

## CHAPTER ONE

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### ARISTOTLE'S EXPLANATION OF NATURAL MOTION

#### 1.1. The Natural Motion Puzzle and the Two Potentialities

My main aim in this chapter is to impress upon you the presence of two kinds of potentiality in Aristotle's mature philosophy, and then to lead toward the conclusion of the nonreality of all potentiality, a conclusion that is expressed in Aristotle's principle of the priority of the actual. I begin with a light and breezy sketch of his definition of soul and of a puzzle about the mover in natural motion, and let the analysis of this puzzle get thick only at a later stage, when the consequences about potentiality are brought back to work on Aristotle's explanation of motion.

The puzzle is that in the whole of Aristotle's mature works there is no systematically clear answer to the question: What moves things in their natural motion? He devotes to this question, for the case of living things, the last five chapters of *De Anima* (= *DA*), but nothing definite comes out of it. And he makes a concerted effort to solve it for the case of inanimate things in the seventh and eighth books of *Physics* (= *Phys*), with similar results. It is clear, however, that he looks for an answer in terms of his concept of potentiality. For soul, which must be the mover of living creatures, he regards as the first actuality of what is potentially alive, and in the case of inanimate bodies he concludes that the mover is its potentiality to move as it actually moves.

I shall begin, just to get things rolling, with a brief and very superficial report of Aristotle's solution in the case of animal motion in *DA*, and then use this for developing an interpretation of his theory of potentiality. Equipped with this I shall then, in the second part of this chapter, explain his theory of natural motion. Throughout this presentation I shall bring into relief the elements of his basic conception of nature and of explanation as two noninformative systems. The meaning of noninformativity will emerge as we go.

## 1.1.1. Soul as First Actuality

Let us start with a quick review of Aristotle's effort to solve the problem of animate motion, as he presents it in the concluding five chapters of *DA*.

The particular topic that interests him is local motion, and even though he declares that all such motion occurs either by pushing or pulling, he does not arrive at either the pulling or the pushing factor. He assumes that this factor must be the soul or some part of it (433a31–5), and that it causes motion as a moved mover (433b12) — and hence either as a pusher or as a puller — yet how this happens he does not explain. The only seemingly definite answer he manages to squeeze out is that the cause must be that part of the soul called desire (*orexis* 433a22, 33) or rather the combination of logos and wants he calls *epithumia* (433b5–7). Yet he also denies the reality of any division of the soul into parts since desire, for example, is itself a part of imagination and of intellect (432a22–b6). Moreover, even given the feasibility of an abstract partition of the soul, he had rejected the suggestions that what moves the body is either the intellect (432b26), or knowledge (such as the art of healing 433a3) or, finally, desire (“nor is desire responsible for this movement” 433a8, exemplifying this by the continent man who acts against his desire). Yet this does not hinder him from first settling for some combination of desire and practical reason (433a17), and finally for desire itself (433a24).

A good reason for this confusion may be the fact, ever looming in the background, that in *DA* Aristotle never agrees to regard soul as separate or separable entity. His final conclusion about its ontological situation is that it is the form of a special kind of body, i.e., any body that has life in it, and the way in which it is inseparable makes the whole notion of soul moving the body incoherent.<sup>1</sup> It turns out that soul, as the form of the living body, may function in either of two roles. It may be either the form as the actuality (*energeia*, *entelecheia*) of the living body, or it may be the potentiality for this actuality. Aristotle will finally decide in favor of this latter role, even though he expresses this by saying that the soul is the “first” or “prior” actuality of the living body.<sup>2</sup> But that by this he means the potential aspect of the *energeia*, emerges from the fact that he calls it *hexis*.<sup>3</sup> The potential character of *hexis* is the aim of the analogy he makes in order to clarify the concept: knowledge is the prior potentiality for the actuality of contemplation, and hence knowledge is the *hexis* or “first” actuality of the “final” actuality or *energeia* of contemplation:

The soul must, then, be substance qua form of a natural body which has life potentially. Substance is actuality. The soul, therefore, will be the actuality of a body of this kind. But actuality is so spoken in two ways, first as knowledge is, and second as contemplation is. It is clear then that the soul is actuality as

knowledge is. . . . In the same individual, knowledge is in origin prior. Hence the soul is the first actuality of a natural body which has life potentially. (*DA* 412a17–27, Hamlyn)

He further explains the sense in which soul is the “first actuality” of the form of a body that is potentially alive, by another analogy, similar to the knowledge-contemplation analogy. If the eye were an independent, separate creature, then its actuality would be seeing, since seeing is the end or function of the eye. But in order to be in the actuality of seeing, the eye must have first, or prior to it, the *potentiality* for seeing, that is, sight. Hence sight is the first actuality of the eye as a creature that is potentially seeing, and so would be named its soul, just as, in the third example Aristotle uses here, the axe’s cutting-capacity should be regarded as its soul insofar as it is a cutting instrument.<sup>4</sup>

So, a significant aspect of this “first actuality,” is that although it is form, it is also the potentiality aspect of the final form, or the final actuality, and this must be carefully noted. As we saw in the quoted text, final form is the actuality of the object, that is, its regular and proper activity as such an object. Thus cutting is the actuality and form of the axe, as seeing is that of the eye. It turns out now, however, that this actuality or *energeia* has a potentiality aspect to it, its *hexis*, which is nevertheless part of that actuality. Not only does the whole animal have two aspects, matter and form, but its form in itself and as such, has these twin aspects, the potential, *hexis*, or soul, and the *energeia* or actuality (or activity).

The exact relation between *hexis* and *energeia*, or prior and final actuality, within the form of the animal remains less than clear,<sup>5</sup> but the analogies Aristotle uses could be a hint for a minimal, purely logical or even linguistic interpretation: We may deduce each term of the analogy from the logical form of the other term, without any factual experimental information whatsoever. The first member has the logical structure of *X*able, and the second member is the *X*.

