is not just-as-it-so-happens but rather the rule that the principle and subject of the movement are one and the same. Now, if Aristotle's definition of nature were meant to convey the idea that, in nature by contrast with art, the principle and subject of generation are the same in kind, then the relevant comparison would be to the exceptional circumstance in which doctor and patient are the same, not in number, but in kind, as when (as-it-just-so-happens) a doctor makes his patient not just healthy but a medical expert—what Aristotle should say is that nature is like *that*, except that in nature it is no accident but the rule that principle and subject are the same in kind.[20] In fact, however, the case Aristotle says is closest to nature is not this

[19] So e.g. D. Keyt, 'Three Basic Theorems in Aristotle's *Politics*', in D. Keyt and F. Miller (eds.), *A Companion to Aristotle's* Politics (Oxford, 1991), 118–41 at 121.

[20] See also *Phys.* 2. 8, 199^{b}28–9: 'If the shipwright's art were in the wood, it would produce [ships] similarly [sc. to how it does now, except] by nature.' The proceedings we are asked to envisage here are not those in which a shipwright makes some wood into another shipwright (not even wooden shipwrights in the form of ships), but rather those in which some wood makes *itself* into a ship.

case, but the case in which a doctor cures himself. This suggests that Aristotle's definition of nature is supposed to convey the idea that what is distinctive about natural things is that the principle and subject of movement are not just the same in kind but also the same in number. Consequently, if Aristotle really does believe that there is a sense in which natural things have an internal principle of genesis, it appears as if we must understand him to mean that there is a sense in which individual natural things have in themselves the principle of their *own* genesis. How can this be?

If we think about the reproduction of living things, at least from one point of view, it appears that the ultimate goal of generation is the production of a mature specimen of the kind; from this perspective, there is a sense in which the generative process is not really over until the offspring reaches maturity. It is true that it is difficult to deny that we are faced with specimens of a kind long before they reach maturity; there is a sense in which the process of generation is over much earlier, perhaps once the thing satisfies certain minimum requirements for being of the kind. Even so, it still seems as if there is a sense in which we may regard the changes typical of already existing living things—at least those that take place before they reach maturity—as advanced stages of their generation. From this perspective, we might say that, in whatever sense it is that living things have in themselves a principle of their own movements, in that sense they also have in themselves a principle of their own genesis; for from this perspective these movements just are stages of their genesis (albeit very advanced ones). Of course, the closer a thing gets to maturity, the more difficult this perspective is to sustain; still there are certain stages in an organism's life for which it is a natural and intuitive one, e.g. in embryological development.

As it turns out, Aristotle occasionally adopts just this perspective, not only in discussions of embryology (as in *GA* 2. 4, 740^{b}30 ff.), but also in certain discussions of inanimate bodies (*De caelo* 4. 3; *Phys.* 8. 4). It is true that, in the case of inanimate bodies, Aristotle adopts this perspective in order to explain how these bodies really are moved by external movers (appearances to the contrary notwithstanding); his strategy is to assimilate their movement—e.g. of heavy things down and light things up—to stages of their genesis, and then to identify what moves them with what generates them. That is, in the case of inanimate bodies, Aristotle adopts this perspective not when he wants to argue that these bodies have a

principle of genesis from within, but when he wants to argue that they have an efficient cause of movement from without. Still, the fact remains that Aristotle does at times adopt this perspective, from which we could say that in a certain sense the principles of a thing's movement (whatever they are) are also principles of its genesis. Perhaps, then, Aristotle thinks that natural things have in themselves a principle of genesis in just the sense that they have in themselves a principle of movement, in so far as we are willing to assimilate certain of their movements or behaviour to genesis.

This idea strikes me as promising, considered as a way of explaining how Aristotle can think that natural things have in themselves a principle of their own genesis.[21] Unfortunately, it does not bring us any closer to answering our original question. We are trying to determine what Aristotle is saying about natural things when he says that their movements have an internal principle. The enquiry is not much advanced by the suggestion that he is saying they have in themselves a principle of genesis, if the only way he can think this is on a kind of assimilation of movement to genesis. For in that case he will think natural things have an internal principle of genesis in just the sense (whatever it is) that he thinks they have an internal principle of movement—precisely what we are trying to discover.

