

## The Aim and the Argument of Aristotle's Metaphysics

IIIα3: Θ7-9: conclusions for the ἀρχαί and the priority of ἐνέργεια.

Metaphysics Θ7-9 draw the conclusions from the clarificatory work of Θ1-6. Θ7-9 generally avoid speaking explicitly of ἀρχαί; instead, these chapters frame their main conclusions in terms of priority, including the main conclusion of Θ, namely that ἐνέργεια is prior to δύναμις. But these conclusions about priority can be almost immediately converted into conclusions about the ἀρχαί, and they are so converted in Λ.

Since the argument of Θ clearly builds up to its main conclusion in Θ8, and since this is also the conclusion of the most importance for the ongoing argument leading up to Λ, I will concentrate on Θ8 in what follows, although at least one of the two corollaries added in Θ9 is also important for the ongoing argument and needs some discussion. But I will first say something about Θ7, since it plays a structural role in the internal argument of Θ, bridging the gap from the conceptual clarifications culminating in Θ6 to conclusions about the ἀρχαί; in the process, this chapter helps to connect Θ with Δ.

Θ1-5 do talk explicitly about ἀρχαί, but with two restrictions: these chapters talk only about δυνάμεις as ἀρχαί, not about ἐνέργεια as ἀρχαί, and they do not talk about all kinds of δυνάμεις, but only about δυνάμεις for motion, and not even all δυνάμεις for motion, but only those which fall under the senses of δύναμις given in Δ12: ἀρχαί of moving something else or of being moved (or not being moved) by something else, but not natures, which are ἀρχαί in a thing of that same thing's being moved, not qua another but qua itself. As Aristotle had said in Θ1, δυνάμεις for motion (or this particular kind of δυνάμεις for motion), although they are "the δύναμις which is so called in the most primary sense," are "not the most useful for what we are now aiming at" (1045b35-1046a1), because they are not likely to be among the ἀρχαί in the strict sense, the first of all things. And Θ1-5 have not examined whether these δυνάμεις are ἀρχαί in the strict sense, or whether they are genuinely prior to the things they are said to be ἀρχαί of; the ordinary description of these things as ἀρχαί has been accepted, without being taken as a sign of anything "metaphysical." However, with Θ6, the analogical extension of the ἐνέργεια/δύναμις relation, from ἐνέργεια in the category of κίνησις (or ποιεῖν and πάσχειν) to ἐνέργεια in all categories including οὐσία, opens up a broader range of δυνάμεις, including some which might be better candidates to be ἀρχαί in the strict sense. "Some [things that are related as ἐνέργεια to δύναμις] are related as κίνησις to δύναμις, others as οὐσία to some matter" (Θ6 1048b8-9), and something that is δύναμις as matter might be among the first of all things, as it is according to the pre-Socratic physicists and to the Timaeus--not that these people explicitly claim that their material ἀρχαί are δυνάμεις, but the extended notion of δύναμις gives a way of elaborating and making plausible their claims. (This discussion overlaps with the discussion of the material ἀρχή in Z3, but Z3 made no use of the notion of δύναμις.) But the analysis of δύναμις in Θ6 is also supposed to undermine these claims, to show that the ultimate δύναμις as matter is in fact posterior to the corresponding ἐνέργεια. The conclusion about posteriority is made explicit only in Θ8, but Θ7 does the crucial work in analysing the ontological status of such a δύναμις.

Θ7 begins by taking up the question explicitly deferred at the end of Δ7, "when [something like the just-mentioned examples: the Hermes in the stone, the half-line, or the unripe grain] is δυνατόν, and when not yet, we must determine elsewhere" (Δ7 1017b8-9: "when each thing is

δυνάμει [πότε δυνάμει ἔστιν ἕκαστον] and when not, we must determine: for not just at any time", Θ7 1048b37), and it ends by saying that this question has been answered ("so it has been said when it should be said [that something is] δυνάμει and when not," Θ7 1049b2-3). (See the discussions of Δ7 in IIIα2 {and also Iγ1?} above.) So at one level the purpose of Θ7 is simply to answer a question left over from Δ7, by bringing to bear information not yet available in Δ7, namely the account of δύναμις in Δ12 and its consequences as worked out in Θ. But there is also a deeper purpose, to investigate the claims of the ἀρχή--the primary matter--which is said to be δυνάμει all things. Although the question is first formulated at Θ7 1048b37 in apparently existential terms, here as in Δ7 Aristotle analyzes the question "does Y exist δυνάμει?" through the question "is X δυνάμει Y (for some actually existent X)?: presumably, as in Δ7, the equivalence is mediated through the question "does Y exist δυνάμει in X?" or "is Y δυνάμει present in X?"

Aristotle thus considers the sample question "is earth δυνάμει man?": "no, rather when it has already become seed, and perhaps not even then" (Θ7 1049a1-3).<sup>1</sup> He answers the question, stating and justifying the conditions when something is δυνάμει man, at 1049a3-18. One major purpose of this answer will be to show that a single first ἀρχή, the primary matter, cannot of itself be δυνάμει all things; and the remainder of the chapter, 1049a18-b2, draws further consequences about the relations between the (immediate or ultimate) material ἀρχή and the things that it (immediately or indirectly) is δυνάμει. Although the basic sense of Aristotle's answer at 1049a3-18 is unsurprising, the way he reaches it is circuitous and the text, syntax and logic of the argument are all controversial, so I will briefly say something about how I think it works.

Aristotle starts, as we would expect, with δυνάμεις that are better known to us, and uses them to infer to more basic but more remote δυνάμεις such as the δύναμις of earth or seed to become a human being. He starts with examples from the arts, which are the δυνάμεις we know best, then extracts a general rule from these examples, then argues that the rule also applies (with a necessary amendment) to cases like seed becoming man:

Just as<sup>2</sup> neither would everything be healed by [the art of] medicine, or by chance, but there is something which is capable of it [δυνατόν], and [only] this is δυνάμει healthy, and the mark of what comes-to-be in actuality by [the agency of] thought

<sup>1</sup>adopting Bonitz' punctuation (followed by Ross and Jaeger), with a question mark instead of Bekker's comma after δυνάμει ἄνθρωπος (or ἄνθρωπος δυνάμει, as Ab has it), so that ἢ has the function of introducing a (somewhat tentative) response, rather than meaning "or" (I also leave out the then superfluous question mark after οὐδὲ τότε ἴσως). the traditional punctuation might be right, but Bonitz' punctuation, implying a negative answer to the question whether earth is δυνάμει man, makes better sense as exemplifying and supporting the immediately preceding statement "not just at any time". With Bonitz, Ross and Jaeger I accept Ab's τότε at the end of a2, although J's τοῦτό πω is possible, cp. a14 (E's τοῦτό πως is wrong; there are also other transmitted variants, and it might be worth thinking through how they would have arisen--the stemma may favor J's reading as original, not that anything much turns on it)

<sup>2</sup>note Bonitz' problem about ὡςπερ οὖν, which leads him to delete οὖν and connect ὡςπερ with what precedes rather than with what follows {Ross says that J omits οὖν; Vuillemin-Diem says J does have οὖν, but added later supra lineam; Bonitz doesn't have J, but he mentions that Bessarion's translation omits οὖν}. I think Ross' proposal (though Ross himself is inclined not to adopt it) is correct: ὡςπερ governs everything up through 1049a12, and is picked up by καὶ ὅσων δὴ at a13. the structure is: we ask the question about becoming man (a1-3); we examine the easy cases of artificial production (a3-12: ὡςπερ a3, μὲν a5), give the rule for when X is δυνάμει Y in those cases, and say that just as in those cases, so too in the case of becoming man (a13-14: καὶ picking up ὡςπερ, δὴ picking up μὲν); the seed is not yet δυνάμει a human being (a15-17), just as the earth is not yet δυνάμει a statue

out of being δυνάμει is when it comes-to-be if [the artisan] wishes and nothing external prevents, but there, in what is being healed, nothing within it prevents<sup>3</sup> (and likewise [for being] δυνάμει a house: if nothing within it--the matter--prevents it from becoming a house, and there is nothing that needs to be added or taken away or changed, this is δυνάμει a house, and likewise with all the other things whose ἀρχή of becoming is external), so too among the things that are within what possesses [their ἀρχή of becoming], those [exist δυνάμει] which will exist through this thing if nothing external obstructs.<sup>4</sup> The seed is not yet [δυνάμει a human being], for it must be in something else and be changed, but when through its own ἀρχή it is already such [as to become a human being], it is already δυνάμει this [= a human being]: but that [= the seed not yet in this condition]<sup>5</sup> has need of another ἀρχή, just as earth is not yet δυνάμει a statue, for after it has been changed it will be bronze [and only then is it δυνάμει a statue]. (1049a3-18)

Ross thought that Aristotle was here contrasting the criterion for when X is δυνάμει Y in the case where Y is an artifact (or where X becomes Y through art) from the criterion in the case where Y is a natural being (or where X becomes Y through a natural process). In the first case (1049a3-12 and a17-18), Ross thinks the criterion is a conjunction of two clauses (that (a) X will become Y if the artisan wishes and if nothing external prevents, and (b) nothing internal to X prevents it from becoming Y), whereas in the second case (1049a13-17) the criterion is just a

<sup>3</sup>I think Ross goes wrong in taking "it comes-to-be if [the artisan] wishes and nothing external prevents" and "nothing within it prevents" (each governed by ὅταν) as two different conditions which must both hold for X to be δυνάμει healthy. the sign of X's being δυνάμει healthy is that, if the artisan wills and nothing external prevents, X comes-to-be healthy--that is, there is nothing internal to X which prevents it from becoming healthy, although external things might obstruct. in the house case, which is supposed to be analogous, there is mention only of the lack of internal obstructions, and in the cases of natural transformations, which are also supposed to be analogous, it is said only that X will become Y if there is no external obstruction (the clause "if [the artisan] wishes" of course drops out in these cases). it is not that there are two different conditions, of which one is necessary for the house, the other for natural transformations, and both conjointly for health; these are different ways of referring to the same condition

<sup>4</sup>"so too among the things that are within what possesses [their ἀρχή of becoming], those [exist δυνάμει] which will be through this thing if nothing external obstructs" (a13-14): there are several difficulties. ὅσων ἐν αὐτῷ τῷ ἔχοντι might be taken (as by Ross) to mean "those things [whose ἀρχή of becoming] is within what possesses [that ἀρχή]," filling it out in parallel with the ὅσων-clause in a12. I have translated more straightforwardly, taking ὅσων in a13 as partitive governed by the following ὅσα (on the other reading, the ὅσων-clause in a13 has no clear grammatical connection with the rest of the sentence). on Ross' construal, "those things [whose ἀρχή of becoming] is within what possesses [that ἀρχή]" would have to mean "X, if its ἀρχή of becoming is within X itself." but a thing which does not yet exist cannot really be said to contain its own ἀρχή of coming-to-be; so we would have to take "becoming" here as 2-place, "X, if its ἀρχή of becoming Y is within X itself." the implied predicate would then have to be not "exists δυνάμει" but "is Y δυνάμει". the following clause, "ὅσα ... ἔσται δι' αὐτοῦ" should then be taken as [it is δυνάμει] "those things ... which it will be of itself", rather than "those things which will exist through it". this seems to demand reading αὐτοῦ rather than αὐτοῦ, and I think Ross must be presupposing αὐτοῦ in his translation, although he prints αὐτοῦ in his edition. Bonitz and Jaeger print αὐτοῦ and do not note any variations in their apparatus; Ross says that E and J have αὐτοῦ. but NB Vuillemin-Diem says that J in fact has αὐτοῦ, and I strongly suspect that E does as well. of course, given that Aristotle presumably did not write with breathings anyway, one need not have great scruples in overriding even the consensus of the manuscripts on such a matter. but I think that all told my reading is more straightforward than Ross'. as far as I can see, no great issue hangs on the choice

<sup>5</sup>reading ἐκεῖνο with Ab Bonitz Ross Jaeger; EJ have ἐκεῖνα, lectio facillior as referring back to "things whose ἀρχή of becoming is external" but allowing no overall sense

single clause (that X will become Y if nothing external prevents). But closer attention to the structure of the passage<sup>6</sup> shows that Aristotle intends no such contrast. His stress is rather that just as in the first case, so too in the second case. In the example of the house, which certainly falls under the case of artificial production, he gives only clause (b), intending it as equivalent to the conjunction of (a) and (b) that he has just given in the example of health: the reason is that (within the case of artificial production) he thinks that clauses (a) and (b) are equivalent, and it is again clause (a), with a necessary amendment, that gives the criterion in the second case. It is also not true that the two cases neatly partition comings-to-be into the cases of artificial and natural becoming. For what Aristotle says about the second case is obviously false if the second case is supposed to cover every instance of natural becoming. It may be true of the embryo, which is δυνάμει a human being, that it will become a human being if nothing external prevents, but the katamenia must be δυνάμει an embryo (since they become an embryo when moved by the male seed), although the katamenia would not become an embryo if left to themselves, and likewise air must be δυνάμει fire (since it becomes fire when heated by fire), although it would not become fire if left to itself. It is much better to contrast the two cases by saying that in the first case X becomes Y by the action of an external active δύναμις (whether an art or an irrational δύναμις) and in the second case X becomes Y through its own nature. But the fact remains that Aristotle starts by considering only "what comes-to-be in actuality by [the agency of] thought" (and only here does clause (a) make sense), and only as an afterthought generalizes to "all the other things whose ἀρχή of becoming is external." And the reason is that his aim is not to exhaustively classify cases of becoming and prescribe different rules for different cases, but rather to use the best-understood case, artificial production, as a model for understanding the more basic cases that are of more use for the inquiry into the ἀρχαί.