We may take the relation between soul and living to be that between the “lifeable” and life. Soul would be the lifeable just as cutting-power is “cuttingable”, and sight is “seeingable”. And this may have been exactly the function of the analogies, namely, to point out that the existence and nature of soul may be derived purely logically even though the linguistic form obscures that logical derivability. Soul is the potentiality part of the actuality called living. By this is not meant that it is the potentiality counterpart of this actuality, and to underline that it is not, Aristotle names it “first actuality.” We shall soon see the logical structure this name implies. For I brought this result only as an introductory teaser to an important but puzzling technique of Aristotle’s analysis of the physical world. Most significantly we shall be led to an understanding of his definition of motion, or *kinēsis*.

1.1.2. *The Definition of Motion and the Aspects of the Potential*

If actuality has two aspects to it, *hexis* and *energeia*, may potentiality too have such a dual aspect? Aristotle in fact employs such a strategy in his treatment of natural local motion. The general career of a body consists of three parts: the primary state, the motion, and the final state. The latter is, of course, the "end" of the career in the sense of its peak, the state or place in which the thing is in its best shape. This is its existence "in its end," literally "*entelecheia*." The primary state is, therefore, its poorest existence. But already at this primary state the thing must have "within itself" all the internal necessary conditions for being later at its end. Hence, the actuality of the final *entelecheia* state entails the prior existence of its potentiality at the primary state and in this sense: The seed that has developed into an oak must have contained the potentiality for becoming an oak, simply because it has actually become one. The question I raised concerns, therefore, the distinction between the actuality and the potentiality not of actuality but rather of this early stage of the career, namely, of potentiality qua potentiality. The reading I'll propose is that this is, in fact, the same distinction as that between real, genuine potentiality and merely logical potentiality. That there are grades of actuality Aristotle just implied in his distinction between *hexis* and *entelecheia*, and he pointed out that the lower grade, the "first *entelecheia*," *hexis*, is the potentiality aspect of the *entelecheia*. So *hexis* is the potentiality of the actuality, and yet it is part of this actuality. How can that be? How can anything be actuality and yet be simultaneously the potentiality of this same actuality? My solution will be that this is the precise meaning of being a true or genuine potentiality in Aristotle's ontology.<sup>6</sup>

In part, this seeming paradox is a consequence of the relational nature of the categories potentiality and actuality, such as is expressed in saying that knowledge is an actuality only relative to contemplation, but it is potentiality relative to the student who struggles to obtain it. And so there must be a potentiality for the potentiality named knowledge, maybe the intellect of the student. Moving on along this line, we regress to lower and lower grades of the actuality we started from, contemplation. These are also higher and higher grades of logical potentiality — more and more they involve merely general and abstract necessary conditions for the final actuality. They are ordered by an increasing amount of mere logical potentialities, or by possessing less and less real, genuine capacities, for that final actuality. And if we regard as genuine potentiality for that actuality only that which is very (infinitesimally) close to it, the rest become mere potentialities for this genuine potentiality. They are, as a set, the potentiality for the genuine potentiality.

What, then, is the actuality of this genuine potentiality? There are two possibilities: Either it is the final *entelecheia*, or something in between it and the

genuine potentiality. Formally, Aristotle took it as something in between, namely, as the motion from the genuine potentiality to its final *entelecheia*. Referring to the genuine or real potentiality by his standard way of denoting the real or genuine kernel, he named it “potentiality qua such”<sup>7</sup> and delivered his notorious definition of change:

There being a distinction in respect of each kind [of being], between [being] actually and [being] potentially, the actuality of that which potentially is, qua such, is change. For example, the actuality of what admits of qualitative change, qua admitting of qualitative change, is qualitative change. (*Phys* 201a9–13, Hussey)<sup>8</sup>

But look at it now in the reverse direction, and ask, What then is this genuine potentiality prior to and apart from the change, on the one hand, but also post and apart from the previous mere logical potentialities, on the other hand? In other words, what is this potentiality in itself, qua such, as distinct both from those previous potentialities for it and from its later actualization, i.e., from the change that follows it? The feasibility of this question and point of view may be supported by the types of potentiality as well as actuality Aristotle distinguished in connection with his distinction between motion (or change, *kinēsis*) and actuality. Answering it may further clarify the way *kinēsis*, which is potentiality, is also an actuality.

In *Metaphysics* (= *Met*) 1048b29 Aristotle says that *kinēsis* is an unended (*atelēs*) actuality. Such things as “learning, walking, building” are unended actualities because they do not contain their ends; they are necessarily means to ends that are external to them (e.g., mastering an algorithm, health, a house), and both cannot exist simultaneously. Actuality proper, that is therefore an ended actuality (1048b22–3), is a state that contains its end in itself and so is not a means (e.g., seeing and thinking, 1048b34, pleasure 1174b13 and see more p. 115 below).

Now, more significantly, he also says elsewhere that the actuality he calls *kinēsis* is unended because the potentiality of which it is the actuality is itself unended (*Phys* 201b33), but no more is heard about this. From the *Met* presentation, however, it becomes clear that this concept is linked to such potentialities as “infinity or void”, as we learn from a short preface about the way these “exist potentially or actually” (1048b10–17) that introduces the *kinēsis*–actuality distinction. Now, what is essential about these (e.g., a recursive halving of a line), is that their ends (e.g., the point, or the void) are unreachable by the very definition of the operation (halving) (see more, pp. 116–117). They are unendable potentialities, as against the unended potentialities he goes next to introduce. The actualities of both kinds qua such potentialities are, therefore, equally *kinēseis*.