IV

I have argued that, for Aristotle, the difference between natural things and artefacts lies neither in the fact that natural things effect their own movements nor in the fact that, in certain respects, they move as they do because they exemplify certain forms or kinds. The problem with the first view is that Aristotle thinks many natural movements are effected by causes external to the things whose movements they are; the problem with the second is that, in the respects mentioned, he thinks artefacts also move as they do because of their form or kind—for him, this is a point of analogy between art and nature. As for the third proposal, it may well be correct that Aristotle holds that natural things differ from artefacts by having an internal principle of genesis; the problem is that the only tenable way of explicating this leads us right back to our original question:

[21] Compare the discussion of the same problem in A. Code, 'Soul as Efficient Cause in Aristotle's Embryology', *Philosophical Topics*, 15 (1987), 51–9 at 55–8.

in what sense does Aristotle think natural things have an internal principle of movement?

One way of putting the difficulty we are in is that so far we have failed to identify a role that Aristotle thinks human beings always play in the movement of artefacts, and that natural things always play for themselves. For while he may think human beings always move artefacts, he does not think natural things always move themselves; and while he does think natural things exemplify the forms in terms of which their movements are explained, he thinks artefacts do that as well. The task then is to identify what role Aristotle thinks this is, played for artefacts by human beings but for natural things by themselves. With this in mind, I begin by asking if there are other ways Aristotle thinks art is a principle, besides by being an efficient cause.

Aristotle discusses various ways in which things are called a 'principle' in *Metaphysics* Δ 1; of these, the only one for which he gives art as an example is the fifth: 'that in accordance with whose will [οὗ κατὰ προαίρεσιν] what is moved is moved and what is changed is changed' (1013^{a}10–11).[22] The examples he gives of this kind of principle are the magistracies in cities, oligarchies, monarchies, tyrannies, and arts, 'especially the master arts' (1013^{a}11–14); and as these examples make clear, in this passage Aristotle is thinking of art as a kind of authority: it is called a 'principle' (ἀρχή) because it in some sense 'governs' or 'rules' (ἄρχει).

On the face of it, we would expect that whatever exactly Aristotle thinks it is to be an authority, it is not quite the same thing as being an efficient cause; that is, even if Aristotle thinks authorities typically are efficient causes, presumably he does not think that all there is to being an authority is being an efficient cause, i.e. making or moving or doing things. This initial expectation is confirmed by the fact that Aristotle appears to distinguish between authorities and efficient causes, listing them as different kinds or ways of being a principle. As just noted, authorities are the fifth kind of principle Aristotle mentions in this chapter; by contrast, the efficient cause appears to be the kind he mentions fourth:

> That from which, *not* as an immanent part, a thing first comes to be, and from which the movement or change naturally first begins, as a child

[22] Trans. W. D. Ross, *The Works of Aristotle*, viii. *Metaphysica*, 2nd edn. (Oxford, 1928), modified.

comes from its father and its mother, and a fight from abusive language. (1013ª7–10, trans. Ross, *Metaphysica*)

The identification of this fourth kind of principle with the efficient cause is reasonably secure. It is suggested both by Aristotle's general characterization of it as 'that from which the movement naturally first begins', as well as by his particular examples: 'a child from its father' is used as an example of the efficient cause in *Metaphysics* Δ 2 (1013ª31 = *Phys.* 2. 3, 194ᵇ30–1), as is 'a fight from abusive language' in *Generation of Animals* 1. 18 (724ª29–30) and *Metaphysics* Δ 24 (1023ª29–31). And though it is true that Aristotle does not regard mothers as efficient causes of their offspring, it is not uncommon for him to illustrate ideas with examples that are at odds with his considered judgement, particularly when, as here, he takes the matter to require some argument (see *GA* 1. 19–20). Thus we appear to have direct textual confirmation of the suggestion, which is antecedently plausible anyway, that Aristotle does not think that being an authority just is being an efficient cause.[23]

It appears then that there are other ways Aristotle thinks art is a principle, besides by being an efficient cause; in addition to making and moving, art 'governs' or 'rules' (ἄρχει). In what follows I explore the suggestion that Aristotle thinks of nature as a principle in a way somehow analogous to this.