The immediate reason why cases of artificial production and also of "all the other things whose ἀρχή of becoming is external" are well-understood, and why Aristotle thinks he can win agreement on a criterion for when X is δυνάμει Y in these cases, is that he has analyzed these cases in Θ5. In the case of irrational powers, "it is necessary, whenever the agent and the patient come together in the way they are capable of, that the one acts and the other is acted on" (Θ5 1048a6-7), whereas if the active power is rational, and is therefore a power for contrary activities, a further condition is needed, desire or choice: "it is necessary that what has a rational power, when it desires that of which it has the power, and in the way that it has it, does this thing: and it has [the power subject to the condition that] the patient is present and is disposed in this way [i.e. has the passive power necessary for being acted on]" (1048a13-16; Aristotle adds that if we have fully specified the powers, as powers for acting or being acted on in this way, under these conditions, we will not need to add the further clause "if nothing external prevents," as we would for powers less precisely specified).<sup>7</sup> This is why our clauses (a) and (b) in the case of artificial production were equivalent: if nothing internal to the patient X prevents it from becoming Y, then whenever the artisan wishes (if he is present and genuinely has the art of producing Y) and nothing external prevents, X will become Y; conversely, if X becomes Y whenever the artisan wishes and nothing external prevents, then there cannot be anything internal to X preventing it from becoming Y. To modify clause (a) for the case of an external irrational power acting on the patient, we can say that X is δυνάμει Y if whenever the agent with the

<sup>6</sup>see the above footnotes

<sup>7</sup>note *Physics* VIII parallel; note discussion in IIIα2 above (where I probably didn't say enough). I am not entirely sure I understand the ὡς δύναται clauses in Θ5 (1048a6, a12, and presumably connected with the other ὡς clauses); Ross has no discussion

appropriate power is present and nothing external obstructs, X will become Y. And in the case where the active power is not external to X, we can simply say that X is δυνάμει Y if whenever nothing external obstructs, X will become Y. In this case, however, we are going beyond δυνάμεις in the senses defined in Δ12 and discussed in Θ1-5 to natures, which are powers only in a more generic sense ("nature too belongs in the same genus as δύναμις, for it is a moving principle, not in something else, but in [the thing] itself qua itself," Θ8 1049b8-10):<sup>8</sup> fire down here is δυνάμει up there, not because of a δύναμις in the narrow sense, but because of the nature of fire. Aristotle thinks that the case of δυνάμεις in the narrow sense is easier to understand than the case of natures, and one function of the discussion of the δυνάμεις in the narrow sense is to help understand the case of natures, and the way in which X may be δυνάμει Y due to its nature. But it is important to see that there is no necessary connection between the question whether the δύναμις through which X is δυνάμει Y is a nature or a narrow δύναμις, and the question whether it is a δύναμις πρὸς οὐσίαν or πρὸς κίνησιν. Thus the power of fire to rise is a nature, but it is not a power πρὸς οὐσίαν; the power of fire to become air or of the katamenia to become an embryo is πρὸς οὐσίαν (and, as far as we can tell from Θ, so is the power of wood to become a box), but none of these is a nature, since all require some external agent to act on X and make it into Y.

However, the main lesson of this passage is that, in any of the cases that Aristotle considers, X is not δυνάμει Y unless X has within itself some kind of moving principle which (by itself or in conjunction with an active δύναμις in something else) is sufficient, if nothing external obstructs, to produce Y. It thus takes quite special conditions for some matter to be δυνάμει Y, and there is no reason to expect that a single first material ἀρχή would be δυνάμει all the objects of ordinary experience. In particular, the relation "X is δυνάμει Y" is not transitive: if X is δυνάμει Y and Y is δυνάμει Z, there is no reason to expect that X is δυνάμει Z--earth is δυνάμει bronze and bronze is δυνάμει a statue, but earth is not δυνάμει a statue, since it needs to be changed before the will of a sculptor will be sufficient (given no external obstacles) for it to become a statue.

This point about the non-transitivity of being δυνάμει, and the implied denial that any one material ἀρχή is δυνάμει everything, help to explain the more famous remainder of Θ7, the discussion of paronymy which we have already quoted in IIβ2 above:

It seems that what we call not this [τόδε] but that-en [ἐκείνινον]--as the box is not wood but wooden, and the wood is not earth but earthen, and [likewise] if the earth too is not something else but something-else-en--the latter [e.g. the wood] is ἀπλῶς potentially that thing [e.g. the box]. Thus the box is not earthen or earth, but wooden, for this [sc. wood] is potentially a box and this is the matter of a box, [wood] ἀπλῶς of [box] ἀπλῶς and this wood of this [box]. And if there is some first thing which is no longer called that-en with respect to something else, this is first matter: thus if earth is air-y, and air is not fire but fier-y, fire would be the first matter, not being a this. For that-of-which [τὸ καθ' οὗ], [i.e.] the ὑποκείμενον, differs, in that one [ὑποκείμενον] is a this and another is not. Thus man, and body and soul, is the ὑποκείμενον of the affections, and musical or white is an affection (when music comes-to-be-in [the ὑποκείμενον], it is called, not music, but musical, and the man is called not whiteness but white, not a walk or a motion but walking or moving, as being that-en). So in cases of this kind [sc. where the ὑποκείμενον is a this, and is called paronymously from the affected]

<sup>8</sup>accepting the text of Ab, with Bonitz, Ross and Jaeger

the ultimate thing is οὐσία: but in the other kind of case, where what is predicated is a form and a this, the ultimate thing is matter and οὐσία-in-the-sense-of-matter [οὐσία ὑλική, as opposed to οὐσία ἀπλῶς]. And it comes out right [ὀρθῶς συμβαίνει] that "that-en" ["ἐκείνινον," standing in for any paronymous term] is said both with respect to [i.e. paronymously from] the matter and with respect to the affections: for both are indeterminate [ἀόριστα; i.e. to say that something is made of this matter, or that has this affection, does not determine what the thing is].<sup>9</sup> (1049a18-b2)

I discussed in IIβ2 Aristotle's thesis that matter, like qualities, is indeterminate, and his comparison of paronymy from a matter with paronymy from a quality; these ideas, while intrinsically important, are not about δύναμις as such, and so this passage may seem like a digression in the middle of Θ. But this discussion has two important implications which explain why Aristotle includes it here. First, we learned in Θ6 that the δύναμις presupposed by the coming-to-be of a substance is its matter; the present passage points out that this matter, the underlying ὑποκείμενον of the substantial change, is not a this; the implication is that the matter cannot be an ἀρχή in the strict sense, i.e. cannot be prior κατ' οὐσίαν to the resulting substance, and this implication will be one major support of Θ8's argument that ἐνέργεια is prior to δύναμις. Second, the claim that if X is matter for a substance Y (and thus is δυνάμει Y), then Y is not X but X-en, is crucial in defending Aristotle's claim that the relation "X is δυνάμει Y" is not transitive. If, when X is δυνάμει Y, it followed that Y is X, then, when X is δυνάμει Y and Y is δυνάμει Z, it would follow that Z is Y and Y is X, and therefore that Z is X (if the box were not wooden but wood, and the wood were not earthen but earth, then the box would be earth--whereas, Aristotle says here, it is not even earthen). In other words, if the matter of something were its οὐσία, then a single ultimate material ἀρχή (if there is one, and Aristotle agrees that there is one at least for sublunar things) would also be immediately the matter, and the δύναμις, for all things. It is important for Aristotle's negative project in the *Metaphysics* to refute such claims about the ἀρχαί. For Aristotle there are many matters for different things (a point made in H, esp. H4, in talking about the "appropriate matter" which must be cited in defining each thing, and taken up in the account of material ἀρχαί in Λ2), and there are many δυνάμεις for different things: as Aristotle will insist in Λ4-5, the only sense in which a single δύναμις is an ἀρχή for all things is that all δυνάμεις are one by analogy. Θ7 thus puts Θ6's extension of the notion of δύναμις to matter (developing Δ7) together with the Θ1-5 account of δυνάμεις for motion (developing Δ12) to answer the question left over from Δ7 of when X is δυνάμει Y; but the function of the chapter, in the ongoing argument of Θ, is to criticize the claim of δύναμις to be an ἀρχή, and to prepare for the positive account of ἐνέργεια as a prior ἀρχή.

## Θ8

Θ8 draws the main positive conclusions of Θ, although the conclusions are still expressed in terms of priority rather than of ἀρχαί. Aristotle starts by asserting quite generally that ἐνέργεια is prior to δύναμις, where δύναμις is taken broadly enough to include natures as well (1049b4-

<sup>9</sup>note the textual trouble about οὐ τόδε τι οὐσα (perhaps comment on Ross' suggestion οὐ τόδε τι καὶ οὐσία); question about τὸ ἔσχατον, is it only the first subject that is not a this, or (as seems more likely) every subject of a substantial predicate?; note on καθόλου/καθ' οὐδ. see how much of this I talked about in IIβ2. I think my attention to textual issues has been growing in the course of writing, thus some unevenness

10); then, calling explicitly on Δ11's distinction of senses of priority, he breaks this down into three different claims: "ἐνέργεια is prior to every such [δύναμις in the broad sense] both in λόγος and in οὐσία, and in time it is [prior] in one way and not in another" (b10-12). The most important claim is about priority in οὐσία, since this is the crucial test for the ἀρχαί that are the objects of wisdom. But Aristotle has good reasons for discussing priority in time and in λόγος as well. The physicists justify their ἀρχαί by arguing that they are prior in time to everything else, and Platonist dialecticians justify their ἀρχαί by arguing that they are prior in λόγος; and Aristotle thinks that the physicists' ἀρχαί usually, and the dialecticians' ἀρχαί at least sometimes, are δυνάμεις or δυνάμενα causes rather than ἐνέργειαι or ἐνεργοῦντα causes. So it is important for Aristotle to undermine the claims of δύναμις to be prior in time or in λόγος, in order to show that his opponents' arguments do not succeed, on the opponents' own terms, in establishing the priority of δύναμις.

Perhaps the easiest case, certainly the one Aristotle wastes least time over, is priority in λόγος. "That [ἐνέργεια] is prior in λόγος is clear: for what is in the primary sense δυνατόν [= capable] is δυνατόν through being able to act [τῷ ἐνδέχεσθαι ἐνεργῆσαι]--for instance, I call housebuilder what is able to housebuild [λέγω οἰκοδομικὸν τὸ δυνάμενον οἰκοδομεῖν], and sighted what is able to see, and visible what is able to be seen: the account is the same in all cases, so that necessarily the λόγος [of the ἐνέργεια] must exist prior to the λόγος [of the δύναμις],<sup>10</sup> and the knowledge to the knowledge" (1049b12-17). Aristotle rushes through this, almost in a parenthesis, on the way to the more controversial question of priority in time. What it is for one person to be a housebuilder and another a fluteplayer (or for one ἔξις to be the art of housebuilding and another to be the art of fluteplaying) is for one to be able to build houses and the other to be able to play flutes. And Aristotle's scientific program depends on analyzing natural powers analogously to the arts. This applies most obviously to psychic powers such as the senses: in Aristotle's example here, for something to be sighted [ὄρατικόν] is for it to be able to see [ὄρᾶν], using the same construction of adjectives in -ικός and nouns in -ική so commonly applied to artisans and arts. According to the program of the *De Anima*, Aristotle analyzes the soul as a series of powers (τὸ αἰσθητικόν and so on), and describes each power by describing its ἐνέργεια (τὸ αἰσθάνεσθαι), "since the ἐνέργειαι and πράξεις are prior in λόγος to the powers" (DA II,4 415a18-20, cf. a14-22)--rather than trying to say what the soul is by finding its substratum, and concluding that it is a fire or a self-moved number or a blend of Being and Sameness and Difference. And many qualities in non-living things are also to be analyzed as powers, and described by describing their ἐνέργειαι: as Aristotle says here in Θ, the visible is what is able to be seen, which can be filled out by analyzing a color as a power to move a transparent medium and thereby move the organ of sight so as to actualize the power of sight. Aristotle is here defending one side in an internal Academic debate with both logical and teleological aspects: is a ἔξις valued for the sake of, and defined by reference to, its ἐνέργεια, or, rather, is the ἐνέργεια valued for the sake of the ἔξις and defined as what results from the ἔξις or is necessary for acquiring or maintaining it?<sup>11</sup> Thus while for Aristotle the aim of human life is rational activity, and the virtues are by definition whatever ἔξεις enable such activity (NE I,7 1098b5-18), Plato says that just actions are those actions which tend to preserve justice as a

<sup>10</sup>accepting Jaeger's supplement τὸν λόγον <τοῦ λόγου> προϋπάρχειν. if we keep the transmitted text, this must of course be implicitly understood

<sup>11</sup>Aristotle gives a manifesto-like statement of his position already in *Protrepticus* B79-84: if the same term is applied in a δύναμις-sense and in an ἐνέργεια-sense, it will be applied in a stronger sense to what is ἐνεργοῦν. In context this seems to imply both that the ἐνέργεια sense is prior in λόγος and that, assuming both the δύναμις and the ἐνέργεια are valuable, the ἐνέργεια is more valuable and the δύναμις is valued for the sake of the ἐνέργεια.

condition of the soul, as healthy actions are those actions which tend to preserve health as a condition of the body: he implies both that justice is prior in definition to just actions, and that just actions are valued on account of the virtue rather than *vice versa* (*Republic* IV 444c1-445b4). Plato would presumably concede that if (e.g.) a virtue were defined as a δύναμις, it would be posterior in definition to its ἐνέργεια, but he would say that the essence of virtue is not being a δύναμις but being a good condition of the soul, where this can be spelled out, say, as a harmony; Aristotle thinks that this kind of definition is hopeless, and that we can give a scientific treatment of souls, virtues, and so on, only by defining them as δυνάμεις and spelling out what ἐνέργεια they are for.