Obviously, such actualities (halving of a line, building) keep their identity and character unchanged throughout the *kinēsis*, i.e., throughout their being the

actualities of unended potentialities. The repeated halving of the line, the building of the house, the falling of the stone, all keep being exactly the same throughout their actuality, and in this sense they are, like all actuality, strictly changeless: "It is wrong to say that the thinker in thinking undergoes a change, just as it would be wrong to say this of the builder when he builds" (*DA* 417b8–9).<sup>9</sup> And similarly, because building is the actuality of the buildable qua buildable, it follows that relative to the buildable it is not a change, for "it is the buildable that is being built," i.e., the buildable keeps being buildable without any change in it qua buildable throughout the building period. This is what Aristotle tries to argue here:

The actuality of the buildable qua buildable is the process of building. For the actuality of the buildable must be either this or the house. But when there is a house, the buildable is no longer buildable. On the other hand, it *is* the buildable which is *being* built. (201b9–13, Hardie and Gaye)

It is only relative to the house that building is a change, but not relative to the buildable. Now, the heaps of stones, cement, etc. are to the building exactly as the building is to the house. Both are unended potentialities, and the reason why both need not end at all in some product is simply that such potentialities do not contain such products as their ends.

Aristotle may be implying, therefore, that besides unendable and unended potentialities there are also end-potentialities,<sup>10</sup> which are distinct from those that figure in the definition of *kinēsis* in just this. My hypothesis will be that it is this end-potentiality that must be the genuine potentiality as distinct from the mere logical one, which is, accordingly, the unended potentiality in the definition of motion. Only this end-potentiality will be distinct both from the previous series of mere possibilities and also from its ended actuality.

To see this, take the ended actuality to be the being of the completed house (for it is a house and also has been a house) and ask: Is the actuality of building it genuine potentiality for being a house? It is obvious that of the previous potentialities for the building, e.g., the heaps of stones and sand and cement lying at the site, none is genuine potentiality for the house, since these may be lying there for an unlimited time to come. Just as the building process, these heaps of materials are unended potentiality, not containing their actuality (the building process). They are, therefore, no different from the previous potentiality for them (the stone quarry, the cement factory, etc). But exactly so is the process of building, for even though as "the actuality of the buildable qua buildable" (*Phys* 201b9) it is an end-actuality, yet relative to the house it is an unended actuality, a *kinēsis*, and so there is no necessity for it to end with a house. Consequently, the genuine potentiality for the house is not the *kinēsis* of building.

My hypothesis is that the buildable as genuine potentiality for building is

an end-potentiality, which must be distinct from the surrounding various unended actualities (the process of building, the stone and cement piles, the stone and cement quarries, etc.) as well as from the completed house.

### 1.1.3. *The Two Potentials*

During the sixteenth and seventeenth centuries, Aristotle's definition of motion became the symbol of Aristotelian verbosity and vacuity.<sup>11</sup> And for a very good reason, too: It crystalizes a central dogma of Aristotle's philosophy of nature, namely, the logical relation of the genuine potential to its *entelecheia*. It is in this relation that the hallmark of Aristotelian science is rooted, i.e., its systematic noninformativity and its concomitants such as its conceptual or logical nature, its classificatory explanation plan, and finally the nature of the cosmos it describes. These will unfold as we go along.

That the connection between the potential and the actual in Aristotle's ontology is strictly logical is readily seen by the fact that no physical principles are ever considered in inferring either from the other. Consequently, for Aristotle the potential is strictly the automatically entailed capacity for the actual. Now, if this is the case, then the potential may be merely a necessary condition for the actuality, and then it would be an unended or unendable potentiality, as we saw. But it may also be its sufficient condition, and so entail the actual as its logical consequence, and then it would be an end-potentiality, containing its end in itself, as it were.

So, on the one hand a potential can be regarded as ineffectual, since insofar as it is merely a partial cause or a necessary condition it does not contain its end and may never actualize. On the other hand, however, insofar as the existence of a particular potentiality is logically entailed by the existence of its actualization, there can be no doubt about the effectuality of this potential.

My proposed interpretation will be based upon introducing this double feature of potentiality as a basic tenet of Aristotle's physics. I'll argue that there are two distinct kinds of potentials, the one consisting of potentials that are marked by their being logically entailed by the given existence of the actual, and the other, of potentials that are merely suggested by similarity or inductive considerations. The ontological difference between them is that whereas the entailed potential is fully effectual (which is why it is entailed by its already existing effect, the *entelecheia*), the analogical or inductive potential is merely a necessary condition and thus necessarily ineffectual. As such it must remain in this ineffectual state indefinitely. I'll use the terms "genuine" and "nongenuine" respectively to refer to these two modes of potentiality. The genuine potential is necessarily actualized, and logically deriving it from this actuality is the sole basis of our

knowledge of its prior existence. But we only guess at the existence of a nongenuine potential, and we do this merely on the basis of an inductive or probability consideration that its actualization is possible, or consistent with all the rest we know. I shall therefore use also the term "consistency-potential" to refer to the nongenuine potential. I will avoid the term "logical potential," which is in general usage and is obviously ambiguous in consequence of the strictly logical status of both kinds in Aristotle's philosophy, as will become apparent in what follows.

#### *1.1.4. Genuine Potentiality Is One with Actuality*

This difference between the genuine and the nongenuine potential, as it is reflected in their respective logical status (deduced or induced) arises from the existential tie of each potentiality with its *entelecheia*. According to my hypothesis, the genuine potential contains its end and so cannot exist separately from its effected *entelecheia*, whereas the consistency-potential obviously is external to its end and so necessarily separate from it and, temporally, at least, prior to it.

