

ESSAY 1

ARISTOTLE ON TELEOLOGICAL EXPLANATION

He charged like a hill-bred lion, ravenous
for meat, whose proud heart urges him to dare
an attack on the flocks in a close-kept sheepfold.
And even should he find herdsmen there
watching over the sheep with spears and dogs,
he will not think of turning back, empty,
without attacking. Now he must spring down
on a sheep and kill it—otherwise be pierced,
unyielding, by a shaft from a swift hand.

Iliad XII.299–306.

“All animals impart movement and are moved for the sake of something, so that this is the limit of their movement, the thing for-the-sake-of-which” (*MA* 6, 700^b16–17). So Aristotle announces his preference for a teleological account of animal and human behavior. Explanation begins with a goal or end and shows how the animal’s activity tends to realize that end. The scientist is instructed to analyze the “hill-bred lion”’s attack not simply as the response of a physiological mechanism to external stimuli (although this picture, too, may have its usefulness in describing the workings of his physiological apparatus). He is to remain close to the Homeric (or ordinary) account, which mentions the lion’s “proud heart,” his needs and desires, and presents the external object as seen from the point of view of the desiring being. The *MA* presents a model for the teleological explanation of animal behavior and indicates how this account is related to other, non-teleological accounts. To interpret the treatise correctly we must, then, understand why, and in what form, Aristotle endorses teleology. This essay will present a general exposition of his views on the “final cause” as background for a better understanding of his picture of animal behavior.

Aristotle's teleology has often been badly misunderstood. In recent work in the philosophy of biology, he has been held up as the source of the false and inflated claims that have given teleology a bad name among scientists: claims that mysterious or supernatural agencies guide things towards goals; that all natural processes, even the changes of non-living substances, have a teleological explanation; that there is a universal teleology of nature, in which the activities of some species subserve the ends of others. It has even been suggested that moderate defenders of teleological explanation should coin a different name for their theory, so tainted is the old word "teleology" as a result of Aristotelian excesses.¹ These misconceptions have been attacked, but nowhere refuted as comprehensively and consistently as one might wish.² In fact, Aristotle's position is both moderate and interesting, well worth exploring in some detail. We must begin by looking at some of his claims about the roles of form and matter in explanation, in order to characterize in very general terms his criticisms of low-level material accounts. Out of this general defence of the formal principle, he develops an argument that teleological accounts are the most satisfactory way of explaining both the non-conscious growth and development of all living things and the intentional or quasi-intentional activities of animals. The argument proves, on examination, to be a sound and fruitful one, invoking no mysterious non-empirical entities, no efficient-causal gaps. It will emerge, furthermore, that Aristotle neither applies teleology to non-living natural bodies nor gives any evidence of believing in a universal teleology of nature.³

¹ Cf. Mayr, "Cause and Effect," and G. G. Simpson, *This View of Life*.

² Some recent contributions that have helped to clarify the picture are: Ayala, "Teleological Explanations"; Balme, *Aristotle's Use of the Teleological Explanation*; Wieland, "The Problem of Teleology". Ayala's attack on Mayr's reading of Aristotle is based on Randall's *Aristotle*, rather than on a close analysis of texts.

³ As is argued—to cite only two prominent examples—by Owens, "Teleology of Nature," and Zeller, *Phil. der Gr.* II.2, 339.

THE DEMOCRITEAN CHALLENGE

In order to bring out more clearly from the start what the alternatives are, and what is at stake in the debate over teleology, let us provide Aristotle with an imaginary opponent. His predecessors in natural science, Aristotle often tells us, used to spend all their time searching for explanations of natural bodies and their activities in terms of the interactions of low-level material constituents, thinking that the end of science was to reduce all substances to these basic building blocks and to give causal accounts of change on this level (especially *PA* 640^b 4 ff.). "If we look at the early thinkers, the study of nature would appear to be the study of matter" (*Ph.* 194^a 18–19). Aristotle repeatedly attacks them for their lack of attention to formal and final explanation, insisting that form, and not matter, is the basic explanatory principle of living beings and their activities, and that, furthermore, the growth and motion of animals and plants must be explained with reference to an end-state—the mature functioning of the adult creature, as specified in its *logos*. His defences of formal and of final explanation are closely connected: in living creatures, the soul is both form and end (*DA* 415^b 8–12), and, in general, "the what is it and the for-the-sake-of-which are one" (*Ph.* 198^a 25–26). Nonetheless, the two defences are worth examining separately, and the best way to begin sorting out the issues is to have a more concrete picture of the view of scientific explanation that Aristotle is combatting. He has, at various times, many different opponents in view—the Milesians, Empedocles, even Anaxagoras. But it will be convenient to make Democritus, in some ways the most rigorous and the most self-conscious of the ancient materialists, the spokesman for them all—and to imagine him giving a defence of materialist reductionism that is both more sophisticated and more informed by Aristotle's own distinctions than the actual Democritus' work ever could have been.⁴ Let us suppose, *per impossibile*, that

⁴ The historical Democritus is, of course, very different from modern materialists in that he has no empirical warrant at all for the claim that atoms are the basic particles. In what follows I shall ignore this.

Democritus has arrived at the Lyceum, prepared to question Aristotle about his theory of explanation. He comes equipped with copies of *Metaph.* VII, *Ph.* II, the *DA*, the *PA*, book I, and a little-known treatise of dubious authenticity, the *De Motu Animalium*.⁵

D: Aristotle, you have worked out a very elaborate account of scientific explanation, but it seems to me a most uneconomical and unscientific one. You begin with a peculiar premise: that we should not press for just one most basic type of explanation, but should give, as scientists, accounts of as many different types as are furnished us by the data of ordinary speech, leaving out no distinctive type.⁶ "Since there are four kinds of explanation, the natural scientist ought to know about all of them, and if he makes use of all of them (where possible and relevant), he will answer the 'why' question in a manner befitting a scientist" (*Ph.* 198^a 22–23). I take issue with you right here. What kind of a scientific program is this—to round up all the ways we loosely and imprecisely explain the world in our ordinary talk, and then to hold the expert responsible for reproducing this confusion in his own work? It seems plain to me that the job of the scientist is to find beneath the confusion of the "appearances" the simple and precise laws that will explain them all; and a single account is evidently better, and more scientific, than a plurality. We must not put up with four accounts if we can re-

⁵ For my characterization of the general problem of functional-vs.-low-level material explanation, I am heavily indebted to Putnam, "Philosophy and our Mental Life"; and also, on certain points, to Wiggins, "Identity . . . and Physicalism." On teleological explanation in particular, I am indebted to all the works of Taylor cited in the bibliography—especially, perhaps, "The Explanation of Purposive Behaviour." The position I ascribe to Aristotle departs a good deal from Taylor's, particularly in its insistence that teleological explanations are superior in generality and simplicity where *any* self-maintaining behavior, including the non-purposive, is in question.

⁶ On the search for a complete list of *aitiai*, cf. *Metaph.* 983^b3 ff., 988^b17 ff.

duce them all to one. The fact that ordinary men continue to speak of forms and goals is no reason why we should not dispense with these inconveniences in favor of a more basic material account.

But you do not simply insist on a plurality of explanations. You go on to criticize my interest in ultimate matter, claiming that it is form, and not matter, which is fundamental in our explanations of living beings and their activities, even of the nature and functioning of artifacts (*PA* 640^b 22 ff.):

If we were describing a bed, or any other similar artifact, we should seek to describe the form of it, rather than the matter (e.g., bronze or wood)—and if not this, then at least the matter as matter of a compound whole. For example, a bed is this in this, or a this qualified in such-and-such a way—so we must speak of the configuration as well, and the form. For nature in the sense of form is more fundamental than nature in the sense of matter.⁷

In *Metaph.* VII (although I shall not attempt to follow those arguments in detail) you again appear to be claiming that form is basic to our explanations and definitions (especially of living things) in a way that matter is not. You do not even seem to want us to *mention* matter in our definitions (though you are unclear in those chapters), and you insist that it is form, rather than the constituent matter, that provides the best or most basic explanation for the thing's being what it is and acting as it does (cf., e.g., VII.17, 1041^b6–8, 27 ff.). "We must speak of the form, and of the thing *qua* having form, as each thing, but the material (aspect) must never, by itself, be said to be the thing" (1035^a7–9).

I, of course, think that the material aspect is what really *is*, and should be said to be, the thing. When we speak of men, horses, and beds, we are speaking of what appears to us; in reality, all this is atoms and the void. The most lucid, simple, and basic account of the movements of an animal or the structure

⁷ Cf. *Metaph.* 1034^a5–8: the whole man, Kallias or Sokrates, is "such-and-such a form in such-and-such flesh and bones."

of a bed is the one which succeeds in arriving, with precision, at the underlying reality of the ultimate constituents—the atoms and void that the thing really is—and in tracing these accurately over time. Now I see that one of your worries, perhaps the main motivation behind your defence of form, is that we do not, in fact, succeed in tracing atoms as they move rapidly from one so-called substance to another. You ask, how can the best explanation of the Homeric lion's behavior be an atomic one, when that lion's matter is always changing imperceptibly, and only his form or organization remains the same? You infer from this that our explanations of a lion's life-activities should not reduce form to ultimate matter—that it is via form that we trace a complex living being over time, identify and reidentify it, and come to know its nature. I think you have made the very fundamental mistake of confusing a contingent point about the deficiency of our present-day science of matter with a thesis of deep philosophical significance. Your criticism works only against our sloppy, underdeveloped present-day science of matter, and would have no force against the more sophisticated theory that I see as the business of science to develop. Suppose, for instance, that one of your famous bronze spheres, radius r , is thrown through one of your wooden circles, radius slightly greater than r . I shall soon be able to give you a very illuminating account of the entire process, without even mentioning sphericity or circularity, by plotting all the motions and interactions of the atoms that go to make up the bronze and the wood. Or suppose that the Homeric lion desires meat, plots an attack, then leaps down upon a helpless lamb. I could give you that in language which would be less decorative, to be sure, but much more revealing, by talking of the necessary collisions of the ultimate particles that go to make up the Homeric lion over time.⁸ Once I have succeeded in doing that, what reason will you have for defending your loose talk of form and shape? Homer is more

⁸ Democritus here shows no familiarity with the theory of the random "swerve," later added to atomistic physics to leave room for free will and action.

amusing; but when you have my account you really know what is going on in terms of the ultimate constituents of the universe. Instead of saying, "The formal aspect should be said to be the thing, but the material aspect should never be spoken of by itself," you ought to say, "It's the material that's really the thing; and can offer us the most basic explanations of its behavior; but if we do not know enough to give a precise account of that, we will have to make do with our loose, everyday talk of forms."