Turning to priority in time, Aristotle concedes that the physicists are right in a sense, namely in the sense that prior to any given man, or seeing thing, in ἐνέργεια, there was something that was a man or a seeing thing only δυνάμει (Θ8 1049b19-23).<sup>12</sup> A physicist might infer that what there was before the world was the world only δυνάμει, and that the various things present in that initial condition were only δυνάμει the various things now present in the world. But, Aristotle says, "the ἐνεργοῦν, which is the same in species but not in number, is prior" (1049b18-19).<sup>13</sup> prior to this man Socrates there was a seed that was only potentially Socrates and only potentially a man, but prior again to this there was the generator, Sophroniscus, who was a man in ἐνέργεια. Aristotle refers back explicitly to his discussion of coming-to-be in Z7-9 (ἐν τοῖς περὶ οὐσίας λόγοις, 1049b27-8; he gives a close paraphrase of the first sentence of Z7), and, rephrasing it in the language of δύναμις and ἐνέργεια, gives the general formula that "what exists in ἐνέργεια comes-to-be out of what exists in δύναμις by the agency of [ὑπό] what exists in ἐνέργεια" (1049b24-5). Sometimes, however, Aristotle seems to be using the stronger thesis that when something comes-to-be X, an efficient cause which is already actually X must exist, not just before the actual X that comes-to-be, but even before the potential X which is the material cause of the actual X that comes-to-be. Aristotle has a right to this stronger thesis if X is a plant or animal, where the appropriate matter of an X (e.g. the seed of a plant, the egg of a bird, perhaps the katamenia or the embryo for an mammal) is something species-specific that can only be produced by the form of an X,<sup>14</sup> but not if X is an artifact or a mineral or one of the four so-called elements. The weaker thesis (any actual X that comes-to-be must be preceded by an efficient cause which is already actually X) is enough to show that the ἀρχαί cannot include merely a potential X without an actual X, but we would need the stronger thesis to show that a potential X cannot be among the ἀρχαί at all, that actual-X is prior to potential-X and cannot be merely simultaneous. However, this does not cause too much practical trouble for Aristotle's argument that a potential-X is not among the ἀρχαί, since no one is seriously going to propose potential-bed or potential-clay, under those descriptions, as ἀρχαί (as Anaxagoras did apparently propose seeds of plants and animals), although of course they might propose material elements to which it incidentally belongs to be potentially clay or bed. Someone might propose potential-earth as an ἀρχή, not just in the sense that water is an ἀρχή and it is incidental to water to be potentially earth, but in the sense that that the ἀρχαί include a prime matter whose essence is exhausted by being potentially earth, potentially water, potentially air and potentially fire. Aristotle's arguments here could legitimately establish only that such a prime matter could not be

<sup>12</sup>Aristotle deliberately gives both οὐσία and action/passion examples: he also gives here the example of grain, and he seems to be deliberately echoing the end of Δ7, where both seeing and grain are among the examples

<sup>13</sup>or perhaps "what ἐνεργεῖ the same thing in species is prior, but not [what ἐνεργεῖ the same thing] numerically"

<sup>14</sup>if the matter is the katamenia, it will be Phainarete, rather than Sophroniscus, who will have to exist prior to what is potentially Socrates (the text does not explicitly say the male parent, but that is what Aristotle seems to mean; but it is difficult to fit what he says here with the controversial details of his own theory of animal generation)



temporally prior to earth, water, air and fire; they could all be simultaneously co-eternal, and Aristotle thinks that this is in fact the case. He still thinks that prime matter is not in the strict sense an ἀρχή, but this is because it is posterior in οὐσία, and cannot be established on the basis of arguments about priority in time.

Aristotle applies what I have called the "weaker thesis" (any actual X that comes-to-be must be preceded by an efficient cause which is already actually X) not only to substantial species but also, more dubiously, to habit-types such as being an artisan, and activity-types such as practicing an art. Thus someone cannot become a housebuilder unless there was a prior housebuilder to teach him the art (the example is μουσικός, 1049b24-7). Further, the teacher cannot pass on the art unless he somehow exercises it (even if he can pass it on purely orally, that is still an exercise of the art): so any exercise of the art of housebuilding becomes possible only through a prior exercise of the art of housebuilding. In fact, Aristotle says, for a teacher to pass on to me the art of housebuilding, it is not enough for him to exercise the art in my presence: I must exercise it too. This threatens an absurd regress, and the impossibility of ever learning an art, if "it is impossible to be a housebuilder without having [already] housebuilt anything" (1049b29-30). All Aristotle says here by way of a solution is that the learner already has the art of housebuilding to some degree, so that it is not absurd that he should build houses, and become a fully-fledged housebuilder through building them. To use Aristotle's terms from elsewhere, first he οἰκοδομεῖ not οἰκοδομικῶς, that is, not τεχνικῶς, and then he becomes a full οἰκοδόμος, able to οἰκοδομεῖν τεχνικῶς and οἰκοδομικῶς.<sup>15</sup> Presumably at the beginning he builds under the orders of (or actually having his hands guided by) the teacher, so that his act of housebuilding is at the same time his teacher's act of housebuilding and an exercise of his teacher's art, and then he becomes able to housebuild in an exercise of his own art. (All this is important, not just because Aristotle will come back to the example for a deeper lesson later in Θ8, but also because he thinks of animal generation on this model: initially the male seed moves the katamenia in the appropriate way from without, and then as the embryo develops from the katamenia it "learns" to move in the appropriate way from its own internal disposition, and this is just what it is for it to acquire a soul and so become an actual animal of the species.<sup>16</sup>) So both the first ἐνέργεια and the second ἐνέργεια of housebuilding will come about only through a prior ἐνέργεια of the same type, and so the first ἐνέργεια will be at least as old as the first δύναμις, and the second ἐνέργεια will be at least as old as the first ἐνέργεια. Or so Aristotle's story goes. We might complain that this account of learning makes progress in the arts impossible. The complaint seems particularly serious, given that Aristotle elsewhere accepts a story of cyclical catastrophic destructions of civilization, followed each time by a gradual reconstruction of the arts and sciences; philosophy, in particular, has made rapid progress and come almost to completion in Aristotle's own time.<sup>17</sup> I am not at all sure how Aristotle would respond to this complaint. But even here, he thinks that the progress of the arts is cyclical, so that the perfect arts were preceded by imperfect arts which were preceded by earlier perfect arts before the last flood or fire, and there was never an ἀρχή-condition with only imperfect arts. And of course Aristotle's thesis remains safe at a more generic level: even if there can be an exercise of this art when there was no prior exercise of this art, still there can be no motion unless there

<sup>15</sup>reference in the NE. also note the terms in which Aristotle frames the sophism, and source/parallel in the Euthydemus.

<sup>16</sup>for fuller discussion of this, and of the soul-art analogy in general in Aristotle, see my "Aristotle's Definition of Soul and the Programme of the De Anima," in OSAP

<sup>17</sup>refs; for the latter bit see Ross Fragmenta Selecta pp.37-8

was previously a motion of some type.

In context, these issues are important for Aristotle because of his running argument with the physicists, and especially with Anaxagoras, who thinks that in the beginning there were no actual plants or animals but only their seeds, and no actual motion, and also no νοῦς in (second) ἐνέργεια but only a not-yet-exercised δύναμις. Aristotle's discussion here is quite incomplete: he says nothing, for instance, about privations or about things that come-to-be by chance or spontaneity, presumably because Z7-9 is the official discussion of the whole issue, but also because no one is seriously claiming that δυνάμεις (*per se*) for these things are among the ἀρχαί, and Aristotle is making no counterclaim that the ἐνέργεια of these things are among the ἀρχαί. Aristotle's fundamental point is that an account that begins with δυνάμεις or δυνάμενα causes and then describes how their ἐνέργεια subsequently emerge, while it is sufficient for people who are merely telling a story, is scientifically inadequate: we need to explain *why* the ἐνέργεια emerge (e.g. why does the ordered world emerge out of a previous quiescent state? why now and not sooner?), and mere δυνάμεις or δυνάμενα causes are insufficient to explain the actual existence or occurrence of their effects: this requires something already ἐνεργοῦν. Aristotle thus rejects any description of the ἀρχαί as literal or metaphorical seeds: "those who maintain, like the Pythagoreans and Speusippus, that the finest and best is not in the beginning [ἐν ἀρχῇ], on the ground that the ἀρχαί also of plants and animals are causes [of what is fine etc.], but that what is fine and perfect/complete [τέλειον] is in what is *out-of* these ἀρχαί, are mistaken. For the seed is out-of other perfect/complete prior [plants or animals], and what is first is not seed but the perfect/complete [plant or animal], as one would say that man is prior to the seed, not the [man] that comes-to-be out-of the seed, but another one out-of which the seed [comes-to-be]" (A7 1072b30-1073a3).<sup>18</sup> So the world has always existed with each species present in ἐνέργεια, and in each species there is an eternally repeated cycle of δύναμις and ἐνέργεια; and Aristotle will argue (for reasons to be discussed in IIIβ2 below) that the perpetuation of this cycle within each species requires a cause which is always ἐνεργοῦν, namely the heavenly bodies: "in time one ἐνέργεια precedes another, up to the ἐνέργεια of the first eternal mover" (Θ8 1050b4-6).<sup>19</sup> Thus by a critical examination of the physicists' account of the ἀρχαί, Aristotle undermines the conception of the ἀρχαί as what existed temporally prior to everything else. There is nothing that existed before everything else, except for eternal things such as the heavenly bodies; and even the heavenly bodies, although they existed before any given horse, did not exist before the species horse, so that even the priority of eternal things to non-eternal things is a priority in οὐσία and not in time.

Aristotle's denial of an initial state of the universe is very important in undermining the narrative conception of the ἀρχαί as what there was in the beginning, and thus in undermining the narrative model of science, which explains how things are by showing how they arose from that initial state. And this is needed in order to open up the possibility that the actual X is prior (in a non-temporal, non-narrative way) to the potential X, so that the science of X will begin with the actual X and then proceed to explain the potential X on its basis. Aristotle raises this question of scientific order, in the case of animals, in De Partibus Animalium I,1: as he puts it, the issue is

<sup>18</sup>at 1073a1 I read οἶον with E (with Bonitz and Ross), not οἶόν τε (JAb; a second hand in J makes it ὡς οἶόν τε), which is what Jaeger prints but which I find unintelligible

<sup>19</sup>in Aristotle's view the last phrase should really refer to an immaterial mover of the heavens, but apparently nothing in Θ8 rules out the possibility that the first heaven is itself the first mover. what matters for Aristotle's argument is that there is an eternal efficient cause regulating the cycle of generations: whether this is simply the heavens (or one particular heavenly body), or something beyond the heavens that regulates the sublunar world by means of the heavens, can be left to be determined later

"whether we should say, like those who pursued this study before us, how each thing comes-to-be rather than how each thing is" (640a10-12). His answer is that we should start with a knowledge of what each type of animal is, in the De Partibus Animalium, and only then explain how it gets that way, in the De Generatione Animalium: for "in housebuilding too, these things happen because the form of the house is such, rather than the house being such because it comes-to-be in this way. For coming-to-be is for the sake of being [οὐσία], not being for the sake of coming-to-be" (640a15-19). This contrasts with the order of explanation followed, for instance, by Empedocles, who says "that animals have many [features] because it happened [συμβῆναι] thus in generation, e.g. that they have this kind of backbone [i.e. one divided into vertebrae] because it happened to be broken when [the animal in process of formation] turned around" (640a20-22). Aristotle objects that an animal must have this kind of essential feature, not from accidents in the process of generation, but because the seed has the power to produce this feature, which is because the conspecific generator had the same feature. But since, for Empedocles, there is always a first animal of each type within a given world-cycle, there is not always a conspecific generator. So his fundamental problem is to explain that first animal; as in a traditional story of how the leopard got his spots, the main focus is not on how the spots get transmitted to later generations. Aristotle has no first animal to explain, and so he has the option of beginning with the mature animal-type and using it to explain the process of formation and the immature stages.