However, it seems that Aristotle demolished this minimal priority of consistency-potentials, as a consequence of the following dilemma: Either potentiality is determined by the mere consistency of its possible but not necessary actualization, in which case virtually every thing is potentially any other thing; or, if this absurd result is to be avoided, a new concept of possibility must be introduced by rejecting the assumption responsible for the absurdity. This assumption is that a possibility can remain unactualized, and so the new concept of possibility is to be determined by its actualization, a condition which makes consistency superfluous and so eliminates consistency-potentiality altogether. This story is implied in the following consideration. Having defined a thing to be "capable" of something if "nothing impossible ensues if it will have the actuality of that potentiality" (*Met* 1047a24-6), he goes on to ask:

If what we have described is identical with the capable or convertible with it, evidently it cannot be true to say "this is capable of being but will not be," which would imply that there is nothing incapable of being. (*Met* 1047b3-6, Ross)

The last words I take to mean the absurdity that everything is capable of becoming anything else, without any limitation. It was in order to avoid this threat of the vanishing of the impossible, I suggest, that Aristotle distinguished between genuine and nongenuine possibility, identified them with end-potentiality and unended potentiality respectively, and then characterized the genuine potential



by denying that, containing as it does its end, it can remain unactualized without any time limit. Though he did not solve the difficulty he posed here (*Met* 11,4) in any explicit manner, I suggest this as his actual solution. The evidence for this, as well as for the identification I suggested of unended with consistency-potentials, and of genuine with end-potentials, will emerge from his effort to solve another urgent problem: If real, genuine potentiality is to be only such that actualizes, how long may a given potentiality be allowed to exist unactualized before losing its genuinity? Analysing his attempt to solve this problem will also supply us a more detailed picture of how end-potentiality, if it exists, must look.

Discussing how transformation to actuality occurs, Aristotle says that one thing is by no means always potentially another thing, even if it may and regularly does eventually actualize into this other thing. When, then, does it become potentially (not actually!) the other? He was not sure:

We must distinguish when a thing exists potentially, and when it does not; for it is not at any and every time. E.g., is earth potentially a man? No — but rather when it has already become seed, and perhaps not even then. (*Met* 1048b36–1049a1, Ross)

The inquiry is obviously about genuine potentiality, for there can be no doubt about consistency-potentiality, since earth does sometimes become man. Hence, the question is at what stage does some stuff (earth, semen, etc.) shed off its mere unended, consistency-potentiality and acquire a genuine, end-potentiality to be something else (e.g., man)? Aristotle shows, by his doubt (“perhaps not even then”) how there can be only one answer. For why does he doubt?

The only reason for doubt that I can imagine comes simply from the ever-existent possibility that the process of producing man from earth would stop before the final production. For even when earth is at its semen stage it cannot be said to be a genuinely potential man if, say, it will next be destroyed by inappropriate conditions (dryness, acidity, etc). To have a genuine potentiality, then, must include in its definition at least the existence of the “right conditions.” But this is exactly why, instead of coming up with a verdict, after some further deliberations he procrastinates again:

E.g., the seed is not yet potentially a man; for it must be deposited in something other than itself and undergo a change. (1049a13–15, Ross)

He still hesitates, for even though he has by now smuggled in not only the appropriate external conditions (being in the ovum, say, etc.) but also some changes in the semen itself, it becomes obvious that no amount of further piecemeal addition of such particular details will be ever quite sufficient to ensure the certain containment of the end, that is, the eventual actualization of the semen

into man. In short, if the initial doubt about the potentiality of earth is valid, and if it is based on the possibility of aborting its next transformation (i.e., into semen), then this same doubt is equally valid and applies equally to every other stage in its future career. But then the inevitable conclusion is that earth or semen is a genuinely-potential man only and exactly at the very moment it stops being an unended potentiality and becomes an end-potentiality, and this cannot be at any moment before it is man. To be genuinely potential man is to have an end-potentiality for being man, but this is to be man, for nothing less will do. Though Aristotle does not declare it in so many words, not only does his conception of potentiality enforce this interpretation, but in fact he actually abides by its dictates. For he explicitly denies that the seed is potentially alive in the relevant sense, and he compares it with bodies that died. Consequently, if "it is not the body that has lost a soul that is potentially alive but the body that has soul" (*DA* 412b26-7), i.e., only the actually living creature, then nothing is genuinely potential man except actual man.<sup>12</sup>

At 1049a11, Aristotle says that bricks, cement, etc., are "potentially a house" if nothing "prevents it from becoming a house, and if there is nothing which must be added or taken away or changed." This may seem to contradict my reading of the seed argument, but in fact it doesn't. Notice that Aristotle doesn't actually express my conclusion even in the seed case, and yet it binds him there just as in the house case. For he assumes here that not just any state of the matter is sufficient for calling it potentially a house, and this is all that is required for enforcing my conclusion. He is trying to count the minimal conditions under which potentiality supervenes, and he says that they must be such that nothing need be changed. But changed for attaining what state? Suppose it is the state of being ready for the building process to start. But why choose this point rather than any other previous (the stones being chiseled at the quarry) or subsequent (the skeleton before the roof is fixed) state? Obviously the choice is logically arbitrary. On the one hand, there is no stage at which really "nothing prevents it from becoming a house," for then it would become a house of itself. That is, it needs always some change before it is a house. On the other hand, at each of its stages (the quarry, transportation, building, painting, etc.) it needs no further change for some state, namely, for its present one. So either all the stages are equally the potential house, or none is.<sup>13</sup>

An alternative might be suggested that to say that earth is a genuinely-potential man is valid even if it is only given that it will become man. Thus, *given* that, or if, it will actualize in the future into *X*, then it is already *now* a genuinely potential *X*, and so the genuine potential need not actualize at once. Aristotle, however, evaded this line of reasoning. One clear piece of evidence is his statement that capability (and he obviously means genuine capability) exists only at some time point, since

that which is 'capable' is capable of something and at some time and in some way (with all the other qualifications which must be present in the definition). (1047b35–1048a2, Ross)