[23] Aristotle does appear to place 'not being an immanent part' as a requirement on being a principle of this fourth kind; since he does not regard this as a general requirement on being an efficient cause, we might wonder whether the efficient cause is really what he has in mind here. My suspicion is that the requirement is not in fact meant to bind all principles of this fourth kind, but only those 'from which things first *come to be*' (as opposed to those 'from which [sc. non-generative] movement or change naturally first begins'). One sign of this is that the requirement is evidently intended to establish a contrast between this fourth kind of principle and the kind mentioned third: 'that from which as an immanent part things first *come to be*' (1013ª4) (note the exclusive focus, both in this general characterization and in the examples, on *coming to be*, i.e. genesis). Another is that one of Aristotle's examples of principle no. 4—'a fight from abusive language'—is essentially the same as that used elsewhere as an example of efficient causes that are precisely *in* what they are principles of (*GA* 1. 18, 724ª31–5). (His example there is 'slander', reckoned as 'in' what it is a principle of because it is 'a kind of part of the whole disturbance'; the only difference between 'slander' and 'abusive language' is that slander enters the story earlier: 'from the slander comes abusive language, and from this a fight' (724ª29–30).)

V

The suggestion that Aristotle thinks of nature as a kind of 'authority' runs immediately into the problem that (human beings excepted) Aristotle does not think of natural things as possessed of choice or decision or will (προαίρεσις); this makes it very difficult to see how he could think of nature as 'that in accordance with whose will what is moved is moved and what is changed is changed'. It is true that Aristotle does not think there need be choice or decision even in art; the object of choice is what has been settled by deliberation, but in the arts, at least to the extent that they are more perfectly developed, there is no room for deliberation: how to proceed is already settled by the rules of the art (see *Phys.* 2. 8, 199ᵇ28). However, even if Aristotle does not think of the arts as especially marked by decision or choice, he does think of them as capacities of reason (μετὰ λόγου, *NE* 6. 4, 1140ª3–5). By contrast, if we are to speak of authority in nature, we must first strip the idea of authority of those connections to reason and choice so essential to it in its primary applications. The problem is that it is difficult to see how this is even possible.

Authority in Aristotle is said in many ways.[24] There is the authority of monarchs over subjects, of fathers over children, of husbands over wives, of masters over slaves, teachers over students, captains over sailors, doctors over patients, and so on. Yet although none of these is quite the same, Aristotle believes they can all be brought under one of two basic heads. The first, which I will call 'despotic' authority, is typified by the kind of authority that masters have over slaves; Aristotle characterizes it as for the advantage of the ruler. The second, which I will call 'non-despotic' authority, is exemplified by the kind of authority that citizens in certain kinds of political constitution have by turns over their free fellow citizens; Aristotle characterizes this kind of authority as for the advantage of the ruled (see esp. *Pol.* 3. 6, 1278ᵇ30 ff.). At least intuitively, these characterizations are fairly straightforward. Obviously masters give instructions to their slaves with an eye to what will benefit them, the masters; if it is not obvious that political authorities give instruc-

[24] Aristotle's remarks about the nature and varieties of authority are scattered throughout the *Politics* and elsewhere. The principal texts I rely on are *Pol.* 1, esp. chs. 4–7, 12–13; 3, esp. chs. 4, 6; 7, esp. chs. 3, 8.

tions to citizens with an eye to what will benefit the citizens, there are other examples for which this is obvious: the authority of parents over children, or of teachers over students. That said, however, it is not immediately clear how to bring these characterizations into relation to certain more abstract ideas. In so far as Aristotle holds that the good of anything lies in its function, and that it is the function of rulers to rule and of subjects to be ruled—e.g. of teachers to teach and students to be taught, and more generally of the rulers in some undertaking to rule in it, of their servants or charges to be ruled in it—it would appear that he at least ought to hold that the exercise of any authority, whether despotic or non-despotic, constitutes the good of ruler and ruled alike. If that is right, a question arises as to how to fit the intuitive distinction Aristotle draws between despotic and non-despotic authority into this more general framework. If there is a sense in which the exercise of both kinds of authority must constitute the good of ruler and ruled alike, in what sense is it that despotic authority is for the good of the ruler while non-despotic authority is for the good of the ruled?