#### Priority in οὐσία

But how are we supposed to decide whether the mature organism or the seed, actual-X or potential-X, has priority? The issue now is not of priority in time but of priority in οὐσία. The most obvious way to decide this issue would be by Plato's test, asking which of them can exist without the other. And indeed, this is the test used by the B#14 argument for the priority of δύναμις: as Aristotle puts it in the Λ6 restatement of the aporia, "it seems that everything that is acting is capable [of acting], but not everything that is capable [of acting] is acting [τὸ μὲν ἐνεργοῦν πᾶν δύνασθαι, τὸ δὲ δυνάμενον οὐ πᾶν ἐνεργεῖν], so that δύναμις would be prior" (Λ6 1071b23-4, expanding on B#14 1003a1-2). Aristotle rejects this conclusion, so he ought to have some diagnosis of where the argument goes wrong; as we saw (in IIIα1 above), Λ6 handles this argument by referring back to Θ8 for a determination of the senses in which δύναμις is and is not prior to ἐνέργεια, and so, although Θ8 does not explicitly solve the argument, it should at least provide the basis for solving it.

For now I will consider only the case where actual-X and potential-X are not single (possibly eternal) individuals, but merely eternal types, like oak and acorn. This is the case that Aristotle is discussing at Θ8 1050a4-b6, before turning to eternal individuals at 1050b6-1051a3. As we have seen, the Θ8 discussion of priority in time argues that neither the mature organism nor the seed is temporally prior, i.e. that there was no time when potential-X existed and actual-X did not yet exist, or vice versa. But it is not just a matter of fact that neither existed without the other: neither could exist without the other, since the mature organism necessarily came from a seed, and the seed necessarily came from a mature organism. Since neither can exist without the other, Plato's test yields a tie. Now according to the Categories, if two things necessarily imply each other's existence, the tiebreaking test is that "what is in any way a cause of being to the other would be reasonably said to be prior by nature" (c12 14b12-13). Aristotle's argument at Θ8 1050a4-b6 seems to apply this test to show that actual-X is more properly the cause of being to potential-X

than vice versa, so that the tie should be resolved in favor of the priority of ἐνέργεια.

The argument is complicated and its structure is controversial. I will start by quoting it in full:

But [ἐνέργεια is prior to δύναμις] also in οὐσία, first, because the things that are posterior in coming-to-be are prior in form and οὐσία, as man [άνήρ] to child, and human [άνθρωπος] to seed (for the former already has the form and the latter does not), and because everything that is coming-to-be is proceeding toward some ἀρχή and end [τέλος] (for that for-the-sake-of-which is an ἀρχή, and the coming-to-be is for the sake of the end), and the ἐνέργεια is an end, and the δύναμις is acquired for its sake. For animals do not see in order to have sight [ὄψις = the visual power], but have sight in order to see, and likewise they have [the art of] housebuilding in order to housebuild, and theoretical [knowledge] in order to contemplate [θεωρεῖν]--they do not contemplate in order to have theoretical [knowledge], except people who are studying/exercising [μελετῶντες], and these are not contemplating except in a special sense.<sup>20</sup> Again, the matter is δυνάμει, because it would [under appropriate conditions] go into the form; whenever it is ἐνέργεια, then it is in the form. And likewise in the other cases, where the τέλος is a κίνησις: for this reason, as teachers think they have delivered the finished product [τὸ τέλος] when they have exhibited [the student] ἐνεργῶν, so nature likewise. For unless it is thus, it will be Pauson's Hermes:<sup>21</sup> for it will be unclear whether the knowledge is inside or outside, like the Hermes. For the ἔργον is a τέλος, and the ἐνέργεια is the ἔργον, and for this reason the word "ἐνέργεια" [τοῦνομα ἐνέργεια] is said in the sense of the ἔργον [λέγεται κατὰ τὸ ἔργον], and is extended [συντείνει] to the ἐντελέχεια. And since in some cases the χρῆσις is the last thing (as seeing is the last thing for sight, and nothing else comes-to-be from sight beyond this), while from some things something comes-to-be (as from [the art of] housebuilding, beyond [the act of] housebuilding, a house also comes-to-be), nonetheless in the former cases [the ἐνέργεια] is the τέλος, and in the latter cases it is more τέλος than the δύναμις is. For [the act of] housebuilding is in the house-being-built, and it comes-to-be, and is, simultaneously with the house. And of whatever things there is something else that comes-to-be beyond the χρῆσις, the ἐνέργεια of these things is in the ποιούμενον, as [the act of] housebuilding is in the house-being-built and the weaving is in the thing-being-woven, and similarly in other cases, and in general the κίνησις is in the κινούμενον. But whatever things have no other ἔργον beyond the ἐνέργεια, in these the ἐνέργεια is present (as seeing is in the seer and contemplation in the contemplator and life in the soul, so that happiness too is in the soul, since it is a kind of life). So it is clear that the οὐσία and the form are [an] ἐνέργεια. So according to this argument it is clear that ἐνέργεια is prior to δύναμις in οὐσία; and, as we have said, in time one ἐνέργεια precedes another, up to the ἐνέργεια of the first eternal mover. (1050a4-b6)

<sup>20</sup>note the textual mess; what I have above renders Jaeger's text. neither this solution nor any other satisfies me. Ross has a good discussion of different possibilities ad locum; at the moment I have no further possibilities or further considerations to add

<sup>21</sup>apparently some sort of trick painting, see Ross ad loc. (against pseudo-Alexander)

There is a structural problem here about the relation between 1050a4-7 ("But [ἐνέργεια is prior to δύναμις] also in οὐσία, first, because the things that are posterior in coming-to-be are prior in form and οὐσία, as man [ἄνθρωπος] to child, and human [ἄνθρωπος] to seed (for the former already has the form and the latter does not)") and the remainder 1050a7-b6. Bonitz, following the pseudo-Alexander, thinks that 1050a4-7 are a complete short argument for the main conclusion that ἐνέργεια is prior to δύναμις in οὐσία, so that 1050a7-b6 would be a much longer but formally parallel argument for the same conclusion; in support of this reading, "and because" [καὶ ὅτι] in a7 seems to pick up "first, because" [πρῶτον μὲν ὅτι] at the beginning of the passage in a4, so that they would naturally introduce two parallel arguments. But despite various plausibilities, I think that this reading must be wrong, and that there is only a single continuous argument in 1050a4-b6 for the conclusion that ἐνέργεια is prior to δύναμις in οὐσία. To begin with, 1050a4-7 would at best be very elliptical as an argument that ἐνέργεια is prior to δύναμις, since it never uses the words "ἐνέργεια" or "δύναμις". Perhaps it simply takes for granted that the form that distinguishes human being from seed is an ἐνέργεια, so that if human being is prior to seed, ἐνέργεια is prior to δύναμις; but Aristotle seems to have to argue for this conclusion later in the passage ("so it is clear that the οὐσία and the form are [an] ἐνέργεια", 1050b2-3). Another difficulty for Bonitz' reading is that the premiss introduced right after 1050a4-7 ("because everything that is coming-to-be is proceeding toward some ἀρχή and end [τέλος]", 1050a7-8) seems to duplicate the thesis of 1050a4-7 that "the things that are posterior in coming-to-be are prior in form and οὐσία", rather than adding a new premiss that might be the starting-point of an independent argument. To say that the final state toward which coming-to-be proceeds is also the ἀρχή of what was coming-to-be is just to say once more that what is posterior in coming-to-be is prior in οὐσία to what was temporally prior: there are two different justifications in 1050a4-7 and 1050a7-9, but they seem to be justifying the same conclusion. And that Aristotle does not distinguish the two conclusions is confirmed by the parallel in Physics VIII,7, "it seems in general that what is coming-to-be is incomplete [ἄτελες = lacking a τέλος] and going toward an ἀρχή, so that what is posterior in coming-to-be is prior in nature" (261a13-14), where the argument is the argument of 1050a7-9 but the conclusion is the conclusion of 1050a4-7. For these reasons, I think Bonitz is wrong to divide 1050a4-b6 into two arguments at 1050a7; rather, it is one long argument with its main internal division after 1050a9 "and the ἐνέργεια is an end." The first part, 1050a4-9, says nothing about ἐνέργεια, but argues for the thesis that the developmentally later stage (the τέλος) is the ἀρχή of the developmentally earlier stages, i.e. is prior to them in οὐσία, since it is that for the sake of which they come about; then 1050a9-10 states the thesis that the ἐνέργεια is the τέλος for the sake of which the δύναμις is acquired, and 1050a10-b3 argues for this thesis, both in substance and in non-substance cases; then Aristotle puts the two theses together to conclude that the ἐνέργεια, since it is the τέλος, is prior to the δύναμις in οὐσία.<sup>22</sup>

Aristotle goes very quickly through the first part, 1050a4-9, arguing that "the things that are posterior in coming-to-be are prior ... in οὐσία." Aristotle cites this slogan, with slight variations, in a number of texts,<sup>23</sup> he seems to expect his readers or hearers to recognize it and accept it, and

<sup>22</sup>question about where πρῶτον μὲν at 1050a4 is picked up, if not as Bonitz supposes at 1050a7 καὶ ὅτι. In one sense the answer must be ἀλλὰ μὴν καὶ κυριώτερος all the way down at 1050b6. But internally to 1050a4-b6, 1050a9 τέλος δὲ ἢ ἐνέργεια also seems to take up the initial πρῶτον μὲν. But if 1050a7 καὶ ὅτι does not pick up 1050a4 πρῶτον μὲν ὅτι, why does a7 have ὅτι at all, and not just καὶ? (Can "because X and because Y" just mean "because X and Y"?)

<sup>23</sup>besides Physics VIII,7 261a13-14 cited just above, the same slogan is at Metaphysics A8 989a15-16 and M2 1077a18ff (twice) and Generation of Animals II,6 742a19-22

he does not feel that he needs to argue for it fully here, but only to remind us of its main grounds. But some comments may be helpful to clarify such arguments as Aristotle gives in 1050a4-9.

