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PLATO'S UNNATURAL TELEOLOGY

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In a number of later dialogues, Plato contrasts two sorts of accounts for features of the natural world.¹ One would account for the pattern of the visible world's changes by invoking chance, spontaneity, or blind necessity, *and nothing else*, as the responsible force. The other insists that an intelligent maker or craftsman is the truly responsible agent. Plato encapsulates the former well in these lines from the *Laws*:

Fire, water, earth and air, all of them they say are by nature and chance, while none of them is by craft. And again, the bodies made from these, earth, sun, moon and stars they say have come to be due to these [nature and chance], being entirely without soul. Each one, moving about among each of the others by chance of its power, hot to cold, dry to moist, soft to hard, and all whatsoever have been blended by the blending of opposites according to chance from necessity, by which has been concocted a harmony which is somehow fitting. (889b1-7)

He has the Athenian endorse the latter view three pages later:

And so judgement and foresight, wisdom, art and law would be prior to hard and soft, heavy and light; and the great and primary works and actions just because they are primary, would be those of art; those of nature and nature herself—this very thing which they mis-name—would be secondary, having its origin from art and intelligence.

The idea of the "natural" world as *unnatural*, as the product of a *technē*, is a stable feature of Plato's later thought and had momentous

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1. *Sph.* 265c-266c; *Lg.* X, 889a-890a; *Phlb.* 28d-e, *Ti.* 46c-47c; 68e-69d.

consequences for the history of natural philosophy.² Robert Boyle, a leader among the British "mechanical philosophers" of the seventeenth century, looked back self-consciously to Plato in his *Disquisition on the Final Causes of Natural Things*: "The provident Δημιουργός wisely suited the fabric of the parts to the uses, that were to be made of them: as a mechanic employs another contrivance of his wheels, pinions, etc., when he is to grind corn with a mill."³

The world viewed as the product of a good and benevolent craftsman was one of two aspects of Darwin's formal education at Christ College, Cambridge which he looked back upon with approval (the other also had Greek roots, Euclidean geometry). Indeed, as one traces the numerous versions of Darwin's argument for natural selection, from its first formulation in the late 1830s through the last edition of the *Origin*, one sees a palpable struggle to free himself from the implications of this picture.

The tradition begins in a familiar passage in the *Phaedo*, and so shall we. In it, Plato provides two models of explanation which he clearly feels are preferable to those put forward by the "natural investigators." One of these types of explanation is teleological in nature; the other uses forms as *aitia* of coming to be and being. The *Phaedo* self-consciously announces Socrates' failure to develop the former, and to integrate it in any way with the latter. During Plato's middle and later period there is a persistent exploration of a model of skillful craftsmanship, a major theme in the *Gorgias*, *Cratylus*, *Republic X*, *Timaeus Statesman*, *Sophist*, and *Philebus*.⁴ The central question of the second half of this paper is this: to what extent, and in what ways, do these explorations help Plato develop a more integrated theory of scientific explanation?

I

In an allegedly autobiographical digression, Socrates tells of his initial enthusiasm for, and ultimate rejection of, certain attempts to provide explanations of generation and destruction. These accounts had

2. David Gallop, *Plato's Phaedo* (Oxford, Clarendon Press, 1975), p. 175; G. Vlastos, *Plato's Universe* (University of Washington Press, 1975), p. 97. Both these authors overstate the extent to which the "mechanical philosophers" of the seventeenth century reject Plato's vision. That the universe as a whole was a rationally designed artifact was seldom in doubt before the nineteenth century.

3. Robert Boyle, *A Disquisition about the Final Causes of Natural Things*, in *The Works of the Honorable Robert Boyle*, Vol. 5, ed. Thomas Birch (London, 1688), p. 409.

4. Cf. R. S. Brumbaugh, "Plato's Relation to the Arts and Crafts," in *Facets of Plato's Philosophy*, ed. W. H. Werkmeister (*Phronesis*, Supplementary Vol. 3, Van Gorcum, Assen, 1976), pp. 40-52.

consequences that left him confused even about things he had once thought he understood. At this point he reports, "I now rashly adopt a different method, a jumble of my own, and in no way incline toward the other" (97b6-7, Gallop trans.).⁵

Socrates appears about to introduce the safe (100d8, e1) but simple-minded (100d3-4) form of explanation, which, however, is not introduced until 99b4. What interferes is an apparently parenthetical discussion of Anaxagoras, which puts off the presentation of the method of explanation by hypothesized forms for two pages.⁶

I want to look carefully within the parentheses with two primary questions in mind. What can this passage tell us about Plato's views on what a fully adequate account of a feature of the natural world should look like? Second, what is the significance of the placement and style of this passage for an evaluation of other discussions of teleological explanations in the Platonic corpus?