I want to pursue this question a little, because I think the answer to it points the way out of our problem. Let's begin with despotic authority, as exemplified in the relation of master to slave. Aristotle describes slaves as a kind of tool, unlike ordinary tools in that they are used not to make things but to act in certain ways (*Pol.* 1. 4, $1254^{a}7$–8). (The idea appears to be that the free man occupies his time not with building houses or making shoes but with leading a good human life, which is a matter not of the manufacture of goods (*ποίησις*) but of the doing of deeds, of action (*πρᾶξις*); this then is the activity in which he employs slaves as tools or assistants.) The point to notice here is that if the slave's work is (not building houses or making shoes but) living a life, it is clear that the proper subject of this undertaking is not the slave but the master; it is he who actually lives the life that is the common enterprise of both. This suggests that even if master and slave both find their good in the success of a single enterprise, there is at least one sense in which this good is primarily a good of the master, namely in so far as the enterprise in which it consists is primarily an enterprise of the master: the good of a slave is that his *master* live a good life. We see the same thing in other manifestations of despotic authority, e.g. those exemplified in the arts in the relation of master craftsmen to their assistants and workers. Here too we observe that Aristotle

holds that it is the master craftsman who is the proper subject of their common work (e.g. building houses): 'speaking unqualifiedly, the work is [not the worker's but] the master craftsman's [*τὸ γὰρ ἔργον ἐστὶν ἁπλῶς τοῦ ἀρχιτέκτονος*]' (*Pol.* 1. 13, $1260^{a}18$). And just as before, this observation suggests that one reason the good of the relationship between worker and master craftsman might belong primarily to the master craftsman is that it is the master craftsman who is the proper subject of the undertaking in which that goodness consists: for example, he is the one that is most properly said to build houses.[25]

By contrast, turning briefly now to non-despotic authority, we can make exactly the opposite observation; here, the proper subject of the enterprise common to ruler and ruled appears to be the ruled. For example, the good life that governments are in the business of providing is that of their citizens, and likewise for the getting fit that is the business of physical trainers, the recovery of health that is the business of doctors, the safe passage that is the business of pilots—all examples of non-despotic authority (see *Pol.* 3. 6, $1278^{b}30$ ff.). It is true that, when there is an active and passive side to the business, there is a sense in which, considered in its 'active' side, the business is properly ascribed to the ruler; for example, governing, healing (transitive), training (transitive), and ensuring a safe passage are all activities of the authorities, of the governors, doctors, trainers, and pilots, not of their charges. However, as is well known, Aristotle regards the active and passive sides of a proceeding as different aspects of a single proceeding, a proceeding moreover that is to be located precisely in the subject of its passive side (the *locus classicus* is *Phys.* 3. 3). Thus the observation appears to stand: in cases of non-despotic authority, the proper subject of the enterprise in which ruler and ruled are united is not the ruler but the ruled. This suggests that in non-despotic authority, even if ruler and ruled both find their good in the success of a single enterprise, one sense in which this good might belong primarily to the ruled is that they

[25] Aristotle does not take this as a point about what people ordinarily think, as is clear from the following remark about a difference between framing general laws and enacting particular decrees: 'The master part of politics [*ἡ ὡς ἀρχιτεκτονική*] is legislature, while the part concerned with particulars bears the name common to both, "politics"; it is of a kind to manifest itself in action and deliberation, for decrees are enacted as the last step. That is why [those who practise] the latter alone are said to practise politics; they alone act as manual labourers' (*NE* 6. 8, $1141^{b}24$–9). For Aristotle's own view, which is just the reverse, see e.g. *Pol.* 7. 3, $1325^{b}21$–3.

are the proper subjects of the enterprise in which it consists: for example, it is not the governor but the citizens who actually live the life that is the proper concern of both.

To sum up: we were asking how to fit the intuitive distinction Aristotle draws between despotic and non-despotic authorities into a theoretical framework according to which the good of anything lies in its functioning; for if we suppose that the functioning of both ruler and ruled lies in a single enterprise common to them both, it would appear as if the exercise of authority is invariably a good of both. In pursuing this question, we observed that Aristotle does not think that ruler and ruled are equally party to the enterprise that constitutes their functioning. In despotic authority, where ruler and ruled appear to be on the same side of the enterprise (the 'active' side), the enterprise belongs most properly to the ruler, who is most properly said to undertake it. By contrast, in non-despotic authority, where ruler and ruled appear to be on different sides of the enterprise, the enterprise belongs most properly to the ruled, who is most properly said to undergo this activity considered in its passive side. On the basis of these observations, we made the suggestion that the way to fit the intuitive distinction Aristotle draws between despotic and non-despotic authority into a more theoretical framework is to assign the good that comes of these different kinds of authority to the proper subjects of the functioning in which that good consists. If this suggestion were correct, everything would come out just right: the exercise of despotic authority would be a good primarily of the authorities, while the exercise of non-despotic authority would be a good primarily of the things governed by it.