Clearly the claim that "the things that are posterior in coming-to-be are prior in form and οὐσία" needs some restriction: decaying tooth is not prior in οὐσία to healthy tooth, and flute-playing man is not prior in οὐσία to man. But Aristotle seems to be restricting his attention to cases of the natural coming-to-be of something in its normal mature state. The argument of 1050a7-9 is causal, that is, it applies the causal test to break the tie left by Plato's test: neither the mature nor the immature state can exist without the other, but the mature state is the final cause of the existence of the immature state. It is obvious that what is coming-to-be "is proceeding toward some ... τέλος", where "τέλος" at the outset just means "the final state of the process"; the controversial and paradoxically emphasized claim is that this τέλος is also an ἀρχή, i.e. that it is not just posterior in time but also prior in οὐσία.<sup>24</sup> The middle term for proving this claim is "for-the-sake-of-which": "the coming-to-be is for the sake of the τέλος", but "that for-the-sake-of-which is an ἀρχή"--because it is the cause of the existence of what is for its sake--and therefore the τέλος is an ἀρχή. By contrast, the argument of 1050a4-7 turns on the claim--not explicitly causal--that the final state of the process of coming-to-be "already has the form" and is therefore prior in οὐσία. This argument makes best sense if it is restricted to cases of coming-to-be in the category of substance. But even with this restriction, the argument is making some strong assumptions: it seems natural to say that the seed does not yet have the form of a human being, but strange to say that a child does not yet have the form of a human being. But we can gloss this by saying that to have the form of X (where X is some kind of plant or animal) is to have the relevant (second) δυνάμεις and the organs to exercise them, and that an immature member of the species, which has not yet acquired all of these δυνάμεις and organs, does not fully possess the form of X. However, the deeper problem is what Aristotle means by saying that what already has the form of some substance-type is "prior in form and οὐσία" to what does not. Aristotle apparently intends this to be tautologically obvious, but if it is tautological, it seems that it can conclude only to a priority of honor: what has the form is "higher-ranking" with respect to form than what does not have the form, or what has it only partially. But then it seems impossible to justify the inference from "priority in form" in this sense to priority in οὐσία, if that means, as elsewhere, that the posterior thing is dependent in being on the prior. However, Aristotle probably means to be relying on the conclusion of Θ7 that the subject of which some substance is predicated (and thus the subject which comes-to-be that substance) is not τότε τι; and if so, he may be able to justify a more robust sense of priority in οὐσία. If "statue" is a

<sup>24</sup>this comes out in the word-order, placing all the emphasis on ἀρχή (ὅτι ἅπαν ἐπ' ἀρχὴν βαδίζει τὸ γινόμενον καὶ τέλος). it looks as if Aristotle may be deliberately taking up a Platonist argument, alluded to very quickly in B#8 (and discussed in Iβ3 above) that if something is coming-to-be X, the οὐσία X which it is coming-to-be must already exist; I distinguished a "logical" from a "teleological" interpretation of that argument, and Aristotle would now be endorsing a version of the "teleological" argument, but as supporting only the priority in οὐσία of the form = the τέλος of coming-to-be, not its temporal priority. Aristotle may also be picking up a line of thought from Z7 1032b6ff: in the artificial production of (say) health, the agent reasons: for health to come-to-be, X must come-to-be; for X to come-to-be, Y must come-to-be; and so on, until he reaches some Z that is in his immediate power to produce, and then he produces Z and then Y and X until he reaches health; and apparently something analogous is supposed to happen in natural production, at least in the generation of plants and animals. here the τέλος of the coming-to-be is the ἀρχή of the reasoning, and the beginning of coming-to-be is the endpoint of the reasoning, and furthermore it seems that the priority of the τέλος of coming-to-be is not just a logical priority in the reasoning, but also a priority of the οὐσία to its material conditions. but much is obscure here, and I hope that the argument in Θ8 does not hang on any detailed interpretation or development of the ideas from Z7. (with the Z7 passage cp. also NE 1112b19ff)

genuine substance-term, then the bronze which becomes a statue is not τὸδε τι and therefore does not exist καθ' αὐτό but only parasitically on something else that is brazen, so that statue will be prior to bronze in οὐσία. Once again this argument breaks a tie left by Plato's test, although not explicitly by invoking causality; however, we can put it in causal terms by saying that if bronze exists because the statue exists and is brazen, then the statue is the cause of existence to the bronze and therefore is prior to it in οὐσία. But it is not so easy to apply this argument to the more important biological case: if human being comes-to-be from seed (whether this means the male seed, the katamenia, or the embryo), or chicken from egg, or man from child, does the seed/egg/child exist only because something else exists and is seedy/eggy/childish? We might try saying that for an embryo to exist is just for the mother to exist and to be pregnant, since an embryo cannot be alive (thus cannot exist as an embryo) by itself, but only as part of the mother's body, since the embryo does not yet have an internal principle capable of sustaining life on its own. But it is harder to extend this kind of argument to the case of a bird's egg, and hopeless to extend it to the child. But, as we have seen, it makes sense to say that an immature X does not yet fully possess the form of X, since it does not yet have all of the δυνάμεις and organs characteristic of an X. Nor does the immature X have some other form instead of the form of X; rather, for an immature X to be is for it to be an X, but an ἄτελες one; where what it is for it to be an X can be spelled out only by reference to what a mature/τέλειον X would be. So the analogy between (say) "kitten" and "bronze" is that, as for bronze to exist is for some substance to exist and be brazen, so for a kitten to exist is for a cat to exist and be kittenish, i.e. be immature/ἄτελες. The reason why we can say that a kitten is just an immature cat, and infer that kitten is posterior to cat in οὐσία, whereas we cannot say that a cat is just a superannuated kitten, and infer that cat is posterior to kitten in οὐσία, is that "cat," not "kitten," is the substance-term; and this is because "cat" signifies the form, i.e. the set of δυνάμεις and organs directed to the survival of the individual and of the species, in which the οὐσία of a living thing consists.

The larger part of the passage 1050a4-b6, namely 1050a9-b6, gives arguments that the ἐνέργεια is the τέλος of the δύναμις, or, where it fails to be the τέλος, at least that it is closer to the τέλος than the δύναμις is. Aristotle distinguishes two cases, roughly Θ6's distinction between ἐνέργεια in the category of κίνησις and ἐνέργεια in the category of substance (where the δύναμις is the matter); some of the arguments in 1050a9-b6 apply to only one of these cases, or apply in the first instance to one and then are extended to the other. Another distinction is that some of the arguments in 1050a9-b6 argue directly that the ἐνέργεια is a τέλος (or that the δύναμις is for the sake of the form), which, together with the conclusion of 1050a4-9 that the τέλος is prior in οὐσία, yields the ultimate conclusion that the ἐνέργεια is prior to the δύναμις in οὐσία. Some of the arguments, however, argue that "the οὐσία and the form are [an] ἐνέργεια", which, together with the premisses that the form is a τέλος and that the τέλος is prior in οὐσία, or with the implicit premiss of 1050a6-7 that what has the form is prior in οὐσία to what does not, again implies that the ἐνέργεια is prior in οὐσία; but this kind of argument applies only to ἐνέργεια in the category of substance.

Aristotle begins at 1050a10-14 with κίνησις-cases, and specifically with his favorite examples (favorite since the Protrepticus) of cognitive powers, the senses and the arts and sciences: these are the cases where even those Academics who believe that the human good is the ἕξις of virtue will find it hardest to resist his conclusion that the δύναμις is desirable for the sake of the ἐνέργεια rather than vice versa. Then Aristotle extends gradually into more controversial cases. The argument at 1050a15-16 applies only to substances. "The matter is δυνάμει, because it

would go into the form," since, as we saw in Θ7, X is δυνάμει Y if it would under the appropriate external circumstances become Y; this sense of δύναμις must be said in relation to some ἐνέργεια, which can only be the form of Y, i.e. what something has when it is already actually Y. This is an argument that (in substance-cases) the ἐνέργεια is the form, but, since the form is obviously the τέλος, it can also be put as an argument that in these cases the ἐνέργεια is the τέλος. Aristotle next claims that in κίνησις-cases too, the ἐνέργεια is the τέλος: this is why teachers think they have delivered the τέλος when they have exhibited the student ἐνεργῶν on his own, since otherwise it will be unclear whether the student has really acquired the knowledge as an internal principle enabling him to ἐνεργεῖν on his own, or whether his repeating lessons and going through exercises are ἐνέργειαι of his teacher's knowledge rather than his own,<sup>25</sup> "nature likewise," since the formation of an embryo is a similar process of "training" it until it can perform its vital activities from an internal principle and no longer needs to be guided by the male seed or nourished by the mother's blood.

Aristotle then says, generalizing from these cases: "for the ἔργον is a τέλος, and the ἐνέργεια is the ἔργον, and for this reason the word 'ἐνέργεια' [τοῦνομα ἐνέργεια] is said in the sense of the ἔργον [λέγεται κατὰ τὸ ἔργον], and is extended [συντείνει] to the ἐντελέχεια". It is always true that the ἔργον, the work or thing accomplished, is a τέλος, and the ἐνέργεια is in each case; but it is going beyond this to say that "the word 'ἐνέργεια' is said in the sense of the ἔργον, and is extended to the ἐντελέχεια". It is one thing to say that every ἐνέργεια is an ἔργον, another to say that every ἔργον is an ἐνέργεια; but--Aristotle is now saying--since some ἔργα, namely those in the category of κίνησις (or the categories of ποιεῖν and πάσχειν) are ἐνέργειαι, the word "ἐνέργεια" can be extended or transferred to all ἔργα, i.e. to actualities in all categories including substance. (The basis for this extension will be the analogy described in Θ6: ἔργα in all categories stand in the same proportion to their δυνάμεις that ἐνέργειαι in the strict sense do to δυνάμεις for action or passion.) What Aristotle means by saying that the word 'ἐνέργεια' is extended to the ἐντελέχεια is clear from the parallel in Θ3: "the word 'ἐνέργεια', which is applied to the ἐντελέχεια [ἢ ἐνέργεια τοῦνομα, ἢ πρὸς τὴν ἐντελέχειαν συντιθεμένη], has been extended [ἐλήλυθε] to other things too from [applying to] κινήσεις especially" (1047a30-31). The point is not simply, as Ross' translation has it, that the word "ἐνέργεια" is etymologically derived from "ἔργον", but rather that the word "ἐνέργεια" is extended so as to become coextensive with "ἔργον", or, equivalently, with "ἐντελέχεια"--for "ἐντελέχεια" means etymologically the state of being completed or accomplished, and for this reason Θ1 had contrasted being κατὰ δύναμιν with being [κατ' ] ἐντελέχειαν καὶ κατὰ τὸ ἔργον (1045b33-4).<sup>26</sup>

Now if every ἔργον--every accomplished work, or its state of being accomplished--is to be called an ἐνέργεια, then we have to admit that a δύναμις can have an ἐνέργεια that is external to it, i.e. that does not inhere in the same substratum in which the δύναμις inheres. But Aristotle is quite willing to admit this, in accord with his usual doctrine that the ἐνέργεια of the agent and the patient are the same and that they are in the patient (if the motion were in the mover rather than in the thing moved, there could be no unmoved movers). At the same time, there is an awkwardness in the way he is forced to express this. He speaks of things that "things have no other ἔργον beyond the ἐνέργεια" and of things that do have a further ἔργον, but if the

<sup>25</sup>an Academic opponent will protest that the ἐνέργεια is only a sign that the student has the desired knowledge, and is not itself the τέλος

<sup>26</sup>for discussion of all this, including the etymology of "ἐντελέχεια", see "The Origins of Aristotle's Concept of Energeia: Energeia and Dunamis"



ἐνέργεια of housebuilding is the house, or is in the house, in what sense is the ἔργον "beyond the ἐνέργεια"? Perhaps for this reason, at 1050a23-4 he revisits the terminology of his earliest writings and speaks of something coming-to-be "beyond the χρῆσις" rather than "beyond the ἐνέργεια": some powers we use simply for the sake of using them, while others we use in order to produce further effect.<sup>27</sup> In the case of a passion, or an intransitive action like walking, the χρῆσις or ἐνέργεια is the τέλος; in a transitive action like housebuilding, this χρῆσις is at least closer to the τέλος than the δύναμις is: we have the δύναμις in order to use it, and we use it in order to produce the ἔργον. "But whatever things have no other ἔργον beyond the ἐνέργεια, in these the ἐνέργεια is present," and this includes the case of the matter as δύναμις to the form, where there is no further ἔργον: so "the οὐσία and the form are [an] ἐνέργεια", and are the τέλος for the sake of which the δύναμις is acquired, and therefore are prior to it in οὐσία, as was to be shown.

### Absolute priority, eternal things, and the ἀρχαί

There remains the claim that ἐνέργεια is absolutely [κυριωτέως, 1050b6] prior to δύναμις in οὐσία, that is, prior with the priority of an eternal individual to temporal things and not merely with the priority of one eternal type, instantiated by temporal things, to another. Only this "absolute" priority leads to the ἀρχαί of first philosophy, although the discussion of non-absolute priority in οὐσία is very important, not just for determining what "ἀρχαί" physics (e.g. the account of the generation of animals) should begin from, but also for eliminating things that claim to be ἀρχαί absolutely, and for showing where the Plato's test argument for the priority of δύναμις goes wrong.

Formally, Aristotle's main argument in this section (1050b6-34) is as follows: "eternal things are prior to corruptible things in οὐσία" (1050b6-7); "but nothing δυνάμει is eternal" (b7-8, and then supported further down), so that eternal things are not δυνάμει but purely ἐνεργεία; so ἐνέργεια is an attribute of things that are prior to the things of which δύναμις is an attribute, and therefore ἐνέργεια is prior to δύναμις (using the sense of priority at Δ11 1018b37-1019a1). That eternal things are prior to corruptible things is uncontroversial, assuming that there are eternal things, and it is also uncontroversial that if we can find ἀρχαί (in the strict sense), they will be eternal and will be prior to everything else; the priority of eternal things, including the ἀρχαί, to corruptible-things-in-general will be priority only in οὐσία and not also in time, if there was never a time when there were no corruptible things. And a suggestion of how to look for the ἀρχαί, with the implied suggestion that we should abandon the search for ἀρχαί that are temporally prior to everything else, has just come in the last few lines of the preceding section: "as we have said, in time one ἐνέργεια precedes another, up to the ἐνέργεια of the first eternal mover" (1050b4-6, with reference back to the argument that ἐνέργεια and δύναμις are each in different ways temporally prior, 1049b17-1050a3). Since each corruptible living thing is generated by a temporally prior conspecific corruptible living thing, and so back ad infinitum, there is no hope of reaching an ἀρχή by going further back in time; "the first eternal mover"--more literally, the thing which is always primarily moving (something else) ([ἡ ἐνέργεια] τοῦ ἀεὶ κινουῦντος πρώτως)--will be found not as a first in the series of ancestors, but as a cause which operates simultaneously with the entire series, and which is a primary cause sustaining the existence and operation of the series of corruptible causes. That there must be such a cause is not

<sup>27</sup> on "revisiting the terminology of his earliest writings," note that the present passage very closely echoes EE II,1 1219a11-18

argued here, but elsewhere, notably in Physics VIII,6, Aristotle does make the argument that an eternal cycle of generation requires an eternal sustaining cause, and he will draw on this argument in Metaphysics Λ.<sup>28</sup> This argument from the Physics is not in the first instance to an eternal unmoved mover, but just to eternally moving heavenly bodies ("a man is generated by a man and by the sun"), and here too in Θ8 1050b6-34 the heavenly bodies are the main examples of eternal things. But naturally Aristotle is also thinking of what eternally moves the heavenly bodies, which he will invoke when he applies the results of Θ8 to the question of the ἀρχαί in Λ6.