Before you reply, I have another complaint. You defend not only form, but another sort of explanation which I do not fully understand—the one you call "for-the-sake-of-which." "All animals impart movement and are moved for the sake of something," you claim in your cryptic little book on animal motion. The lion's leap is supposed to be seen as for the sake of a goal or end, not just as the outcome of an antecedent sequence of physiological changes. In the first book of *DA* (403^a29 ff.), you offer a promising causal account of anger as the boiling of blood around the heart and contrast that account with the imprecise or "dialectical" ordinary definition: the desire for revenge. But then you very obscurely say that the real natural scientist will give *both* accounts (403^b8–9). Again, in the first book of your *Parts of Animals* you instruct students of biology to give a teleological, as well as a mechanistic account of respiration:

Exposition should be as follows: for example, breathing is for the sake of *this*, while that comes to be of necessity because of those (642^a31 f.).

You ask for the necessary causal linkage on the material level (the "this from this of necessity," *Ph.* 198^b5–6), but you also require an explanation mentioning the goal. In the *Motion of Animals* you have a nice section dealing with the necessary interactions of hot and cold materials in animal bodies, in the course of which you compare animals to automatic puppets: a small initial change in the matter determines an entire material sequence, which follows automatically. But you still do not concede that this makes explanation in terms of goals and desires

otiose: you insist that all animals, and, more oddly still, even the heavenly bodies, are moved "for-the-sake-of something."

You are not a completely unscientific philosopher. You take a great deal of interest in ultimate matter, and in necessary causal sequences. It also seems to me that you do not espouse teleology in a naïve, Panglossian fashion: you keep these accounts *within* species boundaries, making the relevant end the mature functioning of the normal adult. You are also ready to concede that many natural events are *not* "for something"—apparently most of the changes happening to non-living things.⁹ But if you are so moderate, why are you also so blind as to keep teleology around at all? Can't you see that a simple pruning out of all that otiose material would put your really scientific work in a much better light? That the *De Motu*, for example, would look a lot more modern and precise if you cut chapter six, and the strange part on the so-called "practical syllogism," and expanded your efficient-causal account of animal motion, getting clearer about the nature of the basic material particles? Or are you determined to remain attached to your methodological principle that we should not have just one simple account where we can have a confusing plurality?

To conclude, then, Aristotle: you tell us in your lengthy discussions of "what is" that the primary category of what is is substance, and that substance, in the primary sense, is form. In your accounts of explanation you insist that the formal-teleological account gives us the most insight into the nature of living things. But, in fact,—if I may paraphrase a piece of my own work—form is a convention, the for-the-sake-of-which is convention; what there really is is atoms and the void.¹⁰

Democritus has conceded some points to Aristotle that not all interpreters would, and that we shall have to consider later: the restriction of teleological explanation to living beings, the

⁹ Cf. *Metaph.* 1044^b12 and *Ph.* 198^b18–19, to be discussed below.

¹⁰ Cf. Democritus, *DK B 9*.

parallelism of teleological and mechanistic accounts of behavior, the absence of Panglossian universal teleology. But he has raised what seem to be the most serious questions for Aristotle's theory and has revealed in his arguments some materialist assumptions that infect not only many modern interpretations of Aristotle, but also much modern original writing on these subjects. Aristotle's answer must fall, as has the challenge, into two parts: (1) a defence of explanations on the formal or structural level, rather than at the level of ultimate matter; (2) a defence of explanations that are teleological, rather than efficient-causal, in direction.

THE LEVEL OF EXPLANATION: FORM AND MATTER

A: Your challenge, Democritus, illustrates very nicely what I have so often objected to in Pre-Socratic science: its assumption that the only really "scientific" study is the study of matter, that explanations are more precise and more scientific the more they cast off the "appearances"—the concepts and theories that figure in our ordinary accounts of the world—and point to a material "reality" behind these. Thales thought he had done wonders for science when he said it's all made of water—although he had not enabled himself to say *what* it was that was so made, or to account for its changes. Empedocles added to his account of basic constituents *some* story about how compound bodies were put together; but his story did not take account of the fact that natural bodies are born, grow, live, and decay as organic wholes.¹¹ Now you suppose that you have made great progress by reducing all the physical world to ultimate particles and the void, assuming only some simple laws of motion and interaction. You, like the others, equate "scientific" with "reductionistic," and assume that the most interesting explanation is the one that moves the furthest from the ordinary in the direction of basic material stuffs. Throughout your speech I noticed words like "illuminating," "revealing," "interesting,"

¹¹ Cf. *Ph.* II.8 on teeth, and especially *PA* 640^a19 ff. on the spine, to be discussed below n. 22.

"basic," that you used (forgive me) with the naïve persistence of a zealot rather than the balanced judgment of a scientist. By "illuminating" you really seem to mean nothing more than "concerned with ultimate matter"—since, as I shall argue, in no other more truly scientific sense of "illuminating" could your accounts make this claim.

My methodological principle is not, of course, the one you ascribe to me (not to make do with simplicity when you can have confusion); it is, rather, not to make do with one story when another is available which gives new and relevant information. Particularly, of course, not to neglect the explanation that is the most general and has the greatest predictive power in favor of one that is hardly an explanation at all. You assume throughout that if formal-teleological and material accounts are accounts of the same beings or events (if there are no mysterious disembodied "purposes" or Platonic souls), then my formal accounts are otiose and are retained only from old-fashioned pedantry or intellectual dimness. I do not appear to believe in disembodied purposes, or in separable substantial souls;¹² I say quite clearly that the soul is the form of the living body, and that it is wrongheaded even to *ask* whether the soul and the body are one (*DA* 412^a6–b9). Ergo, by your argument, I am wrongheaded to keep on talking of forms. If we are enmattered beings, our behavior is best explained using the low-level laws of material particle interaction.

There are a number of confusions in this argument, which it will take some time to sort out. I agree that we must not get entangled now in a detailed analysis of the arguments of *Metaphysics* VII. You seem to me to have read it rather well. At least you have grasped that my two most important claims about form in that book are these: (1) Form, and not matter, remains the same as long as this is the same X; and hence it is form, and not matter, that enables us to identify and reidentify complex substances. The lion's matter is constantly changing as he assimilates food and excretes wastes; it is his form that must

¹² Aristotle is here abstracting from the complexities added to this general picture by his theories of *nous* and of the unmoved mover.

persist as long as this particular lion is in existence. (2) It is form, and not matter, with reference to which we can arrive at the most satisfactory explanations of the activities and motions of both living beings and artifacts. (I am, in VII, interested primarily in living creatures; it is no accident that most of my detailed examples concern souls and bodies. I even say repeatedly that the word "substance" is used primarily for the natural¹³—just as, in the *Categories*, my primary substances were natural kinds. It is much clearer for these than for artifacts what the form is that provides a principle of unity and identity. If you add a wing onto a house, its shape changes; it is hard to say whether it is still the same house. But we have a very clear notion of what changes a lion can undergo and still be the same creature.)

Now I want, first of all, to address your claim that the best explanations are on the level of ultimate constituents, that what is "really real" (the real substance) is atoms rushing through a void. I shall grant for the sake of argument that your theory of ultimate matter is correct and use the geometrical examples you so kindly introduced to make my objection clear.¹⁴

We have a bronze sphere of radius r that passes through a circular wooden hoop of radius just slightly greater than r . Let us say that we also have a bronze cube of side $2r$. It will not, of course, pass through the hoop. Suppose I ask you, "Why?" You denigrate attempts like mine to make available a variety of answers to "why"-questions; for you, the only scientific answer will be one that lists the atoms that compose the hoop and the two bronze figures, charts their distances and positions in the void, and gives a precise, elaborate account of all the movements and trajectories of all the particles. I, on the other hand, will

¹³ Cf. *Metaph.* 1014^b27, 1041^b28–31, 1040^b14, 1043^a4, 1021. A very interesting analysis of *Metaph.* VII along similar lines is in an unpublished paper by Michael Frede.

¹⁴ Aristotle appears to be indebted for this example to Putnam's paper (pp. 295–98) cited in n. 5 *supra* (though Putnam, in this same paper, expresses his indebtedness to Aristotle, with whom the argument clearly got its start).

hold that the relevant explanation is a very simple one in terms of simple laws of geometry known to all of us and that your charting procedure is simply irrelevant to the "why" question as I have asked it. (1) It is my account, rather than yours (as you suggested) that is *simple*. Yours is extraordinarily complicated, and the answer would never become perspicuous to the interlocutor. (2) My account is also more *general* than the account that invokes ultimate matter: for instance, I can predict that if we did the same thing with a wooden sphere and a bronze circle, the result would be the same; you would have to redo all your computations. (3) My account invokes only the *relevant* data: the dimensions and shapes of the bodies. Yours, on the other hand, is full of irrelevancies. "What we seek is the explanation, i.e., the form, by reason of which the matter is some definite thing" (*Metaph.* 1041^b6-8); it does not matter, for these purposes, whether the form of sphere is realized in bronze or wood or bone. "In the case of things that are found to occur in specifically different materials, as a circle may exist in bronze or stone or wood, it seems plain that these, the bronze or the stone, are no part of what it is to be a circle, since it is found apart from them" (*Metaph.* 1036^a32 ff.). Again, if we were describing a bed and what it was good for, we would cite the relevant structural features (rigidity, a certain length and shape) and mention the *specific* matter only as that in which the form was appropriately realized (*PA* 640^a23 ff.): the formal nature is more relevant to explanation here, too (*kuriōtera*, 640^b28), than the material nature. The form must be realized in *some* sort of suitable matter, but the matter is relevant to a general explanation only as being some stuff that can potentially function in the way specified in the formal account.