However, what matters for our purposes here is not the correctness or otherwise of this suggestion, but rather the observations on which it rests. Our problem was to see if there is anything to make of the suggestion that natural things have a kind of 'authority' with respect to their own movements, analogous to that had by human artisans with respect to the movements of artefacts. In particular, the problem was to separate somehow the idea of authority as Aristotle conceives it from its essential connections to reason and choice. The question then is whether this idea of *being the proper subject* of a proceeding, which we drew on in trying to explain the distinction between despotic and non-despotic authority, allows us to do that; and it appears that it does. For although reason and choice are pre-

conditions for being the proper subject of certain kinds of activity, they do not appear to be necessary for being the proper subject of any kind of activity at all, of any kind of movement. Thus one thing it might be for natural things to be 'authorities' with respect to their own movements is simply for them to be its proper subjects; this is something that can literally take hold of them, despite the fact that they are not generally possessed of reason or choice.

VI

The suggestion then is that when Aristotle says that natural things have an internal principle of movement, he means that they are the proper subjects of their movements; by contrast, to say that artefacts have an external principle of movement would be to say that the proper subject of their movement is precisely not they themselves but something else distinct from them. I believe that this proposal fares better than any we have considered so far in capturing the distinction between natural thing and artefact as Aristotle sees it.

As we saw, the problem with the proposal that nature is an efficient cause of movement was that Aristotle does not believe that all natural things effect all their own movements; sometimes, he thinks, natural movements are effected by something other than the things whose movements they are. The current proposal avoids this problem, inasmuch as you do not need to effect or produce a movement in order to be the subject of it, considered in its passive side. For example, the fact (as Aristotle sees it) that animals do not perceive unless they are 'acted on' by perceptible objects in their environment—'just as what is combustible does not burn itself of itself without something capable of burning it' (*De anima* 2. 5, 417^{a}7–8)—does not prevent them from being the proper subjects of perception; when animals perceive, it is unqualifiedly they who are doing the perceiving. The same thing is true of the natural movements of inanimate bodies. For example, although oil may only combust when put to heat or flame, it does not follow from this, nor is it true, that oil is not the proper subject of the burning it does when so acted upon. Analogous remarks apply to the locomotion of inanimate bodies, e.g. to the rising and falling of fire and earth; though Aristotle appears to think that these changes are effected by

external efficient causes, he need not and does not believe they are undergone by anything other than fire and earth themselves.

These considerations suggest that Aristotle thinks it is at least characteristic of natural things to be the proper subjects of their own movements; but does he also think that this is distinctive of them? Recall that the problem with the proposal that natural things are 'explanatory' of their own movement was that part of the point of the analogy Aristotle draws between art and nature is precisely to highlight the fact that in this respect art and nature are alike; does the current proposal run into a similar difficulty? I think not, though the point is in some respects a complicated one.

We noted earlier that in those passages where Aristotle compares and contrasts nature and art as principles, he appears to be thinking of art as a principle of artefact production; that is, he appears to be thinking of art as a principle of the movements whereby artefacts are produced, rather than as a principle of the movements that constitute their actual functioning. Let's begin then by asking whether he thinks artefacts are the proper subject of these movements, the ones that constitute their production. Obviously he does not think they are the proper subjects of these movements considered in their active side; so considered, their proper subject is not the artefacts that are produced but rather the craftsmen who make them. However, neither should he think that artefacts are the proper subjects of these movements considered in their passive side. It is true that we say that it is an artefact of such-and-such a kind that is being produced (e.g. that it is a house that is being built). Nevertheless, Aristotle's considered view is that when something comes to be or is made into something, the thing that properly speaking 'comes to be' or 'is made into' the thing we end up with is *not* the very thing we end up with, but rather the materials that things of that kind are made from, which are things of that kind only potentially (seeing this is supposed to be the great achievement of *Physics* 1).[26] And we

[26] Put another way: arts do not have authority over what they produce. Cf. *NE* 6. 13, 1145^{a}6–9: 'However, [practical wisdom] is not sovereign [κυρία] over wisdom nor over the better part, *just as the art of medicine is not over health; for it does not use health, but sees to its coming about*; it issues commands then for the sake of it, but not to it.' See also *Phys.* 2. 2, 194^{a}36–^{b}2, where Aristotle speaks of arts that '*rule the matter* and involve knowledge of it' (αἱ ἄρχουσαι τῆς ὕλης καὶ γνωρίζουσαι τέχναι). (It is true that in the immediate sequel Aristotle identifies these arts as the art of using a thing and the (master) art of producing it, and that it seems wrong to say that the *using* art rules *matter* (see below). But note that Aristotle goes on to contrast these two arts by saying that the using art involves knowledge not of matter but of *form*; perhaps we are to take this apparent correction as to what the using art 'knows' to imply a corresponding correction as to what it 'rules.')

have seen the rationale for this already: things cannot be the proper subject of their coming into existence because they do not properly speaking exist until that process is completed.