Thus, for example, a rational being has a "rational potentiality" (*dunaton kata logon*) only under "the circumstances in which it has the potentiality (*dunamis*)" (1048a14):

And it has the potentiality in question when the passive object is present and is in a certain state; if not it will not be able to act. (1048a15–16, Ross; mod: "potentiality" for "potency," and so in all translations from Ross)

Obviously, "it will not be able to act" means just that it does not have the ability, or potentiality, to act. The "potentiality in question" is, therefore, the genuine potentiality (for it obviously still possesses the consistency-potentiality to act), and Aristotle says here quite explicitly that it does not exist in the subject under all circumstances (again, contrary to the consistency-potentiality, which does), but only under certain very definite circumstances. These are "all the other qualifications which must be present in the definition" of genuine potency (see previous quotation of 1048a2). In a note he appended here, Aristotle made a point of this dependence of genuine potentiality on the circumstances. He explains that he did not explicitly qualify the definition of "having potentiality" by "if nothing external prevents" exactly because this is one of the "qualifications which must be present" in the very concept of genuine potentiality, and so need not be mentioned separately:

To add the qualification "if nothing external prevents it" is not further necessary; for it has the potentiality on the terms on which this is a potentiality of acting (*hōs esti dunamis tou poiein*) and it is this not in all circumstances but on certain conditions, among which will be the exclusion of external hindrances; for these are barred by some of the positive qualifications. (1048a19–21, Ross; mod: "potentiality" for "power" and so in all translations from Ross)

Very clearly, this is an explicit demand to include in the definition of genuine potentiality all the necessary conditions for its actualization. Inevitably, then, potentiality is genuine only when *all* these necessary conditions exist, and not before, and Aristotle declares here that this is constitutive of the very meaning and definition of the concept 'genuine potency.' Consequently, this concept functions like a proper name, and denotes a specific once-only situation involving these bodies at this point in time and space, i.e., "at some time and in some way," as we saw in 1047b35. To say that this body has now and here a genuine capacity to act does not mean it will act upon any thing and in any old way: It

has this potential "not in all circumstances but on certain conditions," that is, in exactly the circumstances it actualizes, because only then is it an end-potentiality, and only thus containing its end does it necessarily actualize.<sup>14</sup> This consideration confirms the hypothesis that genuine potentiality is one that contains its end, and it shows that to contain an end the potentiality must be such as to contain *all* the conditions that are necessary for the end. Consistency-potentiality may now be a little more sharply characterized as a state whose actualization, as far as we know, would not be logically impossible but fails to actualize because some necessary conditions are absent.

Allowing this to be the case, we can answer now the question (p. 8) about soul—how can it be both a *hexis* and so a potentiality for life but also the actuality of it? The answer is that soul is genuine potentiality for life, and so it is an end-potentiality of the relevant organic body. An organic body that has life as a consistency-potentiality can remain lifeless as long as it lacks real capacity, or *hexis*, for life. Soul as *hexis* for life is, then, the genuine potentiality of this body for life. But now we can see that as such it is, identically, also the "first actuality," since genuine or end-potentiality for some actuality is necessarily inseparable from this actuality in the sense that containing all the necessary conditions for the end means that the end is itself actual.

Notice now that according to this line of reasoning, the examples of knowledge, sight, and cutting-ability may fail as cases of genuine potentiality, and so as parallels of soul. We shall see later (p. 19ff.) that, appropriately enough, in regard to knowledge Aristotle was ambivalent: sometimes he treats it as consistency-potentiality, but there are cases in which he doubtlessly regards knowledge as genuine potentiality. Illustrating the various stages of potentiality from studying through possessing knowledge to exercising it, he remarks that when the learner already possesses knowledge,

if nothing prevents him, he actively exercises his knowledge, otherwise he would be in the contradictory state of not knowing. . . . Thus, the exercising of knowledge follows at once (*euthus*) upon the possession of it unless something prevents it. (*Phys* 255b3–5, 23, Hardie and Gaye)

Clearly, knowledge is taken here as an end-potentiality, as the nonexistence of interference indicates (equivalent to the existence of all necessary conditions) and as the "at once" underlines. As we shall see, *euthus* and *hama* are the indicators of the presence of genuine or end-potentiality, marking the simultaneous, i.e., the logically necessary and instantaneous appearance of the end. This end-potentiality is the very last in the series of potentialities that precede contemplation, and as such it is also the first actuality, for it actualizes "at once" into contemplation.<sup>15</sup>

This result signifies two important tenets. First, genuine potentiality and its

actuality are in fact one and the same state. Second, which is entailed by the first, genuine potentiality transforms into its actuality by logical necessity, since to say "it transforms into" and to say "it is one with" is to say the same thing. Consequently, corresponding to the last or end-potentiality there is a "first actuality," and they are identical. Since Aristotle uses the matter-form and the potentiality-actuality distinctions interchangeably, in his other definition of soul in *DA* he says that it "must be substance qua form of a natural body which has life potentially" (412a19–21), with "substance" and "form" substituting for "first actuality," and "potentially" functioning as "matter." Now, the identity of last or end-potentiality with the first actuality comes out in one text as the identity of "last matter" with "form." After deriding the Platonic-like explanations of what holds soul and body together, he offers his own solution:

The explanation is that they look for an account of *dunamis* and *entelecheia* which will both differentiate them and make them one. But as has been said, the last matter and the form are one and the same, the one in *dunamis* and the other in *energeia*, so it is like looking for an explanation of why what is one is also one. (*Met* 1045b17–19, Charlton in 1980: 176)