Now so far you might suppose that a formal account would not have anything to say about *function*. The examples of the sphere and the cube suggest that by "form" I mean merely "shape" or "configuration;" indeed, I myself frequently use the words *morphē* and *schēma* to designate the form. In the case of artifacts, this is usually all right, since shape and suitability to function tend to coincide: the aesthetic value of a statue depends

on its morphology, the capacity of a solid body to pass through a hoop on its size, shape, and rigidity. But in the case of living things, it is very clear that to explain behavior we must refer, not to surface configuration, but to the functional organization that the individuals share with other members of their species. This is the form; this, and not the shape, remains the same as long as the creature is the same creature. The lion may change its shape, get thin or fat, without ceasing to be the same lion; its form is not its shape, but its soul, the set of vital capacities, the functional organization, in virtue of which it lives and acts. If the eye were an animal, sight, not sphericity, would be its soul; if an axe were an animal, not wedge-shape, but cutting, would be its first actuality (*DA* 412^b10 ff.). A corpse has the same *shape* as a living man; but it is not a man, since it cannot perform the activities appropriate to a man (*PA* 640^b30-641^a17). When I ask for a formal account of lion behavior, I am not, then, asking just for a reference to tawny color or great weight. I am asking for an account of what it is to be a lion: how lions are organized to function, what vital capacities they have, and how these interact. And it is this, again, rather than an enumeration of its material constituents, that will provide the most simple, general, and relevant account for the scientist interested in explaining and predicting lion behavior (cf. *PA* 641^a7-17). You tell me that this particular lion in book XII of the *Iliad* has five billion atoms, of such-and-such shape, in such-and-such configurations, and plot me a chart of collisions and motions. Homer tells me that lions need meat, that they are proud and strong, that when they are hungry they take great risks to attack sheepfolds, and are often brave enough and skilled enough to beat off attackers. If you were a shepherd in charge of the flocks, which account would give you more information that was relevant to your plans and precautions? From eight lines of Homer I learn more that is general and valuable about the behavior of lions than I would from two volumes of detailed atom-charts.

You may imagine at this point that I am turning Platonic and casting aspersions on matter as a proper object of serious scientific concern. My terminology, which appears constantly to set

up an *opposition* between form and matter, can be misleading on this point. Actually, of course, the form of a living being is not something separable from matter; it is something material, a functional state of matter—or, if you prefer, a first entelechy (the organization-to-function, analogous to “sight”) of some matter. In the geometrical cases we have discussed, one might argue that the relevant explanation need make no reference at all to matter. The mathematician treats of form and shape as separable from change (*Ph.* 193^b32 ff.). The bronze is no part of a sphere’s essence; sphericity can be realized in many different sorts of matter, but it can also be studied and defined completely in abstraction from matter. But living beings are necessarily enmattered. Although the account of what it is to be a man or an animal should not make the mistake of supposing that the flesh and bones in which such creatures always, in our experience, turn up are necessary parts of their essence (for if we found tomorrow a creature made of string and wood who performed all the functions mentioned in our formal account of what it is to be human, we could not rule him out simply on material grounds), it should at the same time recognize that *some* sort of matter is necessary for the performance of these functions. Socrates the younger suggested that we could define “animal” as we define “circle”—without any reference to matter. “But the case is not similar; for an animal is something perceptible, and it is not possible to define it without reference to change—not, then, without reference to the parts’ being in a certain state” (*Metaph.* VII.11, 1036^b27 ff.). Circularity is a form that may or may not be enmattered; soul is a functional state of some matter, so that any account of it must mention the realization of this state in *some* sort of suitable stuff. As the snub, unlike concavity, is inseparable from, and inexplicable without reference to, its realization in some material stuff of a suitable kind, so with beings in nature: “For none of these is the account without reference to change; they always have matter” (*Metaph.* 1026^a2–3). “We should study such things neither apart from matter, nor according to matter only” (*Ph.* 194^a13–15). Soul is the first actuality of a natural body potentially having life (*DA*

412^a27–28); soul and body are as much one as the wax and its shape (*DA* 412^b6–9).¹⁵

Thus when I criticize your material accounts for living beings, I do not mean to suggest that we want to explain their behavior on the level of form where form is distinct from, and seen in abstraction from, matter. I am distinguishing two levels on which we can give a material account: the level of ultimate particles, and the level of matter’s functional states. Perception, desire, etc., are not physical in the sense that the best account of them involves reference to the basic particles of atomistic (or any other) physics. But they are physical in the sense that an account of what they are necessarily involves matter.¹⁶ Form is not a constituent of the animal over and above its material constituents (although my expression “the compound” might mislead one on this point—cf. *Metaph.* 1041^b12 ff.); it is the arrangement of the constituents themselves. “To eliminate the matter is beside the point; for some things just *are* this in this, or these in such-and-such a state” (*Metaph.* 1036^b22–24).

I have tried to show that you, Democritus, although you are right to suppose that living creatures are necessarily physical entities, are wrong to infer from this that the best explanation

¹⁵ The position on VII.10–11 taken here is roughly the one defended by Sellars in “Substance and Form” and “Raw Materials.” The unmoved mover is, of course, an exception to this account and to the *DA* definition, as are the heavenly spheres as well to the next definition—“entelechy of a natural *organic* body.”

Putnam argues that to insist that the functional state be realized in *matter* is already too restrictive: “What we are really interested in, as Aristotle saw, is form and not matter. . . . And whatever our substance may be, soul-stuff, or matter or Swiss cheese, it is not going to place any interesting first order restrictions on the answer to this question” (302). The difference between Aristotle and Putnam here is, I think, only verbal. Both concede that the functional states of living creatures are realized in some *stuff* (or what Putnam calls “substance”); Aristotle uses the term *hylē* (“matter”) for “stuff” conceived in the most general possible way, while Putnam uses it for a certain kind of “stuff”—the basic particles of physics and chemistry.

¹⁶ Cf. Wiggins, “Identity,” 25–26, and the parallels with Hobbes in nn. 22–24.

of their behavior is on the level of basic particles. Whether we think of animals or of artifacts, in most cases structural principles provide explanations that are superior in economy and generality to the elaborate atomistic accounts you project. In the case of living beings, the account will be concerned not with form in the sense of *shape*, but with form in the sense of functional organization; and this formal account, unlike the formal accounts of mathematical entities, necessarily involves matter.

TELEOLOGY: THE DIRECTION OF EXPLANATION

You had a second complaint: that where there appears to be a complete explanation of a motion or process in terms of an antecedent causal sequence, it is otiose to invoke the goal, or the "for-the-sake-of which." I was glad to see that you did not make some of the more common mistakes about my teleological accounts: you saw that they do not require us to introduce mysterious, non-empirical processes and events—for example, a divine guidance of the universe towards the good, or mysterious strivings in matter to realize form.¹⁷ But, having seen this, you were then faced with the more interesting question: why, given that teleology does not posit entities different from those that turn up in a causal account, is it not simply redundant? How can it claim to contribute anything distinctive to our understanding of natural beings and processes? You actually conflated your attack on teleology with your defence of explanation at the atomistic level; I have already begun to answer you by criticizing those ideas—all the more since the form of the living body is the end or goal with reference to which I argue that most teleological explanations are to be given. Let me, however, ignore atomistic reductionism for the present, and try to give a general defence of teleological accounts as compared with any account in terms of an antecedent efficient-causal sequence, elaborating the claim I made at *PA* 639^b12 ff.:

¹⁷ Cf. Zeller, n. 3, *supra*: "Alteration and change have their place only in matter, and are directed towards form by a striving which dwells in matter."

And further, since we see more than one explanation in connection with coming-to-be in nature, for example, the explanation *for the sake of which*, as well as the explanation *from which comes the beginning of the movement*, we must be clear about these too, as to which sort of explanation is naturally first, and which naturally second. First is evidently the one we call *for the sake of something*. For this is the definition, and the definition is the beginning in natural things.

A teleological account claims that *x* happens for the sake of *y*. More precisely, it can claim either that (1) $x \left\{ \begin{array}{l} \text{happens} \\ \text{is} \end{array} \right\}$ for the sake of *y*, or that (2) O did *x* for the sake of *y*. Let us call the first an objective teleological account; it characterizes both the goal and the process or system from the scientist's point of view, and presupposes no conscious awareness on the part of the agent. The second account, which we shall call the subjective, claims in addition that the animal is aware of the goal. It mentions the goal under its intentional description for the agent, and implies that it is this description of the goal that is relevant in understanding why the action occurred. Some examples of the relevant types would be:

- (1) (a) Growth takes place in O in such-and-such a way because O is a lion (i.e., for-the-sake-of realizing lion-form).
- (b) The function of eyes in lions is seeing.
- (2) The lion entered the sheepfold to get meat.

This last sort of case is the kind for which teleological accounts would, perhaps, be most frequently defended. They are, however, in fact the ones in which the distinctive contribution of teleology is the most difficult to pick out. I want, therefore, to begin with the first type; and, before, looking at functional explanations of particular organs and systems, to give a general defence of explaining events and processes in the life of a plant

or animal with reference to the mature state characterized in that creature's *logos*.¹⁸

SELF-MAINTAINING SYSTEMS¹⁹

An animal or plant is an organic whole, a complicated system of interrelated capacities, most of which tend, in one way or another, to promote and maintain the mature functioning of an organic system of that sort, and/or to perpetuate the system beyond the individual life by reproduction. This capacity—to maintain functional states through self-nutrition and to propagate them through reproduction—is the mark that sets off the living from the lifeless. “By life we mean self-nutrition, growth, and decay” (*DA* 412^a14–15). “The living, *qua* living, is a self-nourishing body, so that food is essentially, not accidentally, related to the living” (416^b9–11). Self-nutrition, with reproduction, is “the first and most common capacity of soul, the one

¹⁸ Aristotle will speak here only of living beings. This restriction is defended below.