Since it is uncontroversial that eternal things are prior, and since Aristotle does not fill in the argument here for the existence of ἀρχαί or of eternal things, his main burden here is to explicate and defend the claim that eternal things are not δυνάμει; what he says on this head will also feed directly into Λ6's argument, in answer to B#14, that the ἀρχαί are not δυνάμει.

The argument that eternal things are not δυνάμει turns on the claim that "every δύναμις is simultaneously for the contradictory" (1050b8-9). As we noted above in discussing Θ2, Aristotle claims this in a strong sense for rational powers (such as arts), but in a weaker sense for all powers, since an active power will produce its effect only when conjoined with the correlative passive power (and conversely), and otherwise they will yield the contradictory effect.<sup>29</sup> So, since "it is possible [ἐνδέχεται] for everything that is δυνατόν not to ἐνεργεῖν" (1050b10-11, very similarly Λ6 1071b13-14 and b23-4, cp. B#14 1003a2), then "it is possible for what is δυνατόν-to-be ... not to be" (1050b11-12, paralleled Λ6 1071b19 and b25-6, cp. B#14 1003a2-4). The basic point is the point that much of Θ is designed to convey, that a δύναμις is not a sufficient reason for something to actually be; so, at a minimum, there is no reason to expect something that is merely δυνατόν-to-be to be eternal. Here, as in Λ6, Aristotle draws the stronger conclusion that something that is merely δυνατόν-to-be will not be eternal (if an eternal moving principle "ἐνεργήσει, but its οὐσία is δύναμις", then "motion will not be eternal, since it is possible for what-is-δυνάμει not to be," Λ6 1071b17-19); perhaps he is relying on a principle that every δύναμις that persists for infinite time will at some time be exercised, or perhaps he is merely drawing on some form of the principle of sufficient reason.<sup>30</sup> But an at least equally dubious and equally important step in the argument comes in the initial claim that "every δύναμις is simultaneously for the contradictory." After all, we might well think that actually being implies being able to be [δύνασθαι εἶναι], so that the eternal things, or the ἀρχαί, would possess δύναμις as well as ἐνέργεια, in which case ἐνέργεια would have no priority over δύναμις. Indeed, the assumption that actuality implies potentiality is probably implicit in B#14's Plato's test argument for the priority of δύναμις (1003a1-2), and the assumption is made explicit when the argument is restated in Λ6: "it seems that everything that is acting is capable [of acting], but not everything that is capable [of acting] is acting [τὸ μὲν ἐνεργοῦν πᾶν δύνασθαι, τὸ δὲ δυνάμενον οὐ πᾶν ἐνεργεῖν], so that δύναμις would be prior" (1071b23-4). Here in this section of Θ8 (as in the other sections) Aristotle is offering a way to defuse this Plato's test argument. Aristotle is claiming that, in one sense of δυνατόν, whatever is δυνατόν-to-be is also δυνατόν-not-to-be, so that eternal and necessarily existing things do not have δύναμις. His thought here can be filled out somewhat from De Interpretatione c13: there, in the course of defending the claim that necessary-to-be implies δυνατόν-to-be, against the objection that δυνατόν-to-be implies δυνατόν-not-to-be and therefore contradicts necessary-to-be, Aristotle

<sup>28</sup>references, in Aristotle and to IIIβ2. also cite GC II,9-11?

<sup>29</sup>drawn on here 1050b30-34, a nice example of the use of Θ1-5's theory of powers in Θ6-9. on Θ2 see IIIα2 above

<sup>30</sup>cross-ref parallel discussion of Λ6 in IIIβ2b

says that "'δυνατόν' is not said in only one way, but is true in one case as being in actuality [ἐνεργεία], e.g. it is δυνατόν to walk because it is walking, and in general δυνατόν to be because it is already in actuality what it is δυνατόν [to be]; in another case, because it would ἐνεργεῖν [under appropriate circumstances], e.g. δυνατόν to walk because it would walk" (23a7-11). In the *De Interpretatione* this comes up as part of a purely logical investigation, but even here Aristotle is interested in the implications for first philosophy: "the former kind of δύναμις is in moved things alone, the latter in unmoved things as well" (23a11-13); "what is of necessity, is in actuality, so that if eternal things are prior, ἐνέργεια is also prior to δύναμις: for some things are ἐνέργεια without δύναμις, like the first substances, others [are ἐνέργεια] accompanied by δύναμις, which are prior by nature but posterior in time, and others are never ἐνέργεια but only δυνάμεις" (23a21-6). This may seem like a sleight-of-hand to get out of a difficulty: obviously there are different kinds of things which are δυνατά, e.g. eternal and corruptible things, but it is not obvious that these are δυνατά in different senses, so that there is any sense in which eternal things are not δυνατά. Nonetheless, even if Aristotle's semantic claim that there is a sense in which eternal things are not δυνατά is overstretched, his underlying metaphysical point can be defended. Since actually-X implies potentially-X but not vice versa, potentially-X would be prior in οὐσία to actually-X, if potentially-X were a single τόδε. But if potentially-X is an attribute which belongs to two different kinds of things, necessarily-X and potentially-but-not-necessarily-X, then potentially-X need not be prior in οὐσία to necessarily-X, any more than animal is prior in οὐσία to horse. Thus, in the case most important to Aristotle, potentially-moving-cause is said both of essentially-actually-moving-cause and of not-essentially-actually-moving-cause, but it is not prior in οὐσία to essentially-actually-moving-cause. The first moving cause is an essentially actually moving cause, and, being an essentially actually moving cause, it is a potentially moving cause; and so essentially-actually-moving-cause is prior. Strictly speaking, Aristotle should say not that eternal things have no δύναμις but that they have no non-actualized (or not-essentially-actualized) δύναμις; but his stretching of the terminology is natural enough, and does no harm to the content of his argument that ἐνέργεια is prior to δύναμις.

However, there is another ambiguity, of which Aristotle is well aware, in asking whether something is δυνατόν or whether it is not (merely) δυνατόν. This ambiguity was present already in the posing of B#14: when he asks whether the ἀρχαί are δυνάμει, is he asking whether they (merely) potentially exist, or whether they (merely) potentially are something further--e.g., whether they are (merely) potential causes of the things they are causes of?<sup>31</sup> Here in Θ8 Aristotle is addressing both kinds of questions: what is δυνατόν-to-be, in such a sense or manner that it can also not be, "is corruptible, either absolutely [ἀπλῶς] or in respect of what it is said to be able not to be, either in place or in quantity or quality; [to be corruptible] absolutely means in respect of substance. Therefore none of the things that are incorruptible absolutely is δυνάμει absolutely (nothing prevents its being [δυνάμει] in some respect, e.g. [δυνάμει] such-in-quality or somewhere); therefore they are all in ἐνέργεια. Nor are any of the things that are of necessity [δυνάμει absolutely]; but these are first, since if they did not exist, nothing would exist" (1050b14-19).<sup>32</sup> We might think that Aristotle is making heavy weather out of something

<sup>31</sup>I hope I discussed this in Iβ3; certainly I do in the Lille paper

<sup>32</sup>for the discussion of things that are of necessity, and the sense in which the ἀρχαί must exist of necessity, see Δ5 1015b9-15; I may give a discussion of this in Iγ. this passage in Δ5, and the connected passages in Θ8 and Λ6, are among Avicenna's inspirations for his understanding of God as that whose existence is intrinsically necessary, although of course Avicenna goes far beyond anything in Aristotle. "if they did not exist, nothing would exist" may simply mean because they cannot not exist, they satisfy Plato's test for priority to everything else; or there may be a point, as in Δ5, about their being causes of being to other things

uncontroversial, since all philosophers agree that the ἀρχαί are eternal--whether they are movable but incorruptible bodies, as the pre-Socratic physicists say, or unchangeable incorporeals, as the Academics say--and that there is no possibility of their ceasing to exist. But there are at least two further points that Aristotle wants to make. First, as Λ6 puts it, "further, these substances must be without matter, for they must be eternal, if anything else is to be eternal. So they are ἐνέργεια" (1071b20-22). That is: the matter of X is the cause of X's potentially existing, and, assuming that X currently exists, its matter is equally the cause of its potentially not existing. Consequently, if the ἀρχαί have no potentiality for not existing, they are without matter. Or, more precisely: if the ἀρχαί have no potentiality for not being absolutely, they are without substantial matter-form composition, although if, like the heavenly bodies, they have a potentiality for being in different places or in different orientations, they will still be composed of (and substantially identical with) a "matter" for local but not substantial change ("all things that change have matter, but [a] different [matter]: even those eternal things which are not generable but movable by locomotion [have a matter], not a generable [matter] but [a matter for moving] from somewhere and to somewhere," Λ2 1069b24-6). Of all these things it is correct to say that their substance is ἐνέργεια without δύναμις. Second, Aristotle is interested here also in ἐνέργεια in non-substance categories including motion. So, having said that incorruptible and necessary beings cannot be δυνάμει absolutely, he adds, "neither can motion, if it is eternal" (1050b20), making a point that will be taken up in a passage of Λ6 that we have already cited (if an eternal moving principle "ἐνεργήσσει, but its οὐσία is δύναμις", then "motion will not be eternal, since it is possible for what-is-δυνάμει not to be," 1071b17-19--the argument turns on the rule that if the cause, the moving principle, is δύναμις, then its effect, the motion, is δυνάμει ὄν). But if an eternal motion is not δυνάμει, then "nor, if there is something eternal[ly?] moved, will it be moved κατὰ δύναμιν, except [for its being moved] from somewhere and to somewhere (for nothing prevents its having a matter for this); and for this reason the sun and the stars and the whole heaven are always acting [ἐνεργεῖ], and there is no reason to fear lest they should stop, as the physicists are afraid. Nor do they tire in doing this, for their motion, unlike that of corruptible things, is not connected with a δύναμις for the contradictory, so that the continuity of motion would be laborious: for the οὐσία [of corruptible things], being matter and δύναμις and not ἐνέργεια, is the cause of this" (Θ8 1050b20-28). The point is not simply that the eternally moved body does not have a δύναμις not to exist (this we knew already), but that its motion also does not have a δύναμις not to exist, and therefore that the body does not have a δύναμις not to be moved (except in that, just as it has the δύναμις to be here or there, it has the δύναμις to be moved from here to there or from there to here). Thus it is not merely the ἐνέργεια of existing, but the ἐνέργεια of being moved, which belongs to the οὐσία of the body. Of course, if we can infer from an eternal constant motion to an eternal unmoved mover, then the ἐνέργεια of moving the body will belong to the οὐσία of the mover, and the mover will be a pure ἐνέργεια without any δύναμις and without any matter even for locomotion. Θ8 says that "even the things which are in change, like earth and fire, imitate the incorruptibles, for these too are always acting [ἐνεργεῖ]" (1050b28-9); that is, sublunar things imitate the constant motion of the heavens; but the heavens too will be imitating the constant ἐνέργεια of their movers. Θ deliberately refuses to take this inferential step to a positive theory of incorporeal ἀρχαί, but equally deliberately it prepares for Λ to take it.

Three corollaries: knowledge and motion, evil, mathematics

Θ8 has drawn the main conclusion, the priority of ἐνέργεια over δύναμις, which Aristotle will use in his positive account of the ἀρχαί. The remainder of Θ<sup>33</sup> draws three corollaries from the discussion of ἐνέργεια and δύναμις, all of which seem chiefly concerned with resolving problems arising from Academic accounts of the ἀρχαί; all will play some role in supporting the positive account in Λ. None are exactly corollaries of Θ8's conclusion that ἐνέργεια is prior to δύναμις, but they help to support and fill out Aristotle's revisionist picture of ἐνέργεια as prior, and of the ἀρχαί as consisting in ἐνέργεια.