So far, then, so good; Aristotle does not appear to think of artefacts as the proper subject of their own production, whether considered in its active or in its passive side. However, we should not put too much weight on this result, because it appears that natural things are not the proper subjects of their own production either, and for exactly the same reason: they do not properly speaking exist until the generative process is over. It is true that there is a sense in which natural things might be said to be the proper subjects of their own production or genesis, if we consider certain of their movements as stages of their genesis; in that case, they will be proper subjects of their genesis because they are proper subjects of those movements. This shows how the current proposal can accommodate those passages that suggest that natural things have in themselves a principle of genesis. However, the considerations raised above do not show that Aristotle thinks it is distinctive of natural things to be proper subjects of genesis, if only in this extended sense; this is because they do not show that artefacts are not proper subjects of genesis, even in this extended sense. For that we must argue either that Aristotle would not tolerate the assimilation of artefact movement to artefact production, or that he does not think that artefacts are the proper subjects of the movements that constitute their functioning.

I will argue the second point (we must argue it anyway); there are at least three considerations that speak in favour of it. First, we know already that Aristotle does not think that assistants employed by master craftsmen are proper subjects of their characteristic work: 'speaking unqualifiedly, the work belongs to the master craftsman' (*Pol.* 1. 13, 1260^{a}18). We also know that he thinks that artefacts play a role in the movements that constitute their functioning analogous to that played by assistants in the undertakings of master craftsmen, namely that of instruments or tools:

> Some tools are living, others non-living; for example, for the pilot, the tiller is a non-living tool, the look-out a living one; for in the arts servants are to be classified as tools. (*Pol.* 1. 4, 1253^{b}27–30)

From these points we would expect that just as Aristotle does not think that servants are proper subjects of their work, neither does he think that artefacts are proper subjects of theirs, because they play analogous roles in the proceedings (e.g. piloting) that constitute their functioning.[27] Second, there is much to be said for the idea that artefacts are not the proper subjects of their own movements. Consider some familiar examples: houses, statues, rudders, axes, cloaks, beds. These can all be plausibly regarded as instruments or tools in activities primarily ascribed to the human beings who employ them. This is clearest in cases of artefacts whose characteristic movement consists in a kind of manipulation, as with rudders and axes; part of what it is for a rudder to steer or an axe to chop is for somebody to use them to steer or chop, for someone to steer or chop with them. But it is also plausible in cases where the artefact's characteristic activity or functioning does not consist in any kind of sustained manipulation or handling, such as houses or statues. Houses and statues are not manipulated by human beings in (say) sheltering goods or representing an ideal; by and large they can play their part just sitting there. None the less, it does seem as if part of what it is for them to function in these ways, to shelter or represent, is for human beings to use them; a sign of this is that although abandoned houses may be functional, they do not seem to be functioning, precisely because no one is using them to shelter anything (and perhaps likewise for statues in storage). In all these familiar cases, then, the idea that artefacts are not proper subjects of their normal movements seems straightforward and appealing.[28]

[27] Note that we can specify a thing's normal functioning more or less broadly (e.g. as *piloting* or as *looking-out*). This allows us to distinguish between a stronger and weaker version of the current proposal; on the stronger version, natural things are the proper subjects of their normal functioning on *every* specification of it, while on the weaker version they are its proper subjects only on the narrowest specifications of it. Deciding between these is not easy, because setting out particular cases involves taking a stand on substantive questions about the nature of the phenomena in question, where Aristotle's own stand on these questions is not easy to determine. (For example, bees live in hives, and play a role in the functioning of households, of cities, of ecosystems. How broadly does Aristotle think we should characterize their normal functioning? And what bearing does he think this has on their status as natural?)