¹⁹ On this and the following section, cf. especially Wright, “Functions”; Boorse, “Wright on Functions”; Cummins, “Functional Analysis”; Ruse, “Functional Statements in Biology”; Canfield, “Teleological Explanation in Biology”; Scheffler, “Thoughts on Teleology”; also Beckner, “Function and Teleology”; Hempel, “The Logic of Functional Analysis”; E. Nagel, *The Structure of Science*, chapter 12; Sorabji, “Functions.” Aristotle’s position, I shall argue, is closest to the one defended by Boorse and Cummins, both of whom insist that a functional explanation of a part *x* is part of an analytical answer to a question about the whole system *O*—how does *O* work?—and not, except secondarily, an answer to the question, “Why is *x* there?” or “How did *x* get there?” (Contrast Wright, who nonetheless makes some important observations about the relationship between functional analysis and evolution.) Boorse argues that functional accounts are appropriate only to goal-directed systems—i.e., to systems that display appropriate behavior modifications within some range of environmental variation (78–80); cf. also Ruse, whose notion of “reproductive fitness” is, however, much narrower than Aristotle’s nutritive-reproductive *psuchē*: we can still talk about the functions of parts of a mule, although the animal is sterile, because it remains (numerically, if not in species) a self-maintaining organism.

in virtue of which life belongs to all that has life” (415^a24 f.).²⁰ As we shall see later, to ascribe to a creature the capacity for self-nutrition is also to ascribe to it a certain plasticity of behavior: in a variety of circumstances (though always within natural limits) it does what is appropriate to maintain its states. An icicle grows by absorbing material from the environment; a fire “nourishes” itself by consuming surrounding matter. Yet we do not call these living, because there appears to be no selectivity, no capacity to vary behavior with changing circumstances; this behavior is explained by the laws of matter alone. A plant, on the other hand, turns and grows now this way, now that, depending on the location of the sources of light and water, limiting its growth as the life of the whole system requires. An animal does not eat just any object in its environment; it selects the food which is appropriate to maintaining its organic states. This plasticity is part of what we mean by *self-nutrition*; previous thinkers who made perception or motion the characteristic mark of *psuchē* failed to see that it is basic to our ordinary notion of life. Numerous organisms that neither perceive nor move are still counted by us as living because their behavior displays appropriate variation directed at the end of keeping the creature (and, beyond him, the species) alive. The parts of a plant, like the parts of an animal, are for-the-sake-of life (416^a17–18).

The capacity for self-maintenance is the “first soul” not just in the sense that it is most basic, or lowest; it is also most central, “most general” in the sense that it in a way encompasses and subsumes all the others. For when we give an account of perception or motion, we do so in terms of the basic ends of self-maintenance (nutrition) and reproduction.²¹ All the more specialized capacities are to be explained functionally, as tending to promote life. The perceptive capacity is one part of an analyti-

²⁰ On reproduction, *DA* 415^a25–26.

²¹ This will not, of course, be true of god or the heavenly spheres, and this may be the reason that, at 413^a22 ff., Aristotle proposes a different account of life: if only *one* of the life-capacities (intellect, perception, nutrition, etc.) is present, the creature is called living.

cal account of the nutritive capacity (as well as a part of the *logos* that we give when we ask what "self" the nutritive capacity is to preserve). If we ask why animals perceive, we will get an answer that shows how perception is, in certain animals, necessary for survival and reproduction (*DA* 434^a30 ff.). If we ask why animals preserve themselves or reproduce themselves, we hear only that this is "the most natural function" in living beings (415^a25 ff.), that this is what it is to be alive (412^a14–15).

Now if animals and plants are self-maintaining organisms whose behavior tends to promote their life and states, we might expect that the best explanation of any particular process or piece of behavior will be one that takes this into account, showing what part the particular activity plays in the overall pattern of the organism's self-maintaining activity. It must have two parts: (1) a specification of what it is to be that sort of creature—the *logos*, which describes in a general way the form or functional organization of a normal adult of that species; and (2) an analytical account that shows how a particular process or organ contributes towards the realization or maintenance of some component of the *logos*. The *logos*-state, a certain functional state of potentially living matter, is the goal or end with reference to which growth and particular bits of activity are to be explained:

For coming-to-be is for the sake of being (*ousia*), not being for the sake of coming-to-be. . . . Hence we should, if possible, say that because this is what it is to be a man, therefore he has these parts; for he cannot be without them. . . . And because he is a thing of this sort, his coming-to-be must happen the way it does. And that is why this part comes to be first, and then this (*PA* 640^a18 ff., cf. *GA* 778^b3 ff.).

Such an account appears to have two important advantages over an efficient-causal account of the form "A happens after C of necessity": (1) The teleological account, unlike the efficient-causal one, sets the process to be explained in the wider context of an integrated pattern of behavior, showing how it is

related to other systems and activities of the creature. Empedocles' account of animal development ("many heads sprang up without necks," etc.) suggests that we can describe growth by characterizing the interactions of limbs and parts in isolation from a growing whole. But at any stage in the process of growth, what we have is a whole, an organic creature of a certain sort; and the *logos* of what it is to be that sort of creature is crucial to us in explaining and predicting how growth will go.²²

(2) These considerations might not tip the balance in favor of a teleological account, if animals and plants were not plastic and self-maintaining: for then, given a suitable amount of information about the initial state and the laws of efficient-causal interaction, we would be able adequately to predict or explain the outcome. But for living beings as we know them, the teleological account that begins with the creature's *logos* is superior in generality and predictive value. In a wide range of circumstances, an animal or plant responds appropriately, so as to fulfill or maintain some part of its *logos*. As the circumstances change, the behavior, and the efficient-causal laws that explain it, change also. What remains the same, and unifies the various cases, is the teleological law that the behavior is whatever will promote the flourishing of the mature organism. Empedocles argued that the growth of plants was to be explained solely by the laws of matter: the downward rooting because earthy matter travels down, the upward branching because fiery stuff travels up (415^b28 ff.). But this fails to explain why it is that, when the sources of water and light change position, the rooting and branching change also; and why the growth does not go on within limit, but only as far as is compatible with the health and life of the whole organism (cf. 416^a8–18). The material laws may be a concurrent ex-

²² *Ph.* II.8, 198^b23 ff.; and also *PA* 640^a19 ff., where Empedocles is again accused of explaining development piecemeal and of not recognizing that what comes to be is, at any stage in the process, an organic whole: "the seed which gives rise to the man must to begin with have a capability of a certain sort." Cf. Clark, *Aristotle's Man*, 50–64, and, for a similar argument, Mackie, *The Cement*, 273–74.

planation of plant-growth, but the primary explanation is provided by soul (416^a14–16)—by a functional account that tells us that in a variety of circumstances that plant will root and grow in the way best suited to its continued life and growth—that the growth is “better so—better not simply, but with reference to the nature of each thing” (*Ph.* 198^b8–9).²³ Instead of a separate story for each part and system, we have an account that shows how each system contributes to the interlocking functioning of a whole organism, whose states (as a whole) most of its behavior seeks to perpetuate. Instead of a conjunction of efficient-causal sequences (In C_1 , plant O does x_1 ; in C_2 , O does x_2 , etc.), we have the simple law—from which, unlike the conjunction, we can make predictions about new situations—that in $C_1 \dots C_n$, O will “choose” (within natural limits) whatever behavior will bring about y , where y is some component of its *logos*.²⁴ Empedocles’ accounts imply that the growth and development of bodily parts is a matter of chance interaction; but “all natural things either invariably or normally come about in a certain way” (*Ph.* 198^b34–6)—the way that promotes the *logos*, which should be the beginning of a scientific account. “Things exist by nature if, starting from some internal starting-point, they arrive by a continuous process of change at some end-state. Each starting-point gives rise, not to the same thing in all cases, nor to just any chance thing, but always to something *proceeding towards the same thing*, if there is no impediment” (*Ph.* 199^b15–18). The *logos* is the end-state which provides a unified account of adaptive behavior.

²³ Cf. also *Ph.* 199^b9–13, where the organic unity of plants (we do not see “olive-headed vinelets” growing from seeds) is used as an argument against Empedocles’ theory of animal reproduction.

²⁴ Cf. Taylor, “A Reply,” 141–43; “Explanation of Purposive Behaviour,” especially 58–59; Mackie, *The Cement*, 278. Taylor sometimes seems to confine the argument to genuine cases of purposive behavior; Mackie is closer to Aristotle, extending it to animal behavior which “invites purposive description” (275). Real animals will, of course, have complex and sometimes conflicting goals in view; this vastly complicates the problem of explanation and prediction—cf. Scheffler.

FUNCTIONS

It is now worth looking more closely at some cases where I ascribe a function to a bodily part in order to be more precise about what such claims imply. Plato, in *Republic* I, suggested a three-part account of functions, from which I feel it important to distinguish my account. He suggested that the function of a part or an artifact is (1) what it alone does, *or* (2) what it does best, *or* (by implication) (3) what it is designed to do (352e–353a). These criteria pick out different functions; and Plato nowhere tells us the point of giving functional accounts, what they are supposed to explain. To take an example: the heart makes a thumping noise; it is the only organ in the body to make a thumping noise; but nobody would say that its function was to make noise, rather than to pump blood. Plato’s account, however, admits both as functions.

The first thing to notice about my functional accounts is that they are always given with reference to a containing system—they say “the function of x is y ” “not simply, but with reference to the nature of each thing.” This means that functional accounts are useful primarily for systems of living bodies; they can be applied to artifacts only derivatively, and by regarding them as extensions of the living body—like the stick in *MA*, chapter 8, whose function is to help the man to walk and which “becomes like a separable limb.” Plato’s pruning-knife, and other detached artifacts, have a function only with reference to the needs and desires of the beings who use them. In animal organisms, we can ask, given a creature of a certain type, what the functions of various systems and parts are in its self-maintaining activity. What we cannot do is (1) to ask what the function of self-maintaining itself is (that we take as given, and as “most natural”), or (2) to ask what the function of a certain type of animal is, in some larger scheme of things. That is the cosmic teleology of design of which I have often been accused, but of which *Ph.* II.7–8 and hundreds of examples ought to acquit me.

A request for a functional account is not a demand to know

how the heart got into the lion or why this bone is here rather than there.²⁵ There is some evidence that systems and structures *did* get the way they are by altering in response to environmental change, and then being transmitted in changed form to offspring; and this, if true, would give functional accounts an added aetiological value for the physiologist.²⁶ But the main thing that we demand when we ask for the function of *x* is an analytical account that begins with the animal's *logos*, and goes on to say what systems and parts enable animals of this sort to maintain themselves and how these are interrelated. This happens on two levels:

(1) On the formal level: we list what I shall call the "constitutive activities" of the animal and show what contribution each of these makes to self-maintenance. We do not mention matter, except to say that this function is necessarily realized in some sort of suitable matter. Constitutive activities are all those activities that enter into the best specification of what it is to be a certain sort of animal; these also, in most cases, enter into the best analysis of how animals of this sort nourish themselves and reproduce.²⁷ For example: the perceptual system is constitutive of what it is to be an animal; and there is also a functional account of perception (cf. *DA* III.12) that shows how perception contributes to an animal's self-nutritive activity.

(2) When we have enumerated the constitutive activities, we still know comparatively little about the biology of par-

²⁵ Cf. Cummins, Boorse.

²⁶ This is the contribution of functional accounts stressed by Wright; for some criticisms of his account of evolutionary theory, cf. Cummins, 750-51; more general criticisms are in Boorse, 70-77.