The identity he points out is of "the last matter (*hē eschatē hulē*)<sup>16</sup> and the form," meaning thereby the "first" form. That this meaning is feasible is clear from the cue Aristotle supplies by his two definitions of soul in *DA*, where he substitutes "form" for "first actuality." At the beginning of *DA* Aristotle says that there is a real difference whether soul is an actuality or a potentiality (402a25), and we can see now that this is the case only for consistency-potentiality. It is impossible to distinguish, either theoretically or in fact, between last matter, or end-potentiality, and first form or actuality.<sup>17</sup>

This is well accepted for the case of living things, where the notion of organs necessarily implies their being ensouled.<sup>18</sup> But it cannot be a result specific to living things, since there is no difference that Aristotle points out between the concepts of form and matter as he applied them to living things and as he applied them to dead matter and even to artificial things. To take the last case, the form of a house is not just covering but, rather, covering by rigid structure, and here the rigid structure is the proximate or last matter in which the covering resides, so this matter is part of the form just as the form is this form only if it is in such matter. It is in their unity only that structure and covering constitute the substance house, and this unity is supplied by their logical inseparability from each other: it is only covering in rigid structure that is at all the right kind of covering, and it is only a rigid structure that can be a covering that is the right kind of rigid structure. Hence in spelling out the exact nature of the form the matter must be mentioned, and the same goes for the matter.<sup>19</sup>

We can conclude now the answer to the question how would an end-

potentiality look. Since when all the necessary conditions exist the potentiality must actualize at once, this demand entails the disappearance of the genuine potentiality at the moment of its creation;<sup>20</sup> that is to say, it entails its nonexistence for any time point. Consequently, genuine potentiality cannot possibly exist for any finite interval of time, and is identical with its ensuing (or first) actuality. Genuine potentiality does not denote a real entity, state, or condition distinct from the ensued actuality.

### 1.1.5. Consistency-Potentials are Noneffectual and Nonreal

The single most telling evidence that consistency-potentials are not real entities in Aristotle's ontology is supplied by his argument against those who reject the law of noncontradiction. He says that they are right in one sense but wrong in another sense. They are right insofar as potential things are concerned, for "it is possible for the same thing simultaneously to be opposite things potentially" (*Met* 1009a31-7). If, however, the law of noncontradiction is rejected for real things, this does "away with substance and essence" (1007a21). Together these statements imply that potentiality need not obey the law of noncontradiction, simply because potentiality is irrelevant to substance and essence as realities.<sup>21</sup> We shall see now that this conception of consistency-potentiality led to its complete drainage of reality, first of substantial reality and then by nullifying its effectuality as a cause. This found its fullest expression in Aristotle's doctrine about the priority of the actual over the potential. I shall first deal with the causal ineffectuality of consistency-potentials.

One main difference between consistency-potentials and real causes is that a real cause can cause only one effect, whereas each consistency-potentiality is potentiality for simultaneous but contrary actualities. This is entailed by the fact that having potentiality for *X* does not necessitate *X*, and hence this same potentiality may end in some non-*X*:

Every potentiality is *at one and the same time* a potentiality of the opposite; for while that which is not capable of being present in a subject cannot be present, everything that is capable of being may possibly not be actual. That, then, which is capable of being may either be or not be; the same thing, then, is capable both of being and of not being. (*Met* 1050b9-13, Ross).

However, since a substance cannot contain contradictory qualities, it followed that consistency-potentiality is not a quality within the substance. There can be little doubt that insofar as potentiality is taken as some talent or capability in the substance in virtue of its special constitution, this potentiality is then regarded as a quality of the substance, but then a consistency-potential cannot possibly be

regarded as a quality. He explains this by contrasting genuine potentialities with "potentialities by having logos," arguing that these are capable of causing both contraries:

Since contraries do not occur in the same thing, but science is a potentiality by having logos, and the soul has an *archē* of motion, then whereas the healthy produces only health and that which can heat produces only heat, and that which can cool produces only cold, the scientist can produce both the contrary results. (1046b17–20)

"That which can heat," like fire when all the necessary conditions obtain, must produce heat but not cold, just as ice similarly situated must produce cold but not heat, and things that are healthy for you must produce in you only health and not disease. Scientific knowledge is different, for the doctor, say, may choose not to heal. Notice too that whereas actual heat entails the prior existence of genuine potentiality for heat, actual health does not entail the prior existence of genuine "healing science," but only that of genuine potentiality to become healthy. Hence, "healing science" is not a genuine potentiality and so cannot by itself induce a change. Rather, it must be coupled to the *archē* of motion in the soul, and this too only if other necessary conditions exist, such as the will to practice it.

We saw that Aristotle took knowledge as an example of *hexis* to illustrate soul, and I argued (p. 16 above) that he in fact implied that genuinely potential knowledge is necessarily exercised knowledge. In the present text, on the contrary, knowledge is taken as a mere consistency-potential, that is, knowledge is the pair of contrary capacities of healing and of not healing. This pair, however, is not a genuine potentiality for it cannot possibly be simultaneously actualized, and Aristotle explains this by noting that knowledge is logos, merely a rational formula, and as such it lacks an *archē* of motion and so "is both" contraries. I take this to be a clear reference to consistency-potential:

The scientific man produces both the contrary effects. For logos is one which applies to both, though not in the same way, and it is in a soul which possesses an *archē* of motion; so that the soul will start both processes from the same *archē* of motion having linked them up with the same thing . . . for its products are included under one *archē*, the logos. (1046b20–25, Ross; mod: "logos" for "rational formula," "*archē*" for "originative source")

This contrareity which is logos, i.e., reason or rational formula, can become motion only by being linked to soul, which has an *archē* of motion, i.e., to the choice of the scientist. He can choose either to practice or not to practice his profession on a given patient, thus either starting or failing to start a healing process. That is why to be able to do either, and to be able to do one of them

when choice is taken, are both "being able," "though not in the same way."<sup>22</sup> Once healing is actually produced, contrareity dissipates and this entails the doctor practicing science and so his genuine potentiality for healing. Once he desires so and has the science and nothing is obstructing, this will produce healing (not health) of necessity and without failing.