The first point is made quickly, in a kind of parenthesis before the formal conclusion of Θ8:<sup>34</sup> "if there are such natures or substances as the dialecticians [οἱ ἐν τοῖς λόγοις] say the ideas are, there would be something much more knowing than knowledge-itself, and more moved than motion[-itself]: for [ordinary instances of knowledge and motion] are more ἐνέργεια, and [the ideas of knowledge and motion] are [merely] δυνάμεις for [those ἐνέργεια]" (Θ8 1050b34-1051a2). The conclusion is supposed to be a reductio ad absurdum, since anyone who posits an idea of X wants it to be the X-itself, and anyone who posits an X-itself wants it to be most X (or X in the strongest sense), and the cause to other X things of their being X. The reductio obviously depends on Aristotle's assumption that the ἐνέργεια of X is more X than the δύναμις of X is (or, perhaps equivalently, that the δύναμις of X is said to be X on account of the ἐνέργεια of X, rather than vice versa).<sup>35</sup> But what justifies the claim that the ideas of knowledge and motion would be δυνάμεις?

Aristotle is not saying that all ideas would be δυνάμεις,<sup>36</sup> and I can see no reason why he would think this. He is thinking of specific and notorious difficulties about motion and knowledge. How can there be an idea of motion, as the Sophist says, if all of the ideas are unchangeable? The Sophist insists that the idea of motion must itself be moved, but it seems that it cannot be moved in the usual sense--it cannot be in one state at time t and in another state at time t'. Aristotle reasonably draws the conclusion that the idea of motion is not actually moved, but is "moved" only in the sense of being a potential cause of motion to its participants, that is, a δύναμις for motion which is actualized when something participates in it and is moved in some particular way. And the difficulty with knowledge (or with νοῦς) is similar: as motion-itself will not be moved in any particular way, so it seems that knowledge-itself will not be knowing anything in particular. If the idea of knowledge were knowledge of X, then participating in the idea of knowledge would be participating in knowledge of X, and the idea could not cause its participants to know anything other than X. On the other hand, if the idea of knowledge were simultaneously knowledge of all the different knowable objects, then there would only be one science, so that whatever possesses the knowledge of X would also possess the knowledge of Y, which is manifestly false. Again, Aristotle reasonably concludes that the idea of knowledge is not actually knowledge of any particular object, but is only a δύναμις, a general capacity for scientific rationality, which is actualized when something participates in it and comes to know something in particular. (Aristotle may also be thinking of the view, which he endorses at

<sup>33</sup>I mean, as usual, Θ1-9, leaving Θ10 aside

<sup>34</sup>Θ8 is a formal unit, not just an editor's artifact, with the formal conclusion 1051a2-3 recalling the initial thesis as set out at 1049b4-5 and clarified 1049b5-10. one way or another, eliminate duplication with the end of IIIα1

<sup>35</sup>see discussion above for Aristotle's difference with some other Academics (already in the Protrepticus) on this question

<sup>36</sup>as is claimed e.g. by Joseph Owens, and by a footnote in Ross' translation (his commentary is silent). the pseudo-Alexander, deeply confused, thinks the problem is that knowledge and motion are accidents. Thomas thinks the problem is that knowledge (as opposed to θεωρεῖν) is necessarily a δύναμις--this does have something to do with it, but then what does he think the problem with motion is?

Metaphysics M10 1087a10-21, that the knowledge of a universal is always a [second] δύναμις, whose ἐνέργειαι consist in recognizing some individual as falling under that universal; assuming that an idea of knowledge would have a universal object, it would be only a δύναμις actualized when an individual knower uses it to know an individual object.) Now the reason that Aristotle raises these issues about motion and knowledge here is not simply that these were notorious embarrassments for the theory of ideas, but that he himself wants his first ἀρχή to be the highest kind of knowledge, and also to be a cause of motion. But, as Θ8 has argued, the ἀρχή must be pure ἐνέργεια, and therefore it cannot be an idea of knowledge or motion. Aristotle's positive alternative will emerge in Λ: the ἀρχή is not νοῦς in the sense of a general capacity for rationality, nor a ἔξις-knowledge of some universal, but a single act of νόησις of a single immaterial individual. So too, the ἀρχή is neither an activity involving change of state, nor an unchanging δύναμις for such activity, but an unchanging activity that produces motion in the heavens and is thus the first cause of motion: it is not more moved than sensible things, but it is more active [ἐνεργοῦν] and more motion-causing [κινητικόν], although philosophers before Aristotle had not thought these could belong to something unless it was moved itself.<sup>37</sup>

Next, the first half of Θ9 (1051a4-21) is officially devoted to arguing that "better and more honorable than the good δύναμις is [its] ἐνέργεια" (1051a4-5). This does not immediately sound like a thesis about the ἀρχαί, and indeed it may sound like a digression from the more serious discussion of the logical and metaphysical priority of ἐνέργεια to a looser priority in value. But the point becomes clear from the consequence Aristotle draws at the end of the section, that "that there is no evil παρὰ τὰ πράγματα, for the evil is posterior in nature to the δύναμις; therefore, in the things which are ἐξ ἀρχῆς and eternal, there is no evil or anything which has gone wrong or been corrupted" (1051a17-21). This is clearly a thesis about the ἀρχαί, namely that there are no evil ἀρχαί (whether an evil-itself or something else which happens to be bad). Metaphysics A had attributed both to Empedocles and to Plato a pair of contrary good and evil ἀρχαί (for Plato the One and the Dyad); and Θ9 in speaking of evil παρὰ τὰ πράγματα is perhaps especially denying Platonic forms, of evil as such or of particular types of evil. The understanding of δύναμις and ἐνέργεια acquired in Θ is supposed to allow us to solve the old problems of whether there is an evil ἀρχή, and whether there are ideas of evils. The argument is as follows. Every δύναμις is simultaneously a δύναμις for two contrary ἐνέργειαι (1051a5-13). So "necessarily one of these [ἐνέργειαι] must be the good" (a13-14): perhaps this means merely that if any value-terms apply to the ἐνέργειαι, one must be good and the other bad, but perhaps the point is that since (as argued in Θ8) the δύναμις is for the sake of its ἐνέργεια, that ἐνέργεια must be good--that is, the ἐνέργεια which the δύναμις is per se a δύναμις for will be good, and the contrary ἐνέργεια will be bad.<sup>38</sup> By contrast, says Aristotle, the δύναμις itself "is likewise both or neither" good or bad (a14): this is an exaggeration, since Aristotle has spoken just above of a "good δύναμις", but it is good only to the extent that it is per se directed toward the good ἐνέργεια, and "therefore the ἐνέργεια is better" (a15). A consequence of this analysis is that there are no bad δυνάμεις, but only bad ἐνέργειαι of δυνάμεις which are naturally

<sup>37</sup>see IIIγ for discussion. note that Plotinus takes Aristotle's criticisms of Plato here seriously enough that he reinterprets Plato's νοῦς as a complex of sciences (unified by interentailment) of a plurality of intelligible contents, and indeed as an ἐνέργεια of νόησις of these things, and he also reinterprets the κίνησις in the intelligible world as an ἐνέργεια (of νόησις) without change of state

<sup>38</sup>relying on Θ2, where arts or "productive sciences" like medicine are "of contraries, but of one per se and of the other not per se" (1046b11-12), being per se of the positive contrary (e.g. health) and per accidens of the privative contrary (e.g. disease) (cp. Topics VII,5 143a2-5, where the art of medicine produces health per se and disease only per accidens)

directed toward good ἐνέργεια, but which are sometimes obstructed from reaching their natural τέλος. A further consequence is that all the types of priority of ἐνέργεια to δύναμις which were described in Θ8, in λόγος and in οὐσία and (in a sense) in time, apply only to the good ἐνέργεια. The δύναμις exists because the good ἐνέργεια exists (since the good ἐνέργεια is the τέλος for the sake of which the δύναμις exists), but we cannot say that the δύναμις exists because the bad ἐνέργεια exists; on the contrary, the bad ἐνέργεια exists only because the δύναμις exists and is sometimes obstructed from reaching its natural τέλος. Thus, as Aristotle concludes, "the evil is posterior in nature to the δύναμις". Consequently, there is no evil in the ἀρχαί, since evil is always a bad ἐνέργεια which is posterior to the δύναμις which is posterior in turn to the good ἐνέργεια. Likewise, there is no evil in anything eternal, since eternal things have no δύναμις which could fail to attain its τέλος. Likewise, neither evil as such nor any particular type of evil exists παρὰ τὰ πράγματα, since the bad ἐνέργεια exists not καθ' αὐτό but inseparably from the underlying δύναμις (or from the bearer of the δύναμις). The theses that the ἀρχαί, and eternal things generally, are pure ἐνέργεια without δύναμις, give Aristotle a criterion for identifying and purging inappropriate descriptions of the ἀρχαί or of eternal things: any description that can be shown to imply δύναμις is inappropriate. Descriptions of the ἀρχαί or of eternal things that put evil among them are the first to be purged. In Λ6-10, guided by the results of Θ, Aristotle will supply a thoroughly purged description of the nature and causality of the ἀρχαί. And the asymmetry between good and evil, leading in Λ10 to the positing of a separately existing good ἀρχή without an evil contrary, will be a crucial part of his resolution of the disputes and difficulties about the good as an ἀρχή raised already in Metaphysics A.

Finally, in the latter half of Θ9 (1051a21-33), Aristotle gives what can be described as an argument for the scientific, or more precisely the heuristic, priority of ἐνέργεια: a scientific truth may apply to things which are δυνάμει as well as to things which are ἐνεργεία, but "the things which are δυνάμει are discovered [εὐρίσκεται] by being brought to ἐνέργεια ... so that δύναμις is out-of-ἐνέργεια" (1051a29-31). But this is only a partial description of the passage. It is also important that all of Aristotle's examples are about mathematics; and indeed the thesis as he announces it at the beginning is that "διαγράμματα [which means equally geometrical diagrams and geometrical proofs] are discovered by ἐνέργεια: for they discover by dividing [i.e. by drawing in lines in a diagram]" (1051a21-3). And his argument here helps to eliminate a difficulty about mathematics which had been lying in the background since the beginning of Metaphysics Beta. Recall that in B#1 one argument, which we found plausible grounds for ascribing to Speusippus, had tried to show that wisdom is not a science of efficient or final causes, on the ground that unmoved things, and in particular mathematical objects, do not have these causes (996a21-b1, as interpreted in Iβ2c above);<sup>39</sup> the presumption was that mathematical things (being unchangeable) are prior to physical things, so that their causes would be prior ἀρχαί and better candidates to be the objects of wisdom. Aristotle's own program for seeking the ἀρχαί, announced in Γ and pursued in EZHΘ, has all-but-ignored the mathematical, beginning instead from physical things as the effects best known to us, and looking for their separately existing unmoved causes. Furthermore, since Metaphysics Z has shown that the pursuit of formal causes of physical things does not lead to such ἀρχαί, Aristotle turns instead to efficient causes--

<sup>39</sup>compare the K parallel: "The desired science must not be supposed to concern the causes which have been named in the Physics. For it is not even [accepting Bonitz' emendation, as I did in Iβ2c but would probably not do now, d make consistent] about the for-the-sake-of-which: for this is the good, and this exists in the case of things-done and things which are in motion; and this is a first mover--for a τέλος is such--and there is no first mover in the case of immobile things" (K1 1059a34-38).

δυνάμεις or potential efficient causes as causes of τὸ ὄν δυνάμει and ἐνέργεια or actual efficient causes as causes of τὸ ὄν ἐνεργείᾳ, rather than causes of being in the sense of οὐσία. And he will claim in Λ that at least one upward chain of actual efficient causes does lead to the desired ἀρχή, which is pure ἐνέργεια and the cause of ἐνέργεια to other things, and which is an efficient cause just by being the ultimate final cause, that is, the good. Even if Aristotle's program works, the mathematical seem to have been left dangling--they may have their own, independent, ἀρχαί, and it seems that these ἀρχαί would not be efficient or final causes, and that they would not be ἐνέργεια or causes of ἐνέργεια to the mathematical things, since mathematical things, being eternally and necessarily what they are, have no potentialities to actualize. As B#1 puts it in stating the claims of the sciences of the different causes, "we think that knowing each of the things of which there are demonstrations occurs when we know what it is (for instance, what squaring [a rectangle] is, that it is finding the mean [proportional line], and likewise in the other cases), but [we think knowing occurs] about comings-to-be and actions and every kind of change when we know the ἀρχή κινήσεως" (996b18-23).<sup>40</sup> How does Aristotle answer this, and how does he justify ignoring the route to formal causes of mathematical things in favor of the route to efficient and final causes of physical things? In the main body of the *Metaphysics*, his only answer seems to be the verdict of E1 (supported later in M2-3) that mathematical exist inseparably and dependent on physical things, so that presumably the causes of mathematical will also exist inseparably and dependent on physical things or on the causes of physical things, and so will not be the ἀρχαί we are seeking. But the latter half of Θ9 seems to allow another answer, and one that responds much more directly to the arguments of B#1.