²⁷ It could be objected that a great many characteristic activities, especially of the higher creatures, do not contribute to self-maintenance or reproduction; the purely theoretical intellect is the most striking example. Aristotle would hold that *most* activities are somehow connected to the "nutritive soul"; in the case of intellect, he could refuse altogether to give its purely theoretical exercise a functional account, or he could make an exception to the usual rule that functional accounts are relative to nutrition and reproduction.

ticular animals. We know what systems they have, and that these are realized in some sort of suitable matter. But this will not help us if, as doctors or scientists, we want to know how these activities actually go on in particular living creatures. For that, we need to move to the level of contingent material realizations of functional states. For nutrition to take place in higher animals, there must be a system which transports nutrition to different parts of the body: the circulatory system. The operation of this system requires something to transport the nutritive material, and a pump to cause the transporting medium to move. This pump, in most of the higher animals that we actually observe, is the heart. Then the function of the heart in higher animals is to pump the blood. The heart does other things as well: it makes a thumping noise, it leaps from fright (cf. *MA* 11, *DA* III.9). But these do not enter into the analytical account of the animal's self-maintaining activity. If the heart did more than one thing that did figure in such an account, it would have more than one function. (Some bodily parts appear to have no function. "There is no reason to look for the for-the-sake-of which in all (bodily functions); some are there for something, and many others are present as a result of these" (*PA* 677^a17-19)).²⁸

Clearly the heart is not *necessary* for the performance of the circulatory pumping. When I so frequently use the phrase "the *x* or its analogue" I am emphasizing that we are interested in a functional state of the organism, which is realized in some suitable matter or other. An artificial pump might perform the heart's function, whereas a non-functioning heart would be only homonymously a heart. But it is also true that as doctors and biologists, we are interested in knowing what particular organs in creature *O* usually realize their various functional states. Thus, though the heart is proper cause of circulation, not *qua* heart, but *qua* pump,²⁹ we still are interested in knowing that in normal circumstances animals in species *O* have hearts, not metal pumps, to do the pumping.

²⁸ Cf. the discussion of *GA* V.1 in the section on necessity, pp. 92-93.

²⁹ Cf. *Ph.* II.3, 195^b3 ff.

When I say, "The function of x in O is to y " (and x is an organ or physical system, not a functional state), I mean, then:

(1) That y is a "constitutive activity" in the system O (an activity which would be mentioned in the best analysis of how O maintains and reproduces itself).

(2) y is an ongoing or regular activity of x in O (to eliminate cases in which a part performs a useful function by accident or sporadically); x has a stable disposition to y in O .

(3) x or some functional analogue of x is necessary for y -ing in O .³⁰

(4) Under normal circumstances x is necessary for y -ing (or good y -ing) in O 's as normally constituted.³¹

Functional accounts will be more informative the more complicated the system being analyzed, and the greater the difference in complexity between the analyzed system and the organs or systems mentioned in the analysis. The functional analysis of a simple plant is less revealing than an analysis that breaks down a complicated human organism into much simpler systems and organs and tells us their roles in the functioning of the whole.³²

In addition to its analytical value, a functional account of a

³⁰ This is not as empty a requirement as it might appear to be. We can say something about what any pump must be like (in terms of large-scale structural laws, specification of division into moving and moved parts, etc.), beyond the bare claim that it must be something suitable for pumping.

³¹ A problem arises for cases in which two or more organs of the same type generally contribute to the performance of the function, though one alone would be adequate: e.g., the kidneys, the teeth. We would not usually say here that, e.g., the function of the *left* kidney is to eliminate wastes from the blood. Aristotle never, so far as I have been able to determine, makes a claim of that form; instead, he ascribes the function only to the whole system that *is* required for the proper performance of the activity—the teeth, the blood vessels, the bones—and ascribes to individual parts only some contribution unique to that part. There will, however, be cases where we will want to say that the presence of, e.g., one of a pair of co-functioning organs is necessary to ensure the *good* performance of the function.

³² Cf. Cummins, 764.

system or organ may, as I suggested, have some aetiological force: it may say something about why that part is there in the form in which it is there.³³ Animals are not only plastic as individuals; they also adapt in more lasting ways to changes in environment. Desert mice develop digestive systems that enable them to go without water in the summer; if they drink the amount of water that regular mice do, they die (*HA* 606^b23). Cattle develop humps in environments where long-term food storage is necessary (606^a12 ff.). In cases like these, we can explain the physiological differences between the desert creatures and their near relatives by citing the usefulness of their adaptations in preserving life and health. A functional account of a desert mouse's water-system not only forms part of an analysis of that mouse's nutritive-reproductive activity for the sake of its *logos*; it also shows us something about the history of this system, and tells us why it is there, why it differs from isofunctional systems in other mice.

TELEOLOGY AND INTENTIONALITY

I have now considered the first and most general form of teleological explanation: " x happens for the sake of y ," or "The function of x is y ." The defence of this sort of account against atomistic reductionism is predicated, first, on my general defence of explanations on the formal-functional level, rather than on the level of ultimate matter; second, on my account of living beings as essentially and primarily self-maintaining organic systems. Teleological accounts show the relevance of an organ or a process to this self-nourishing activity, and contribute to an analysis of it. They are therefore more general than efficient-causal accounts, and, because they take account of plasticity, more economical. But there is a second kind of teleological account whose distinctiveness may prove harder to understand. "He does x for the sake of y ." "All animals move for-the-sake-of something." Here, the y is a goal as seen and

³³ Cf. Wright, and the criticisms cited in n. 26 *supra*.

described from the (animal) agent's point of view. We are explaining his activities not just as tending to bring about a natural goal or end that is a component of his *logos*, but as tending to reach an object which is, for him, an object of desire. All desire is for-the-sake-of something (*DA* 433^a15); the first mover of the animal is the object of desire (433^a20, 433^b11); and the faculty of desire, together with the cognitive faculties that present the object to the creature, is central in the explanation of animal motion (433^b12). In both *DA* III.9–11 and *MA* 6–7, it is clear that I believe that all animal movement involves desire and that the teleological account of that motion should be a subjective one: it should begin with the animal's own *phantasia* of his goal.³⁴

I have defended the superior usefulness of teleological accounts with reference to the animal's regular, self-maintaining activity. The account defended was the scientist's best analysis of its various systems and their interlocking contributions to this activity. But what can we say of teleological explanations such as, "He ran to the sheepfold to get meat," or "He threw the stone to break the window"? In the first case, and in most non-human cases, the defence will go very much as it did above. Animals do not seem to have desires and intentions that are not in some clear way related to self-maintaining. Whenever the animal's perceptual activity leads him to suppose that there is meat, he goes to get it, though this may, in different circumstances, require quite different sorts of behavior. The way the food-getting mechanism functions in a lion is via that lion's beliefs and desires. A plant takes in food that comes into contact with it; it does not have to perceive it, form beliefs about it, or go to get it. Some might argue that animals are, in much the same way, creatures of blind response, automata whose motions are to be explained by simply citing the stimuli to which they are exposed. I argue that even the lowest animals, the "incomplete" creatures who have only "indefinite" motions, must, if they do move from place to place, be described as intentional

³⁴ Cf. Essay 5.

systems: their *phantasia* of the object, and not simply an objective characterization of the object, is what enters into the best explanation of their motions (433^b31 ff.).³⁵ If they see the meat as meat, they will go towards it; if they mistakenly believe it to be some harmful substance, they will run away. Their desires, their view of the object, and their beliefs about what must be done if the object is to be attained, determine the course that they will follow.³⁶ And a teleological account that says that in a variety of circumstances the animal will do whatever he believes will lead to G, some significant goal or *logos*-constituent, remains superior for the reasons we have cited to a messy conjunction of efficient-causal accounts.

But a difficult problem remains. The defence so far has presupposed that the goal G is some constituent of the animal's *logos*, some state it strives consistently to realize. We may fairly safely assume this for most animal movements. (In fact, since these creatures are without language, we ascribe beliefs and desires to them only because their behavior exhibits this teleological regularity.) But many of the intentional activities of human beings (e.g., our second example above) do not bear any obvious connection to self-maintenance; sometimes they are directly harmful to self-nutrition and life. We still, however, use intentional language to explain them. Is there any rationale for this in terms of generality and economy? Granted that a low-level atomistic account is inferior, could we not construct a causal account in terms of the antecedent activity of the man's beliefs and desires?

First, we must insist that most human actions do tend to realize some means to or component in a system of ends; and if we know something about a particular agent's system, we

³⁵ For further comments on this passage, cf. Essay 5 and the note on 703^b2. Plants are not credited with *phantasia*, probably because a plant's self-nutrition does not seem to require a selective sorting-out of its environment, as does an animal's. Direct sensation of the "proper objects" of the sense of touch seems to be sufficient for ingestion.

³⁶ On the application of the "practical syllogism" to animal activity, see Essay 4.

can have fair success predicting its activities. But for actions that are not systematically end-directed, we can still defend the teleological account. If the proposed causal account in terms of antecedent desires and beliefs is to be a genuine alternative to teleology, it must be possible to identify the desire and the belief independently of the goal. To ascribe to the window-smasher a desire to smash a window and a belief that if the window is to be smashed a rock must be thrown *is* to give a teleological account: we begin with a goal, and show how the agent does what is, in the circumstances, necessary to realize it. The desire and the belief are not genuine Humean causes. The connection between them and the goal is a logical or conceptual one; the relevant characterization of the motivating desire must contain a reference to the goal (as seen by the desiring agent). There is, for this reason, no genuinely efficient-causal explanation of intentional activity that remains on the formal or functional level.³⁷ We can, it is true, always move down to the material level, where there will always be *some* physiological state or other in which desire or perception is realized; and these states, if we could pick them out properly, would be Humean causes. But there probably will not be stable or constant relationships between the two levels. A form-type may be instantiated, in different animals and at different times, in various different sorts of matter. Hence there seems to be no way, even in cases of intentionality where self-maintenance is not in view, to move away from teleology without incurring the objections I directed above against your ultimate-particle accounts.

TELEOLOGY AND NECESSITY

Democritus has, all along, been grumbling, like Thrasy Machus in *Republic* I—all the more since Aristotle is so much more prone than Socrates to *makrologia*. But at this point he nonethe-

³⁷ This claim is elaborated in Essay 4; Aristotle's view of this question closely resembles that of von Wright in *Explanation and Understanding*, which is also discussed further there.

less decides to accept unchallenged what he has heard so far and to press for further clarification.