This entails that since nongenuine potentiality is always a potentiality for contradictories, it is a nongenuine attribute, since although potentiality for *X* is the contrary of potentiality for non-*X* (since it is not potentiality for *X*), both of these are said to be present in the same substance at the same time. Were they real attributes, this could not be the case.

*Sterēsis* is featured in *Met* 1055b3ff as the contradictory of the present attribute. Taking potentiality as *sterēsis*, i.e., the attribute about to replace the present one, it denotes a contradictory and cannot be a reality within the same substance. In *Phys* 191a6 *sterēsis* is reduced to absence just as form is reduced to presence, and if *sterēsis* is potentiality then potentiality is absence and so "in itself non-being" (191b15).<sup>23</sup> Hence to say that *sterēsis* is in some substance is to deny that something is a reality. Aristotle employs two illustrations that strikingly bring out the strict nonreality of consistency-potentials as they sit "in" substance. He says that the intellect is "in actuality nothing before it thinks," and is then "in a way potentially the objects of thought," that is, "potentially in the same way as there is writing on a tablet on which nothing actually written exists" (*DA* 429b30, Hamlyn). Similarly he illustrates the contrast between actuality and potentiality by the Hermes in the matter:

Actuality, then, is the existence of a thing not in the way which we express by "potentially"; we say that potentially, for instance, a statue of Hermes is in the block of wood and the half-line is in the whole, because it might be separated out. (*Met* 1048a33, Ross)

In the context of his argumentation against the actual existence of geometrical entities in material things, he remarks that lines and points, etc., are mere "divisions of body," and therefore are not real in the object before the "division" occurs, just as, to use the previous passage, the half-line is not in actuality in the line before the appropriate division occurs. He then adds:

Besides this, no sort of shape is present in the solid more than any other, so that if the Hermes is not in the stone, neither is half of the cube in the cube as something determinate. (1002a20–23, Ross)

He extended this argument from the craft example not only to mathematical entities but also to organic nature in its growth:



We say the Hermes is in the stone, and the half of the line is in the line, and we say of that which is not yet ripe that it is corn. (1017b7–8, Ross)

Hence, the way in which the seed is potentially corn is the same as that in which the Hermes is in the stone. Aristotle obviously could not avoid this extension, for what he illustrates here is not some special sense of potentiality but rather its standard meaning. And so it is as absurd to say that the artist merely reveals what was already in the stone (or wood), as to say that the writer merely reveals what was already in the paper. Here “we” fully agree that there is “nothing” “in” them before actualization. Hence, the same must be the case with the seed—there is nothing of the corn in it before the corn is actualized. What confirms this reading is the sentence that closes the passage: “When a thing is potential and when it is not yet potential must be explained elsewhere” (b9). He obviously refers by this to the seed example in 1048b36ff. (p. 13), showing that he employs in fact two concepts of potentiality, the one denoting the Hermes in the stone, corresponding to consistency-potentiality, and the second denoting only that stage in the process “when a thing is potential,” i.e., genuinely potential. Relative to this late stage, the preceding stages are such that the thing “is not yet potential.”

Hence, insofar as the actual is caused by a potentiality, this cannot be the consistency-potential, for such potentiality is not an *archē* of motion at all. Being a potentiality for contrareities, it cannot be effectual and does not cause. This is its first drainage of existence. Implied here is the view that genuine potentiality is indeed an *archē* of motion, in accord with Aristotle's definition of motion (p. 9 above).

#### 1.1.6. A Role for Consistency-Potentials: Dispute with the Megarians

A seemingly obvious puzzle arises from this analysis: Seeing that consistency-potentials are self contradictory nonentities that can not act, why did Aristotle employ them at all? Some clues may now be gathered from his dispute with the Megarians, since it focused on just this need for consistency-potentialities. The Megarians held, according to Aristotle's account, that consistency-potentialities do not exist and that the only potentialities that do exist are those that are actualized:

There are some who say, as the Megaric school does, that a thing “can” (*dunasthai*) act only when it is acting, and when it is not acting it “cannot” act, e.g., that he who is not building cannot build, but only he who is building; and

so in all other cases. It is not hard to see the absurdities that attend this view.  
(*Met* 1046b29–33, Ross)

The only point at dispute here concerned the existential status of consistency-potentials, and so Aristotle and the Megarians held the same view about genuine potentials, that is, that these necessitate their actualization.

The “absurdities” that Aristotle goes on to point out in the Megarians’ theory derive only from their denial that consistency-potentials possess any reality. First, then, actuality will start without any explanation: Since a man will not have the art when he does not actually practice it, he will become an artisan without any prior preparation (1043a3), just as dispositional properties of matter will cease existing when not actual, so that being soluble, green, sweet, etc., will actualize only on being experienced by someone (1047a5–7). These are absurdities according to our accepted usage of dispositions as explaining their actualizations. Moreover, given that dispositions and capacities do not exist, it follows that all change must stop, since if the sitting man does not, while sitting, have the capacity for standing up, he will not stand up. And since his only capacity, while sitting, is to sit, he must remain sitting forever. Aristotle’s argument is obviously circular, since it assumes that change entails a previous capacity or disposition for it, but this is what has to be proved and what the Megarians deny.