Aristotle says, "διαγράμματα are discovered [εὐρίσκειται] by ἐνέργεια: for they discover by dividing. For if [the figures] were [already] divided, [the διαγράμματα, i.e. the proofs] would be manifest; but as it is [the διαγράμματα] are present in potentiality" (1051a21-4). He adds two examples of elementary geometrical theorems (that the interior angles of a triangle are equal to two right angles, and then a theorem deduced from this, that the angle in a semicircle is right) where the conclusion is not obvious from the initial figure that sets out the proposition, but becomes obvious once a line is drawn and the initial figure is divided.<sup>41</sup> "So it is manifest that the

<sup>40</sup>assuming we keep the transmitted text, rather than bracketing καὶ ὅν ἀποδείξεις εἰσί with Jaeger. I've translated as if that καὶ weren't there: is there a better way to translate with it? should it be deleted? but Jaeger may well be right--there is something funny about the text, and his suggestion of putting the phrase at the end of the parenthesis at 996b22 is supported by the exact verbal parallel at Θ8 1050a16-17. with the transposition, we would have to put a heavy emphasis on ἐν τοῖς ἄλλοις at the beginning of 996b19 (which here I didn't bother to translate): in other things, we think we know it when we know τί ἐστὶ, but with comings-to-be and actions and change when we know the ἀρχή κινήσεως. this may be right, and perhaps I should adopt the transposition in my text. it is also possible that καὶ ὅν ἀποδείξεις εἰσί is a gloss (whichever bit it was meant to go with). Ross' note, and his interpretation of ἐν τοῖς ἄλλοις, seem off base, and he doesn't see the problem which Jaeger (I think rightly) sees. incidentally, μέσης is feminine because γραμμῆς is understood, see LSJ μέση II, LSJ μέσος III.5.

<sup>41</sup>there are a cluster of textual problems in the space of a few lines here, as well as a confusion about one of the diagrams Aristotle is referring to. fortunately none of it has much impact on the points Aristotle wants the examples to illustrate. the text says something like: διὰ τί δύο ὀρθαὶ τὸ τρίγωνον; ὅτι αἱ περὶ μίαν στιγμὴν γωνίαι ἴσαι δύο ὀρθαῖς, εἰ οὖν ἀνήκτο ἢ παρὰ τὴν πλευράν, ἰδόντι ἂν ἦν εὐθύς δῆλον. διὰ τί ἐν ἡμικυκλίῳ ὀρθὴ καθόλου; διότι ἐὰν ἴσαι τρεῖς, ἢ τε βάσις δύο καὶ ἢ ἐκ μέσου ἐπισταθεῖσα, ὀρθή, ἰδόντι δῆλον τῷ ἐκείνῳ εἰδόντι, and means something like "why is the triangle equal to two right angles? Because the angles around one point are equal to two right angles. So if the line parallel to the side were drawn up, it would be obvious to anyone who looked [at the diagram]. Why is the angle in the semicircle universally a right angle? Because if there are three equal lines, the base being two [i.e. the diameter being divided at the center].and the one set up from the middle [i.e. the line connecting the center to the vertex on the semicircle], it is a right angle, [as] would be obvious to anyone who knew [that previous theorem]." among the issues: Bonitz adds ἢ before ἐν ἡμικυκλίῳ ὀρθή (rejected by Ross and Jaeger):



things which are δυνάμει are discovered by being brought to ἐνέργεια:<sup>42</sup> the reason is that νόησις is an ἐνέργεια;<sup>43</sup> so that δύναμις is out-of [i.e. posterior to] ἐνέργεια, and for this reason they know by making (for the numerically [individual] ἐνέργεια is posterior in coming-to-be)" (1051a29-33). That is: the obstacle to knowing the theorem that a certain type of figure has a certain property is that some mathematical object, in these simple cases a single line dividing the figure, exists only in potentiality, so that it and its relations to the other parts of the figure are not perceived. So the mathematician comes to know the potentially existing mathematical object, and thus the theorem which depends on it, by actually constructing the object: the νόησις, e.g. the act of thinking "connect the points A and B," is itself an ἐνέργεια, and either this act is identical with the actualization of the line AB (if the line just exists in my φαντασία), or it immediately causes the actualization of the line AB (if the νόησις directs me to produce the line on a wax tablet). So the νόησις is the cause of being-as-ἐνέργεια, the efficient cause, to the line AB. This gives Aristotle's answer to the argument in B#1 that mathematical objects have no efficient causes, and, lying behind this argument, the Academic view that they are so purely eternal that there is no activity among them and that the δύναμις/ἐνέργεια distinction does not apply to them. This view quite logically led Plato to criticize the geometers for speaking of "squaring" and "applying" and "adding" and other such activities, as if they were acting [πράττοντες] and as if their arguments were for the sake of πράξις, although in fact they are for the sake of γνῶσις alone and geometry is about objects that exist eternally (Republic VII

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this is certainly plausible, but Ross seems right that it is not strictly necessary, since Aristotle gives the proposition without the ἡ at Posterior Analytics II,11 94a33-4 (however, he has spoken of ἡ before ἐν ἡμικυκλίῳ three times in the immediately preceding lines, and may just be abbreviating). the more serious issues are about διὰ τί/διότι and the connected punctuation issues (as I have printed it, or ἰδόντι ἂν ἦν εὐθύς δῆλον διὰ τί. and ἐν ἡμικυκλίῳ ὀρθῆ καθόλου διὰ τί;), and especially about ὀρθῆ after ἐπισταθεῖσα, where I have followed more-or-less Christ's suggestion in putting a comma after ἐπισταθεῖσα (without his δὴ after δῆλον, which might help; note also Cannan's more radical suggestion, reported by Ross). without the comma I suppose that (unless ὀρθῆ can be taken in some loose way not implying a right angle?--this is effectively what Bonitz proposes: he would suppose Aristotle speaks this way because he has in his mind the special case where the line is perpendicular, although intending what he says to apply to all cases) it would have to be referring to the construction Ross gives in his commentary and prints with his translation (not in Barnes), which is mathematically ridiculous and also requires supplying a great deal beyond the text. I admit that two things favor Ross: it looks as if ἰδόντι δῆλον answers εἰ ἴσαί τρεις in the future more vivid, as ἰδόντι ἂν ἦν εὐθύς δῆλον answers εἰ οὐκ ἄνηκτο ἢ παρὰ τὴν πλευρὰν in the future less vivid, which would be broken if ὀρθῆ is the apodosis rather than part of the protasis (it would still be equally grammatical); and the funny καθόλου would make more sense if Aristotle were proving the general case from a special case. I am not sure what to do. I repeat that Ross' construction is mathematically ridiculous. the passages Ross cites from the Posterior Analytics 71a19 and 94a28-34 do not support his construction. on the contrary, the latter passage shows that Aristotle is giving essentially the same proof as in Euclid III,21, except that Euclid cleverly uses the half of I,32 saying that the exterior angle is equal to the two opposite interior angles, rather than the more famous half saying the three interior angles are equal to two right angles, which allows him to show directly that the angle in the semicircle satisfies the definition of right angle, rather than having to argue that because it is half of two right angles, it must be a right angle (to do this rigorously for Euclid, we would have to argue by reductio ad absurdum that it is neither more nor less than a right angle). I think this is enough to rule out Ross' construction.

<sup>42</sup>assuming we read ἀγόμενα with EJ Ross Jaeger rather than ἀναγόμενα with A<sup>b</sup> Bonitz. if we go with Bonitz, then say "reduced to ἐνέργεια". I'm not sure how much difference it makes (ἀναγόμενα would imply that the ἐνέργεια is prior and causal, but it is, so that seems OK)

<sup>43</sup>if we read Ross' ἡ νόησις ἐνέργεια. the manuscripts, and Bonitz and Jaeger, have νόησις ἡ ἐνέργεια, which would mean "the ἐνέργεια [through which mathematical objects are actualized] is a νόησις", which might be possible but makes me uncomfortable

527a1-b8).<sup>44</sup> Aristotle's "they know by making [ποιοῦντες γινώσκουσιν]" may well be intended to respond to this passage of the Republic. The Academics, beginning from a dogma about the status of mathematical objects, conclude that mathematics does not include the activity of construction; Aristotle, beginning from the fact that mathematics does include construction, concludes that mathematical objects do not exist independently of our activity of thinking and constructing them. Of course mathematical theorems are eternally valid, and in a sense mathematical objects are eternally existent, but the kind of existence they have eternally is existence δυνάμει: "so the geometers are speaking rightly, and they are talking about things-that-are, and they are things-that-are, for what-is is twofold, [what is] in actuality and what is materially [i.e. potentially]" (M3 1078a28-31).<sup>45</sup> And if we look back to B#1, we can see that already there Aristotle is undermining the distinction between the pursuit of the formal causes of mathematical things and the pursuit of the efficient cause of physical things: instead of asking "what is a square equal to a rectangle?" and answering "it is a square whose side is a mean proportional between the sides of the rectangle," Aristotle asks about the activity that Plato had tried to banish from mathematics, "what is squaring?", and answers "it is the finding [εὑρεσις] of a mean proportional" (996b20-21), where εὑρεσις is what happens by ἐνέργεια in Θ9. Exactly the same definition of squaring is given in De Anima II,2 (413a16-20), as an example of a definition that "states the cause of the thing" and so is equivalent to a demonstration and not merely to the conclusion, like Aristotle's favorite example, the definition of thunder as "noise of fire being extinguished by the clouds" rather than just "noise in the clouds": but the extinction of fire, or the discovery of the mean proportional, are efficient causes, and this means that the definition or formal cause cannot be given except by giving the efficient cause. And this undermines the Academic opponent's case in B#1 that the way to wisdom (or at any rate one independent way to wisdom) is by studying the formal causes of mathematical things and leaving efficient causes aside: even in mathematics, we ascend to scientific knowledge, and discover what is prior, only by discovering causes of being-as-ἐνέργεια.<sup>46</sup>

<sup>44</sup>The same view led Speusippus to say that all propositions in geometry are really theorems, rather than problems (infinitive formulas like "to square a given rectangle"), since geometry is a theoretical science and theoretical sciences are about eternal objects and do not involve action (see Proclus In Euclidem 77,15-78,3).

<sup>45</sup>reference to treatment in Iγ3, noting that my view there is controversial, and harmonizing the translation of this passage. with (what I take to be the view of) Ian Mueller, "Aristotle on Geometrical Objects" (in Articles on Aristotle v.3), I take Aristotle to think, not that geometrical objects are physical objects with some of their properties abstracted away (since at least sublunar physical objects are not perfectly straight, circular etc.), but rather that the matter of geometrical objects is the matter of physical objects with some of its properties abstracted away (and only extension left), and that geometrical objects exist potentially in that matter. I suppose it is not possible for a physical object ever to become perfectly straight, but the straightness is still potentially in the object, in the same way that infinity is potentially in the objects--it can be asymptotically approached. these potentialities will be actualized (so far as they ever are) either by human acts of thought or by artificial acts of construction (drawing approximately straight lines etc.) caused by those acts of thought. the theorem that every triangle has interior angles equal to two right angles holds just as much for potential as for actual triangles. but we prove it by considering actual triangles, indeed actual triangles ABC with side BC actually produced beyond C to D and line CE actually drawn up parallel to AB; it is true for potential triangles, and for actual triangles ABC with merely potential lines CD and CE, because it is true for fully actualized διαγράμματα ABCDE; or so I take Aristotle to be saying in Θ9. see also Theophrastus Metaphysics 4a21-b2 for the perhaps simplified and radicalized statement that mathematical objects "seem to be as if were contrived by us when we circumscribe figures and shapes and λόγοι [proportions?], and to have [or 'and they have'--textual dispute] no nature on their own"

<sup>46</sup>note the B#1 argt seems to be assuming a dichotomy between theoretical/demonstrative knowledge of eternal things and practical knowledge of things that come-to-be: same dichotomy as assumed in Parts of Animals I,1, and, if I'm right in my Davis paper, also at the end of De Anima III,4--presumably an Academic division, perhaps esp. Speusippean?, see Proclus In Euclidem 77,15-78,3. also conn B#1/M3 Speusippean view that the good is always in

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πραξις, i.e. is invoked only in practical sciences, which, since theoretical knowledge is always of eternal things, may include physics, so the sensible world can be good, as the Timaeus says, even though its model is not good but merely perfect and beautiful; but I couldn't find a witness that the physical world is good. also note: does Θ9b have a ref to the process of analysis, and to the Z7 idea that the last stage in thinking is the first in production?