D: Aristotle, I am not really persuaded by all this. But let us assume for now that this is a compelling account. I still wonder whether it is a consistent reconstruction of the account you actually present in your writings. I have three questions to raise: one about your odd notion of the hypothetical necessity, and then two about points that, for the sake of argument, I conceded to you earlier: the applicability of teleological explanation to the non-living, and the question of a teleology for the universe as a whole.

As I understand it, you tell us that there are two ways of explaining a natural process, e.g., respiration. One way is to explain it functionally, saying what role it plays in the larger pattern of activity of the living being. Another is to mention the particular material interactions which usually realize this process in the animals we are studying (cf. *PA* 642^a32, *DA* 403^a29 ff.). The *MA* is the most elaborate and striking case of this: you say that from one point of view, animal motions are "for something"; and you give us, in chapters 6–7, a functional account beginning with the object of desire and going through perception, desire, and consequent action. But all these functional states are states of matter; and in chapters 7–8 you take a look at the particular material interactions that always or for the most part, in the animals you are studying, constitute perception, desire, etc.³⁸ These physiological processes follow one another of necessity, as do the movements of the parts of automatic puppets. What I want to know is, just what *is* this necessity, and where does it fit in your accounts of the various necessities (e.g., *Ph.* II.8–9, *GA* V.1, *PA* 642^a1 ff.). Is the necessity of the material interaction "simple," or "hypothetical"? And if the latter, doesn't this mean, after all, that we have

³⁸ Barnes, "Aristotle's Concept of Mind," argues that Aristotle is a non-physicalist about desire as well as about *nous*. The opposing view is argued for in Essay 3.

to introduce an extra entity into the process to explain the result, e.g., by supposing goals to have a mysterious *a fronte* causal power? I do not really think this is what you are after, as I have already said; but I shall ask you what you think of one critical account that I have heard. According to this interpretation, if the necessity of the material interaction were a simple necessity that determined the outcome, telology would be otiose. "If the action of heat is absolutely necessary, what further meaning is left for [the final-cause account]? We should have to suppose that a ghost in the machine switched the heat on and off, but in that case, what becomes of the absolute necessity?"³⁹ This critic's solution is to insist that all necessities in natural beings are hypothetical, not simple: by themselves they do not account for the process, any more than the building stones do for the formation of a house.⁴⁰ Now to me this seems rather confusing. First, it takes what you say about the relationship between material *constituents* and formal entities and tries to apply it to what you say about the relationship between the necessary *interactions* of these constituents and the process, formally described. Second, it does not really seem to solve the problem found: for if the antecedent causal factors are not sufficient to produce the result, we will, after all, have to invoke some non-physiological entity which interacts with them. To say, "If there is to be *y*, then there must be *x*," does not seem to help us cross the efficient-causal gap without employing the extra factors that were apparently rejected. But tell me what you make of this, and how the distinction between two sorts of necessity does enter into your account.

A: I am glad you dissociate yourself from the criticisms you report; and you make some preliminary distinctions which

³⁹ "Democritus" here refers to Balme, *PA-GA*, 79. (The view defended in his *Aristotle's Use* is, I believe, much more compelling.) Compare Charlton, *Aristotle's Physics I-II*, 126: "Can our movements be explained mechanically by action on our sense-organs? If so, pursuit and avoidance are epiphenomenal; if not, our movements are for something."

⁴⁰ Cf. *GC* II.11, 337^b14 ff.

will be helpful. First: it would be quite true to say that all material necessity is hypothetical and not simple—if what is meant by that is that the *constituents*, as such, don't explain the structure that is made from them, that a simple enumeration of the material parts of an artifact or a living being tells us little without an account of their organization. This is what I indicated in the *GC* analogy, and again in *Ph.* II.7, when I characterized the material (or constituent) explanation as "if so-and-so is to be (as the conclusion out of the premises)" (198^b7–8). This analogy is crucial: for the conclusion does *not* follow of necessity from one premise, from two premises in isolation, or from the premises incorrectly combined. But it *does* follow of necessity if the premises are all there and put together in the right way. So, too, the constituents simply, or taken as a heap, are only what must be there if there is to be a lion; but all of them combined in a certain way *are* that lion. The form is not, I insist again, a separate element that must be added to the materials to make up the whole.⁴¹

Next, the question of processes. Perception is a process that has a certain role in the total life-pattern of the organism; it is also necessarily enmattered, so that any occurrence of it will have *some* physiological description. And for the most part, in higher animals, it is realized in some sort of *alloiōsis*, or qualitative change. Thus we can also, as biologists, say "this after this of necessity" (*Ph.* 198^b6): at the same time as we give a general teleological account of perception, desire, and action, we can also, for medical and biological interest, give an account of what typically happens, physiologically, in terms of the necessary interactions of the hot and the cold, etc. A biologist will want to give both accounts, where both are applicable, for beings that are "for something" come-to-be "not without things

⁴¹ The *GC* passage is actually more complicated than this indicates; but the distinction made there and elsewhere between the necessity that holds among eternal objects and the necessity that holds in the sublunary realm seems to be a distinction between exceptionless regularity and variation (a man might go for a walk or he might not), not one between susceptibility and non-susceptibility to causal explanation.

having a necessary nature" (*Ph.* 200^a7; cf. 198^b5–9).⁴² "Nature in one sense acts for the sake of something, in another sense of necessity" (*APo* 94^b36–37).

But it is one thing to say that functions are realized in some material efficient-causal sequence that goes through without causal gaps according to the necessary laws of matter, and quite another to hold that this makes functional accounts otiose. I hope this is clear by now. It can sometimes be essential to have the physiological account—as when a doctor learns how to treat patients by getting the best physiological description of the functional state, health (*APo* 94^b19 ff.). But if we are going to give such accounts, we must know what it is we are explaining; we can use matter most efficiently in explanation if we incorporate the "this out of this of necessity" into a teleological account which tells us what functional state is being described and what role it plays. Here hypothetical necessity enters again. An account in terms of "simple necessity"—one that cites the material interactions without incorporating them into any formal account—could be singularly uninformative. There are some animal features for which such an account is all that can be given. To explain the formation of an eye, we can and do give a functional account that shows how eyes work in animals and that cites the material interactions as hypothetically necessary for the realization of the end.⁴³ But the fact that the eye is blue or brown cannot be explained in an any more interesting or general way than as the necessary result of the interaction of such-and-such constituents (*GA* V.1); blueness bears no relation to the creature's *logos*. The contrast between the two sorts of necessity, then, is one between the material factors viewed in isolation and the same factors incorporated into a teleological account. The explanation according to simple necessity is adequate for certain phenomena, but inadequate, alone, for significant processes in living, natural bodies. "The natural scientist should give both explanations, but especially the one for-the-sake-of something; for it is this that explains the matter,

⁴² Cf. also *PA* 642^a35.

⁴³ Cf. Wieland, 149.

and not the matter the end-state. The end-state is the for-the-sake-of which, and the beginning (sc. of explanation) is from the definition and the *logos*" (*Ph.* 200^a31–35). When we know what a lion is, we can see what matter is required; but an account of diverse material interactions will not yield a general account of lion behavior.

TELEOLOGY AND THE UNIVERSE

D: So far, Aristotle, you have spoken only of living beings; you have based your entire defence on your characterization of what you call self-maintaining systems. But many of your students believe that you extend teleological explanation to the lifeless as well; even your sympathizers find this a great flaw in your account.⁴⁴ I myself do not see that this is the case; I believe that are they confused by the fact that you clearly apply teleological explanation to the heavenly bodies. But, of course, you consider these to be living and propelled by desire. This, I think, is a very peculiar move on your part—for it is hard to see in just what sense the perfectly consistent activities of the *primum mobile* could be called plastic or self-maintaining.⁴⁵ But to convict you of drawing the boundary between the living and the non-living oddly is not to show that you extend teleology to inert matter.

A: It is quite true that I believe the heavenly bodies to be living and to be moved by desire; and I often invoke teleological accounts for artifacts—assuming, as I have said, that the goal in question is a human goal. But the idea that I think natural phenomena—eclipses, rainstorms, the downward motion of earth, the upward motion of fire—are best explained teleo-

⁴⁴ For example, Balme, 6; and Ayala, 15: "His error was not that he used teleological explanations in biology, but that he extended the concept of teleology to the non-living world."

⁴⁵ Cf. Essay 2 for further comments on this.

logically is a misconception that I try frequently to avoid—one that has, no doubt, seriously impeded understanding of my real arguments for teleology. One prominent opponent of teleology has even ascribed to me the view that a falling stone *desires* to reach its natural place and feels “jubilant” as it nears the goal. This is an extreme, but not far enough from the norm.⁴⁶ The very opening of my account of teleology in *Ph.* II.8 cites the example of rain as an *illegitimate* case of teleological explanation; and the rest of the discussion argues that the “for-something” is present first and most obviously in animals, but also in plants, “although there it is less clearly articulated” (*Ph.* 199^b9 ff.). The argument for finding it in plants refers to their organic unity, their coherent development towards a mature form. Again, *Metaph.* 1044^b12 cites an eclipse as an example of an occurrence that *is not* “for something.” To explain the downward motion of a stone, we need mention only its own matter (*APo* 95^a1–2, *Ph.* 200^a1–5) or an external source of change that constrains it (*APo* 95^a1); changes of natural bodies (the elements or their compounds) are regularly explained with reference to underlying matter alone (*Meteor.* 378^b31–34; cf. *MA* 703^a26). Furthermore, *Ph.* VIII and the *MA*⁴⁷ clearly ascribe self-motion only to the living, arguing that the motions of lifeless things are explicable, ultimately, with reference to the goal-directed motions of living beings—animals or the heavens. Lifeless things are said in *MA* 6 to have *peras* (in the sense of “end,” *telos*) only inasmuch as they are moved, ultimately, by living creatures, whose motions all have *peras*. Non-living natural bodies do, of course, have a preferred state: rest in their natural place. There is no reason, however, to suppose that the regularities in these motions cannot be accounted for by material laws alone.

⁴⁶ The “extreme” view is attributed to Aristotle by Skinner, *Beyond Freedom and Dignity*, 6, on the authority of Butterfield's *The Origins of Modern Science*. Exceptions to the general tendency to misinterpretation are Charlton, who has a very clear and thorough discussion of the question (116–18), and Wieland, 159.