[28] It is true that artefacts often change in the course of normal use, and that they appear to be the proper subjects of these changes. For example, cloaks not only keep bodies warm, they also stay warm themselves (on the inside); likewise, beds support the weight of sleeping bodies precisely by yielding and resisting in certain ways. These examples might be taken to show that artefacts are the proper subjects of at least some of their own movements; but even here there are things that might be said. On the one hand, if we consider the yielding that beds do as a complete change in its own right, in isolation from the contribution it makes to the support of sleeping bodies, then while this change does have the bed for its proper subject, it is not in the relevant sense characteristic of beds, because it does not constitute the proper functioning or use of a bed (a sign of this is that discarded beds under piles of junk are no more functioning than abandoned houses). On the other hand, if we consider the yielding as essentially part of the work of support, then while this activity, supporting sleeping bodies, is characteristic of beds—and beds piled with junk are not even partly accomplishing it—it does not have a bed for its proper subject, because it consists in a kind of use of a bed by something else.

Finally, the idea seems implicit in various remarks Aristotle himself makes throughout the corpus. Here I take just one example, a passage where he is criticizing earlier thinkers for inadequacies in their conception of the efficient cause. His complaint is that the particular things they call causes are 'excessively tool-like' (*λίαν ὀργανικάς*) to be given credit for, i.e. to be fairly and properly accused of, producing certain effects: 'they act just as someone would who allotted the responsibility [*ἀπονέμοι τὴν αἰτίαν*] for things coming into being to the saw and to each of the tools' (*GC* 2. 9, 336ᵃ7–9). Implicit in this comparison is the idea that although saws may have a role to play in building (say) tables or houses, they do not actually 'bring into being', i.e. *build*, tables or houses: their contribution is 'too instrumental' for them to be given credit for that.

These considerations suggest that Aristotle does not think that artefacts are the proper subject of their own movements. In the case of movements that constitute their production, the proper subject is either (considered on its active side) the craftsman who produces them or (considered on its passive side) the materials they are made from. In the case of movements that constitute their functioning, the proper subject is, again, either the craftsman who uses them or (considered on its passive side, if such there be) the materials they are used to shape or change or make into something. By contrast, Aristotle does appear to think that natural things are always the proper subjects of their movements, even when those movements are effected or produced by things outside of them.

VII

I have suggested that when Aristotle says that natural things have in themselves a principle of movement, he means that they have a kind of 'authority' over their movement, title to which comes not

with being its efficient cause, but with being its proper subject. Read this way, the definition of nature implies that the difference between natural things and artefacts is that natural things are the proper subjects of their characteristic movements; that is, the normal movement or functioning of artefacts consists in a kind of use of them by other things, while that of natural things does not. This idea is at least as intuitive as the suggestion that natural things move themselves, or that they move as they do because they exemplify certain forms or kinds; moreover, it has the advantage over these suggestions of appearing to sort the cases correctly (by Aristotle's lights). For Aristotle does not think that natural things always move themselves, or that they alone exemplify the kinds in terms of which their movements are explained; but he does appear to think that for artefacts to move normally is for them to be used by other things, while for natural things it never is. Finally, this interpretation also accommodates those passages that say nature is an internal principle of genesis, while at the same time saying something definite about the sense in which this is true: natural things are *proper subjects* of their own genesis, because and in so far as they are proper subjects of their own movement.

Here some may object that, however all that might be, the fact is that it is difficult if not impossible to read Aristotle as saying that nature is a kind of 'authority'; the word 'principle' (ἀρχή) as it is used in the *Physics* does not carry the requisite political connotations. It is true that Aristotle thinks of nature on a kind of analogy with art, and that he thinks art is a kind of authority (indeed, he speaks of it as an authority even in *Physics* 2).[29] It is also true that Aristotle thinks part of what it is to be an authority of the kind artisans have over tools is to be the proper subject of the undertakings in which the movements of those tools consist. We may even grant that, at least in Aristotle, this idea of being the proper subject of a proceeding is not essentially connected to the notions of reason or choice and so inapplicable to nature in general. Nevertheless, the fact remains that when one returns to *Physics* 2. 1 and reads through it again, it is hard to overcome the feeling that the word 'principle' (ἀρχή), as it occurs in the definition of nature, simply lacks the associations with authority that the present interpretation seems to require.