Professor Frede has pointed out that this passage exploits a distinction, integral to the moral/legal contexts in which it arose, between τὸ αἴτιον, the agent responsible for a state of affairs, and ἡ αἰτία, that in virtue of which the agent is responsible, which may be called the reason why.⁷ In legal contexts, this would be the distinction between the accused and the basis of the accusation. The doctrine attributed to Anaxagoras is that intelligence is the agent responsible for orderly arrangement and all else.⁸ But at 97c6ff., discovery of the reason why each thing comes to be, is, or passes away as it is or does is said to depend on discovery of why that particular arrangement is *best*. Like-

5. John Burnet, *Plato's Phaedo* (Oxford University Press, 1911), p. 108, claimed his ideas on the *deuteros plous* were in agreement with W. J. Goodrich, "On *Phaedo* 96a-102a and on the *δέυτερος πλοῦς* 99d," *Classical Review*, 17 (1903): 381-385; 18 (1904): 5-11. However, Goodrich convincingly links Socrates' disparaging remarks concerning his own method of explanation to the hoped for teleology of 97b8-99b2, and so unlike Burnet saw no irony in this remark.

6. There are four pieces of evidence that indicate that the sense of intrusion of the Anaxagorean discussion is intentional. (i) The use of the present at 97b6 generates anticipation that Socrates' random method will be discussed immediately. (ii) The discussion of the *deuteros plous* is re-introduced at the end of our passage. To quote Goodrich, "Ἐνδοξε τοίνυν μοι κ.τ.λ. . . . (99d4) links back immediately where the narrative had previously broken off, at 97b8 . . ." (Goodrich [1903], p. 382). (iii) The problems that had led to Socrates' dissatisfaction with natural science, discussed just prior to the Anaxagorean excursus, are shown to be resolved by the *deuteros plous* (100e5-103c4), but are not mentioned from 97b-99e. (iv) As I will discuss in detail shortly, the sorts of *explanantia* focused on in this passage are in striking contrast to those on either side of it.

7. Michael Frede, "The Original Notion of Cause" in *Doubt and Dogmatism: Studies in Hellenistic Epistemology*, ed. M. Schofield, M. Burnyeat, and J. Barnes (Oxford, 1980), pp. 217-249, esp. 222-223.

8. *Phd.* 97c1-2: νοῦς ἐστίν ὁ διακοσμῶν τὲ καὶ πάντων αἰτίας. Compare Aristotle, *Met.* A 984b15-17: νοῦν . . . τὸν αἴτιον τοῦ κόσμου καὶ τῆς τάξεως. . . .

wise, Socrates had hopes that after Anaxagoras had said whether (*πότερον*) the earth was flat or spherical,⁹ he would set out in detail the *aitia* and the *anaghē* of it, which would be a matter of showing that it is better to be this sort of thing (97d8–e3; cf. 98b1–4, 99c5–7). Throughout *Phd.* 97–99 intelligence is the responsible agent, while a certain state of affairs' being good (better, best) is said to be the reason why the agent brings that state of affairs about. Further, accounts that make reference to intelligence and the good are contrasted with "mechanical" explanations—the former provide the true explanation, though their ability to bring about appropriate states of affairs is dependent on the operations of the relevant physical processes.¹⁰

The operative presupposition that accounts for this distinction comes out clearly in the following comment, revealing to us the nature of Socratic expectations for Anaxagorean *Nous*: "For I never supposed that someone who said these things to be ordered by intelligence would offer any other cause for them than that these things are best just as they are." (98a7–b1) Let me encapsulate Socrates' presupposition in the following formula:

P If intelligence bestowes a certain order on something, that thing has that order *because* its having that order is best.¹¹

What this hypothetical formulation is intended to stress is the conceptual link in Socrates' thinking between intelligent agency and the explanatory efficacy of goodness. Only intelligent agents bring about certain states of affairs *because* they are good, though good states of affairs may arise by chance. Aristotle encapsulates the point neatly in a fragment of the *Protrepticus*: ". . . something good might come about by chance; but in respect of chance, and insofar as it results from chance, it is not good." (Fr. 11)

Aristotle, like Plato, will only allow the good outcome of a process to explain it if that good outcome was somehow responsible for the process. They differ, of course, over the issue of whether an intelligent agent is the only sort of agent that can initiate changes for the sake of a goal. But they agree, I would argue, that some such agency must be involved if explanations by reference to the goodness of the outcome are to be legitimate.¹²

9. For problems with translating *στρογγύλη* in the *Phaedo*, cf. J. S. Morrison, "The Shape of the Earth in Plato's *Phaedo*," *Phronesis* 4 (1959): 101–119.