⁴⁷ Cf. note on 700^a11 ff.

D: One further question, and I shall, like Thrasymachus, “become tame and stop grumbling.” Do you believe, after all, that there is any reason to suppose that the ends of some creatures subserve those of other creatures, that there is a universal teleology of nature? I dismissed these points earlier; but there are, in fact, just a few passages that cause me difficulty: *Pol.* 1256, your account of the shark's teeth, and some of your comparisons of Nature to an artisan.

A: I went out of my way to insist in *Ph.* II.7 that teleological accounts say that something is “better so—not simply, but with reference to the *ousia* of each sort of thing” (198^b7–8). I meant this to rule out the universal teleology one finds in Plato.⁴⁸ When I use the metaphor of Nature as craftsman, I usually accompany it with appropriate warnings that we are not to view nature as anything separate from natural things, or to interpret the image as finding an overall purpose in the cosmos.⁴⁹ At *PA* 696^b26, I do claim that sharks have their teeth underneath not only to prevent them from overeating, but also to save other animals (*soṗerias heneken*).⁵⁰ This was perhaps a careless piece of writing; but all that was meant was that the *result* of this morphology was that other animals were saved—that this safety would have been jeopardized had there not been such a structure. The *Pol.* passage seems to be a more serious problem; it says not only that plants are for the sake of animals, animals for the sake of men, but also that if Nature makes nothing in vain, she must have made all of them for the sake of men (1256^b11–22). This does seem to claim that the existence

⁴⁸ Cf. *Phaedo* 97 b–98 b, *Laws* 886 a. Aristotle's arguments for the unmoved mover do not rest on teleological considerations, although the *De Philosophia* (frs. 12a, 13, 17 Ross) show that he was familiar with such arguments for divinity; cf. Wieland, 158–9.

⁴⁹ Balme has a good discussion of Aristotle's use of the metaphor of Nature as craftsman at *PA-GA* 94–95.

⁵⁰ Cf. *Ibid.*, 96.

of animals and plants cannot be satisfactorily explained with reference only to the *logos* of their own species. But in defence I shall say only that this passage is from an introductory section of the work, a section concerned with stating the appearances; it assumes an anthropocentric vantage point and asks what use various parts of the natural world are to man in his efforts to establish himself in the world. It is a preliminary *phainomenon*, from the human-practical viewpoint, not a serious theoretical statement.⁵¹ Surely it is very little on which to build a case for inconsistency.

I am not, however, entirely unwilling to talk about the interrelationships of living species, and the order of the whole universe. In *Metaph.* XII.10, I make use of the following image of universal order:

All things are in some way ordered together (*sunтетaktai*)—things that swim, things that fly, things that grow—but not all in the same way. And it is not the case that one thing has nothing to do with another; there is a connection. For all are ordered in a single system⁵²—as in a household, where the freemen are least at liberty to act capriciously, but all or most of their actions are ordered, while slaves and beasts contribute little to the common good, but do most things capriciously; for such a principle is the nature of each. I mean, for example, that all must be dissolved into their component elements, and there are other ways in which all contribute to the whole (1075^a16–25).

The universe is an interlocking, orderly whole, in which each

⁵¹ Cf. Wieland, 159.

⁵² Ross translates *pros hen* here as “to one end.” But this is not the standard meaning of the expression in Aristotle’s writing. (*Ph.* 199^b15–18 used *epi* to express teleological directedness.) *Pros hen legomena* are terms showing some systematic interconnection, not terms pointed towards a single goal. (Cf. Owen, “Logic and Metaphysics.”) The focal *hen* in the case of the universe is, no doubt, god, but to call him a focal point in an organized system is to say only that to explain any motion in the system we must, ultimately, refer to him, not that he is a goal or end of all motions.

species contributes to the good of other species and in which all depend for life and growth on the consistent movements of the heavenly bodies. If we want to know the necessary conditions for any animal’s fulfilling its *logos*—and hence the factors that, in their absence, may prevent fulfillment, we have to look at the activities of other beings. If the spheres are compared to masters, men and animals to slaves and dogs, it is not because men and animals exist only to serve the gods, but because men and animals cannot live without the heavenly bodies, whereas the heavenly bodies have no external needs; and because the motion of the heavenly bodies is perfect and unimpeded, whereas men and animals have many unfulfilled wants because of the nature of their dependence on the external world. In the case of man, to have unfulfillable yearnings is even a salient feature of his *logos*. But all these interdependencies do not imply that the universe as a whole is an organism with its own *logos* and its own good;⁵³ all enter quite naturally into the explanation of how living beings of various types try to fulfill their natural needs and to attain the best functional state specified in their *logoi*.

It would be stirring to close with a burst of Platonic rhetoric about the good itself, and the relationship of all things to eternal and separable beauty. It would be rousing, too, to end with a call for scientific enlightenment, for progress beyond the confusion of the appearances towards a solid, more certain, physical reality. You and Plato appear to be deadly enemies—he with his defence of the good and the end, you with your physicalistic mockery of final causes. But you share a certain picture of philosophical progress, on account of which you will both be

⁵³ This position is argued very obscurely by Clark, 59 ff. His only clear “evidence” comes from the *Timaeus*, and he concedes that “Aristotle only once, in the extant works, likens the universe to an animal and that in an *aporia*.” (The passage in question, *Ph.* 252^b24, only remarks that if animals can initiate motion in themselves from a state of rest, perhaps the universe, being a large ordered system (*kosmos*) can too.) Of course if Aristotle had had and used the notion of an ecosystem (as he did not) such uses of teleological language would not be amiss. Cf. Boorse, 84–85.

unable to accept either my methods or my results. You share a disdain for the appearances and a determination that true philosophic, or, in your words, scientific, discourse must be about a solid, changeless realm beyond the shifting and indefinite terrain of *nomos* or human interpretation. Behind the *phantasia* is a reality more beautiful and more secure. This little discussion of the end must have been disappointing to you—although you listened most politely and did not, despite your comparison, show the bad manners of a Thrasymachus. But, then, Plato's spirited citizens are dogs who are tame to those they know; and the argument must have seemed to you like an old acquaintance, resting, as it does, on the most ordinary of our everyday accounts of animal motion, and on a picture of the difference between the living and the non-living that is far older than Homer. I began with the *Iliad* to indicate that we were in for something rather old, shopworn, familiar—only a lion going after some meat, not immortal forms, or fascinating little particles. The argument claimed that we have not moved beyond Homer in explaining animal motion—although it may be that we are now able to give a clearer account of what he is doing and to defend his picture from some objections. And you will have noticed that my little speeches even fall short of Homer with respect to power and dramatic force, as they also fall short of Plato's grandeur and your epigrammatic wit. They are plain, shabby things in every way, and you appear, if tame, to be bored by the result.

But if you have followed the argument closely, you will, I hope, come to see that it is not a trivial one, and that even in the rather ordinary realm of the apparent, some order may be found. I can do no better than to end with a story that I used once before—you may remember—in a rather different context.⁶⁴ Some students of philosophy once travelled a long way to see Heraclitus. When they arrived, they found him in the kitchen, warming himself at the stove. They were taken aback. No doubt they had expected to find the great man laboring over a dis-

⁶⁴ Cf. *PA* I.5, 645^b15–24.

secting-table, or silently contemplating the stars. Surely not sitting in the kitchen, where servants and other common people gather to chat and tell stories. This could not be a place for philosophy. They waited at the door. But Heraclitus turned to them, and said, "Come in. Don't be upset. There are gods here, too."

APPENDIX: THE FUNCTION OF MAN

Any analysis of Aristotle's functional arguments—and especially an analysis linked, as this is, with an exposition of Aristotle's views on practical reasoning and the explanation of human action (cf. Essay 4) must give some account of one of the most perplexing and problematic of those arguments, the famous argument concerning "the function of man" in *Nicomachean Ethics* I.7.¹ This argument presents difficulties both for a general understanding of Aristotle's teleology and for the proper assessment of the methods and aims of his ethical project. Essay 4 will treat the difficult ethical questions it raises more systematically and in greater detail; here I shall be able only to sketch the problems posed by the argument itself, to propose a plausible interpretation of its content and its results, and to indicate briefly what it implies for our understanding of Aristotle's aims in ethics.

We have seen that Aristotelian function-ascribing arguments usually concern themselves with the analysis of a complex containing-system—an animal, plant, or machine—into simpler systems and components. The point of ascribing a function to *x* is to show what vital activity of the whole organism is realized in that organ or system. Functions are, in the biological works, never ascribed to creatures as wholes, since this would serve no analytical purpose. But in the *Nicomachean Ethics*, we are suddenly confronted with a strange passage:

A clearer account . . . might perhaps be given, if we could first ascertain the function of man. For just as for a flute-player, a sculptor, or any artist, and, in general, for all things that have a function or activity, the good and the 'well' is

¹ Clark's *Aristotle's Man* contains an interesting and helpful discussion of this argument (chapter II.1) with which I am largely in agreement. Cooper's *Reason* draws a perceptive contrast between this argument and its counterpart in the *EE* (145, n. 2, and 148, n. 5).

INTERPRETIVE ESSAYS

thought to reside in the function, so would it seem to be for man, if he has a function. Have the carpenter, then, and the tanner certain functions or activities, and has man none? Is he born without a function? Or as eye, hand, foot, and in general each of the parts evidently has a function, may one lay it down that man similarly has a function apart from all these? What then can this be? Life seems to be common even to plants, but we are seeking what is peculiar to man (*to idion*). Let us exclude, therefore, the life of nutrition and growth. Next there would be a life of perception, but *it* also seems to be common even to the horse, the ox, and every animal. There remains, then, an active life of the element that has a rational principle (1097^b25 ff., tr. Ross).

The physiological organ, the eye, realizes some constitutive activity in the life of an animal. When we know the function of the eye, we know what point there is in animals' having eyes. In similar fashion, the question, "What is the function of a tanner?" helps us to understand why we have tanners in the *polis*: the workings of a larger containing system are being analyzed by ascribing constitutive functions to its parts. Our first reaction is to look for the containing system in which human beings are being characterized as rational agents, to ask in what whole their practical reasoning is a constitutive activity. If the argument does not, as Hardie believes, imply that man is an artifact, "an instrument designed for some use,"² it does at least seem to ask us to look at the entire universe, and to see how human purposes fit in with the life and activity of the whole. As we have argued earlier, such an approach would be a violation of Aristotle's constraints on teleology, and an exception in the *corpus*.