This seems to me a fair objection, deserving of more careful consideration than I can give it here. But I would point out in

[29] I have in mind the use of ἄρχειν and ἐπιτάττειν at *Phys.* 2. 2, 193ª36–ᵇ7.

closing that there are respectable ways of reading *Physics* 2 that would soften it considerably. To take just one example: it was once common to understand Aristotle's definition of nature against the background of the Platonic conception of soul, particularly as it is developed in *Laws* 10, where soul is explicitly called a principle of movement.[30] At issue in this part of the *Laws* is whether the various hallmarks of cosmic order—the system of the heavenly bodies, animals and plants, the four seasons, and so on—are to be ascribed to something like reason or art, or rather to something called 'nature', here conceived as the primary unreasoning stuffs of the universe. The view argued for in the *Laws* is that these phenomena are to be attributed to soul and the things associated with soul:

> My friend, virtually everyone fails to recognize soul, both what it is and what power it has, and particularly its genesis, how it is one of the first things to come to be and is prior to all bodies, and that it more than anything else governs [ἄρχει] their every change and rearrangement. And if this is so . . . judgement and attention and reason and art and law would be prior to hards and softs and heavies and lights, and in particular the first and greatest works and actions would arise from art, since they are among the first, while nature—I mean what they (incorrectly) call nature[31]—and things due to nature would be later and governed by art and reason [ἀρχόμενα ἐκ τέχνης καὶ νοῦ].[32] (*Laws* 892 A–B)

In this passage, as elsewhere in *Laws* 10, the idea that soul is an authority over the movements earlier thinkers ascribe to nature is explicit and on the surface. Suppose then we follow those scholars who read Aristotle's definition of nature against the background of this discussion in the *Laws*, perhaps as marking a stand with respect to the uncompromising criticisms made there of 'everyone who has ever put his hand to the investigation of nature' (891 D). Read this way, we might take the definition to articulate a conception of nature that, although it retains some affinities with that of earlier thinkers (enough to be called a conception of *nature*),[33] is sufficiently like

[30] So e.g. A. Mansion, *Introduction à la Physique Aristotélicienne*, 2nd edn. (Paris, 1946), 83 ff.; Solmsen, *System*, 95 ff.; Wieland, *Physik*, 234, 240 ff.

[31] 'I mean what they (incorrectly) call nature': incorrectly, because it is not the bodies they call nature but rather soul that is the original and first thing to come to be (see 892 C).

[32] For ἄρχεσθαι ἔκ τινος as 'governed by someone', see Soph. *El.* 264, *Ant.* 63 (references from LSJ s.v. ἄρχω, II.4). Another possible translation is: 'beginning from'.

[33] Although the Athenian does say that soul deserves the name 'nature' more than

Plato's conception of art and reason and soul to serve like them as a kind of principle and source of order: 'for nature is a cause of order for everything [ἡ γὰρ φύσις αἰτία πᾶσιν τάξεως]' (*Phys.* 8. 1, 252ª12).[34] If a reading along some such lines as these could be made to work, perhaps the idea of 'authority' (ἀρχή) would not seem so alien to the definition of nature after all.[35] But that is matter for another time.

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the lifeless bodies to which other thinkers apply it, because it is prior to them (see n. 31 above), it is significant that he does *not* adopt 'nature' as the name for his ἀρχή. (Note that neither is 'nature' the name of any principle operative in the *Timaeus*.)

[34] Compare Solmsen: 'When Aristotle defines nature and natural objects as having the principle of movement in themselves, we realize that nature is taking over the function which Plato assigned to soul' (*System*, 95). For nature as aligned with order, see also e.g. *GA* 3. 10, 760ª31; *Phys.* 8. 1, 252ᵇ16–19; *De caelo* 3. 2, 300ᵇ16–25, 301ª4–6.

[35] Another way to go would be to hear the definition as speaking not about 'authority' but about the *beginning* of movement, and to take the idea of a proper subject as a partial explication of that: movement *begins* with you when you are its proper subject. (This approach need not be incompatible with that sketched in the text above. In Homer, the verb ἄρχω can mean to *start a proceeding* (+gen. or inf.), sometimes to start it for somebody (dat.), i.e. to start him 'at' it: e.g. to start the fighting (inf.) for the Myrmidons (dat.), i.e. to lead them into battle (*Il.* 16. 65). But it can also mean to 'start' *certain people* (gen.), i.e. to rule or command them, to be their leader (as in the catalogue of ships, *passim*; cf. ἄρχος+gen., 'leader of' peoples etc.). Thus in Greek the ideas of *starting* something and of *having authority* over it appear to be closely connected. (On these points see J. L. Myres, *The Political Ideas of the Greeks* (London, *c.*1927; repr. New York, 1968), 139 ff.)

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