However, the Megarians don’t deny capacities all in all. They affirm the existence of genuine potentials, namely, those which actualize, and while they actualize, since they “make potentiality and actuality the same” (1047a19). But what the Megarians really did was, probably, merely to argue that genuine potentiality is entailed only by actuality, for they maintain “that a thing *can* act only when it *is* acting” (1046b29). This, however, is close to Aristotle’s own view. First, it does not deny the existence of potentiality, and second, it does not deny its conceptual distinction from actuality. Third, as I suggested, Aristotle’s view about the genuine potentiality leads to the same conclusion, and fourth, Aristotle does not dispute that actuality entails genuine potentiality.

Aristotle’s stand on the issue of consistency-potentials was, on the other hand, not that far from the Megarians’. For he too is hard pressed to give consistency-potential any clear reality. As we saw in the preceding section, being a capacity for contraries, it could not possibly be allowed to be a real attribute nor an *archē* of motion in substances. But then, how could it be allowed to be a reality at all? On the other hand, the absurdity of paralyzing the world is too much for Aristotle, and he therefore insists on including consistency-potentials in his explanatory system of physics by grounding their existence on no more than logical consistency grounds (1047a25, p. 12 above).

Obviously, this definition gives “capacity” a strictly logical, nonphysical function. For, as we saw (p. 18–21 above) potentialities are deprived of any serious physical status if every substance can be pumped full with infinitely many of them that will never be actual and that are put there irrespective of

the substance's physical nature and its history past and future. The result is a tight connection between the following three points: the logical separation of consistency-potentials from actuality (contrary to genuine potentials), the possible nonactualization of a consistency-potential at any future time, and the purely logical-consistency ground for attributing some given potentiality to a given subject.<sup>24</sup> These interconnected tenets are listed by Aristotle in this order:

Evidently potentiality and actuality are different . . . so that it is possible that a thing may be capable of being and not be, and capable of not being and yet be. . . . A thing is capable (*dunaton*) of doing something, if there will be nothing impossible in its having the actuality of that of which it is said to have the potentiality (*dunamis*). (1047a19, 20, 25, Ross; mod: "potentiality" for "capacity" and so in all translations from Ross)

The dispute with the Megarians ends, therefore, in a short declaration on non-real things. There are some attributes that can and some that cannot be assigned to nonreal things: Motion cannot, but desireability can be attributed to what is not real. He thereby hints that consistency-potentials, the ones denied by the Megarians, are indeed not real, and that this is exactly what he means by saying that something exists potentially:

For of all non-existent things some exist potentially; but they do not exist, because they do not *exist* in complete reality (*entelecheia(i)*). (1047b1, Ross)

To "exist potentially" as consistency-potentials do is, therefore, elliptical for "not to exist," i.e., for "to be non-real." But this would have been accepted by the Megarians, since they too held that potentials are nonrealities inasmuch as they "do not exist in actuality."<sup>25</sup> Only, they probably insisted on extreme purity: Since consistency-potentialities do not exist as real things but only as fictive impossible entities, they should not be admitted into our scheme of explanation. Aristotle, fully agreeing as to their fictive, self-contradictory nature and hence as to their nonreality, nevertheless viewed them as necessary for our explanation of change. He accepts and defends our daily speaking habits by introducing what he admits are nonrealities. The Megarians had no such hang-ups about ordinary language.<sup>26</sup>

We shall see now that Aristotle's view about the nonreality of consistency-potentials explains some of his attacks on Plato's theory of forms.

### 1.1.7. Plato's Forms and the Nature of Consistency-Potential

Aristotle had no doubt that the Platonic Forms correspond to potentialities in his own system and one of his main criticisms of Plato's theory stems

from the identification of Platonic Forms with mere consistency-potentialities. For their alleged activity in causing the coming-to-be and motion of things then becomes inexplicable. Hence, if Plato's intention was to posit Forms as an explanation of the career of things, he surely failed here, for mere consistency-potentialities are not *archai* of motion, as we saw. Forms cannot have—in the way they are defined and posited by Plato—enforcing capacity that could account either for the initiation of motion or for its specific “direction” and “route.” Forms cannot function, therefore, in the causal explanation of why the seed grows, and of why it grows into an oak. Moreover, apparently the causal capacity needed in order to explain why some seeds do while some don't start growing is an on-off capacity. Hence, Forms as potentials cannot be assumed to be causal all the time, and so there must be some other cause that explains this activation and deactivation of the Form. That is why Forms as they are posited by Plato (namely, as consistency-potentials that lack an *archē* of motion) are irrelevant for causal explanations of physical motions.

This is also one of the clearest clues to the nature of potentiality in Aristotle's own system. For obviously this same critique must apply *mutatis mutandis* to his own consistency-potentials, unless they are not taken by him to be causal explanations at all. He could criticize Plato's Forms as consistency-potentials, however, since causal efficacy is indeed their specific role:

If there is something which is capable of moving things or acting upon them, but is not actually doing so, there will not necessarily be movement; for that which has a potentiality need not exercise it. (*Met* 1071b13–15, Ross)

Since there will not necessarily be motion, it may happen that there will be no motion ever. Hence, if motion does happen, it must be as a consequence of another cause, besides the consistency-potentiality, i.e., besides the Forms (see also *Met* 991a20–23, 1033b26). Aristotle could have said but did not say that if it may or may not actualize, then actualization will be a random event. He chose rather to say that possessing a (obviously consistency) potentiality will not cause the actualization of a new state. A thing that is in some state but has only consistency-potentiality for change will remain in that state. On this Aristotle bases his critique of Plato's Forms, for he argues that no amount of further posited potentialities will surmount this difficulty: A potentiality will not actualize of itself, and so, if something only may act, it really will not act forever if it starts from nonactivity and is left to itself:

Nothing is gained even if we suppose eternal substances, as the believers in the Forms do, unless there is to be in them some principle which can cause change; nay, even this is not enough, nor is another substance besides the Forms enough, for if it is not to *act*, there will be no movement. (1071b15–18, Ross)