There is, however, no trace of such a plan in the argument itself or in the conclusions drawn from it. The argument devotes itself to an analysis of the capacities of human beings, asking which are and are not shared with other living creatures; its

² Hardie, *AET*, 23.

conclusion is only that a distinctively human life involves the exercise of practical reason. Neither in this book nor even in Book X is there any suggestion of divine providence or universal purpose. Even when we are invited to strive for divinity and to identify ourselves with the divine in ourselves, it is never with the end of *servi*ng the gods or a divine plan; nor does Aristotle anywhere indicate that the question, "Why are there human beings?" would be of the slightest interest to him.

The argument shares with the function-ascribing arguments to which it refers not their goal of analysis, but only their interest in the distinctive or characteristic. All ask what this thing does that nothing else like it does, what the differentia is which separates it from other members of its genus, what activity it causes not *qua* genus-member, but *qua* itself (cf. *Ph.* II.3).³ The examples that Aristotle cites, and the terminology of function, are indeed rather misleading if we look for a close analogy; this much cannot be denied. But it is also quite clear from context that Aristotle was interested only in a more limited analogy and was not, in fact, announcing a change in his general policy.

But to say this only gets us to the beginning of the really difficult questions raised by the argument. For we need to know (1) why Aristotle is interested in providing an account of human nature at the outset of a moral inquiry; (2) why, within such an analysis, he places such singular stress on the non-shared activity; and (3) why, among the non-shared activities (of which even Aristotle notes several),⁴ the activity of practical reason is given the first place. The first question is, for our purposes, the most crucial. Aristotle appears here to be saying that if we know what a man is, we will know how he should behave; he seems to be deriving behavioral norms from factual observations concerning human nature. He has, furthermore, been thought to

³ Clark concludes (26) that "*ergon* and *eidōs* are here identical." Aristotle is indeed arguing, as I shall claim, that a good human life includes the proper exercise of all the capacities belonging to the *eidōs*, but the term *ergon* seems clearly to be used for the part of the *eidōs* that is *idion* (1097^b34), unshared—the differentia.

⁴ Cf. Clark, p. 17; there are other examples in the biological works.

be treating these observations as given a priori, as forming the unquestionable, immutable basis for an ethical science.⁵ Before we can give a proper analysis of Aristotelian deliberation, we must try to understand (a) what Aristotle believes to be the function of reflection concerning human nature in one's deliberation about the good life, and (b) what status he accords these reflections in his scientific inquiry.

Why should it matter to me in my deliberation about what goods to pursue that men are creatures with capacities X, Y, and Z, of which only Z is not shared by the other related species? I am an individual; what do the goals of others matter, what does even my species-membership matter, in deciding what is good for me? Aristotle's answer, as it emerges here and elsewhere in the *Ethics*, is not some crude form of the naturalistic fallacy, but a subtle and powerful observation about human deliberation. Though it can be only briefly and apodictically set out here, with less textual support than I should like, I believe that the argument is something like this. We are not, when we deliberate about our good, solitary beings concerned only with our own satisfaction and our own responses. We are social creatures who require the company and the approval of others for a fulfilling life. We therefore deliberate with a view to justification: a good life must be one that we can justify as good to our fellow human creatures. The possibility of winning approval and reaching agreement is fundamental to our life and projects, since self-respect in a community of men is, for us, a basic good. We therefore must ask ourselves not simply, "What's a good life for me?" but "What's a good *human* life"—i.e., what life can I hope to commend as good to my fellow citizens? Deliberation takes place not in a vacuum, but in the *polis*. Prior to deliberating, I identify myself as a member of a

⁵ Cf. for example Maritain's interpretation in *The Rights of Man*: we are all like pianos, to be tuned to an external and independent (immutable) standard, the standard of human nature established for all time by God. It is not up to us to decide or to agree about what we are; that is given. Either we put ourselves in tune, or we must be "discarded as worthless" (61; for further discussion of Maritain's Aristotelianism, cf. Essay 4).

certain group, the human species; my reflections about action presuppose some notion of what a human being is, to what kind of community I belong, with what kinds of creatures I am trying to reach agreement. Aristotle indicates more than once that deliberation starts from a conception of the human person, and that this notion of what one is underlies the entire enterprise. "Each man wishes what is good for himself; but nobody chooses to have everything as becoming another sort of thing (as, e.g., a god now possesses the good); he chooses as what he is" (*EN* 1166^a19 ff.). Nor can one wish one's friend the good of becoming another sort of being; deliberation and well-wishing, to make sense, must remain within the confines of a hylomorphic theory of personal identity. "A friend wishes his friend good for the friend's own sake—so he will have to remain the sort of creature he is; then he wishes him the greatest good he can have as a man" (*EN* 1159^a5 ff.). Aristotle realized as keenly as did Plato the importance to ethical deliberation of a theory of personal identity; and his hylomorphic theory denied, as Plato's dualism did not, that the person could ever exactly *be* the divinity within him.

We want, then, to reach some agreement about what a human being is before we try to see whether we can agree on the best plan of life—a life which we can justify to one's peers. There is in the argument as I have presented it no appeal to self-evidence, no hint that the capacities we are discussing are our god-given essence that we are exhorted, in consequence, to use to the full. Aristotle presents this argument as a "sketch" (*perigegraphthō*, 1098^a20), which can be filled in in the course of time and within the limits of precision set by the nature of the subject matter. Shortly thereafter (1098^b10 ff.), he insists on the importance of considering *ta legomena*, what we say; a correct account will be one that harmonizes with this evidence, while a bad one will soon clash. The *Ethics* explicitly builds its account upon the *phainomena*, or *legomena*, of action.⁶ The criticism of the Socratic account of *akrasia* in Book VII (cf. especially

⁶ Cf. Owen, "Tithenai."

1145^b20, 27) is the occasion for one of Aristotle's most famous and most explicit methodological claims (1145^b2 ff.): we must in ethics, as in other areas, set down the "appearances," work through the problems they present, and produce an account which will preserve all of these common beliefs, if possible, but, if not, the greatest number and the most important. Moral philosophy starts from our common beliefs and sayings, from which it tries to build a harmonious picture.

The discussion of human nature gives no evidence of violating this general aim. Its context and its content indicate that it is an attempt to make some clear sense of our ordinary beliefs about what a human being is before we try to reach agreement about a good life for a human being. Aristotle addresses the work to reflective men (1095^a6 ff.), men who want to plan their lives and not merely to live from moment to moment. He suggests that for such men a sorting-out of the questions with which the *Ethics* will deal *will* make a difference—not because it will put them in touch with the a priori, but because, as archers, they will thereby get a clearer view of the target at which they are aiming (1094^a33–34). What we ought to be after in ethics, he suggests, is a broad consensus among the mature and reflective, an ordering of their moral intuitions through reasoned adjustment of competing considerations—a theory very much like Rawls's notion of "wide reflective equilibrium,"⁷ which explicitly rejects appeals to the a priori, but also insists that a non-relativistic agreement can be reached among rational men.

This does not yet, however, tell us exactly *how* an analysis of human nature ought to affect rational deliberation—and, particularly, why Aristotle should be so very interested in man's *characteristic* activity, or *ergon*. Limits of space prevent a fully adequate account of these questions. But a plausible reading of

⁷ Rawls, *A Theory of Justice*, especially 20–21 and 48–53. The approach is shared by Sidgwick, who, like Rawls (51, n. 26), traces it back to Aristotle. Cf. especially *Methods of Ethics*, Preface to the 6th Ed.: "What he gave us there was the Common Sense Morality of Greece, reduced to consistency by careful comparison: given not as something external to him but as what "we"—he and others—think, ascertained by reflection."

the emphasis on reason can, I think, be found. Throughout this section of Book I, Aristotle's main concern has been with popular hedonism. "Most men appear to prefer a slavish life, a life fit for beasts" (1095^b19). Aristotle is not going to go on to propose a view of the good life that *minimizes* the exercise of those capacities that we share with other animals.⁸ In the account of the virtues the ascetic is as defective as the excessively sensual. The *ergon* argument cannot be telling us that we should concern ourselves with reason *only*. Nor does it appear to say this. But the emphasis on this characteristic activity can be seen as motivated (1) by the challenge of hedonism and (2) by practical reason's *architectonic* function: it, and it alone, can arrange for both reason and the shared animal functions to get their due place in a complex human life. Aristotle commends to his reflective audience a life that (1) involves the exercise of all our human capacities, and is thus a truly human life, rather than one which could just as well be led by a plant or a cow, and that (2) is governed and planned in such a way as to give both shared and non-shared capacities their appropriate role—and this means governed and planned by practical reason. If we think reflectively about what a human being is, he suggests, we will have reason to prefer a life under the direction of practical reason to the slavish or cowlike life of pleasure and also to *any* life that is carried on without order or direction. We want a life that uses all our capacities. Such a life both includes the exercise of reason and requires rational direction.

⁸ This is clearly true of *EN* I-IX; Book X raises perplexing problems. Cooper's *Reason* (II-III) offers an excellent discussion of the difficulties and a convincing defence of the "inclusive-end" reading of the *EN*.

ESSAY 2

THE DE MOTU ANIMALIUM AND
ARISTOTLE'S SCIENTIFIC METHOD

At the opening of the *Meteorologica*, Aristotle pauses to comment on the general outlines of his whole series of inquiries concerning natural change and living beings:

We have spoken before about the first reasons in nature, and about natural change in general, and also about the stars that are marshalled in accordance with the motion of the heavens, and about the bodily elements: their number, their kinds, and their changes from one to another, and about coming-to-be and perishing in general. The part of this inquiry which remains to be pursued is what everyone used to call "meteorology" (338^a20-29).

After a few comments on the subject-matter of the inquiry at hand, he continues:

When we have gone through these subjects, let us see if we can give an account, according to the procedure we have been following, of animals and plants, both in general and separately. For when we have said this, we will have just about completed the whole plan we set out from the beginning (339^a5-9).

This probably served as an introduction to a course of lectures given by Aristotle on natural science.¹ There is good reason—stylistically and contextually—to think it was composed by Aristotle himself,² and that it shows, if not that the treatises were mapped out and composed in the order indicated (which they almost certainly were not), then at least that Aristotle

¹ Mansion, *Introduction*, 7-31; cf. also Düring, *PA*, 5 ff.

² The question of authenticity receives a thorough discussion in Capelle, "Das Proömium."