10. *Phd.* 98c5–99d4.

11. The pattern of this formulation, though not its content, was suggested by Larry Wright's *Teleological Explanations* (University of California Press, Los Angeles, 1976).

12. Cf. *Met. Z.7*, 1032a12–13, a25–32; *Ph.* II.5, 196b23–26, II 8, 199a3–8; *Part. An.* I.1, 639b15–21. The story is complex. Plato in *Laws X* discusses those he opposes as

P maintains the *τὸ αἴτιον / ἢ αἰτία* distinction in the following way. Intelligence, conceived of as productive of a certain state of affairs, is its *αἴτιον*. That state of affairs, *identified as best*, and therefore as the outcome desired by intelligence, is the *αἰτία*—the reason why—for that production.

Confirmation that *P* adequately captures Socratic presuppositions on this subject comes from an examination of his distinction between true causes and the things without which they wouldn't be such. Socrates chooses a timely example to explain the distinction. Why does he remain in Athens, though he is about to die? It isn't a matter of constraint—he could easily flee.¹³ Nor is it simply a matter of pointing out that, given the way his bones and sinews are arranged, he could hardly do anything else. No—he has an opinion that remaining is *good*, and he has chosen to remain because it is good that he do so.

Socrates' characterization of the "careless" account of his actions also stresses the role of both intelligence and "what is best" in the preferred account.

If someone were to say that without having such bones and sinews and whatever else I have I would not be able to act on my judgements, he would speak truly; but to say that I do what I do *because* of these things, and do these things with intelligence, but not by means of the desire for what is best, would be an extremely careless account. (99a5–b1)

Commentators regularly note the carelessness Socrates finds in saying "because of bones etc." and "with intelligence."¹⁴ But they ignore the fact that Socrates is drawing it to our attention that these accounts fail to make reference to the desire for what is best. But the above remarks stress its importance. In fact, that those who offer the careless account leave this out altogether may explain why they are so careless as to reverse the true order of priority between intelligence and physical systems. By leaving out of account what is best, they ignore the fact that intelligence is intentional; and thus they will fail to realize that the crucial agency involved in bringing about *this* state of affairs (i.e., the one that is best) is not the physical processes involved, but intelligence.

This passage is not, of course, putting forth a theory about human

holding that the cosmos is due to nature and chance rather than to intelligence and craft. Ultimately, however, as Joan Kung reminds me, Plato wishes to insist that if *φύσις* refers to what is primary and an *ἀρχή*, then it is soul and intelligence that are *φύσις* and their products that are *φύσει* (cf. 892c). Aristotle treats *φύσις* as *sui generis*, refusing to range either intelligence and craft on the one hand, or chance and spontaneity on the other, with it.

13. As is made clear at *Cri.* 53b3ff; cf. *Phd.* 99a1–2.

14. E.g., Burnet, p. 106; Gallop, p. 175.

action per se, but rather a perfectly general thesis about causal attribution. This is made clear as Socrates goes on to note that various theories of why the earth came to be and remains where it is make the same error of taking the physical preconditions of its becoming or remaining where it is to be the actual cause. Later, in a craftily hypothetical mode, Socrates claims to have been persuaded that *if* the earth is a sphere and in the heaven's center, *then* the mere uniformity of the heavens would insure its remaining.¹⁵ Such an account in no sense *competes* with the teleological; rather, it provides the appropriate answer to the question, by what means does intelligence accomplish this good?

The radical discontinuity between the Anaxagorean excursus and the rest of the exploration of the *aitia* of generation and destruction is clear, and clearly self-conscious.¹⁶ At the same time, there is no obvious shift in philosophical motivation. The entire discussion in 96a6–106c9, where its results are applied to the issue of the soul's immortality, is governed by the requirement that a general examination of the reason for coming to be and passing away (*ὅλως γὰρ δεῖ περὶ γενέσεως καὶ φθορᾶς τὴν αἰτίαν διαπραγματεύσασθαι*—95e9–96a1) be carried out. Throughout, Socrates is concerned with answers to the very general question, why (*διὰ τί*) does each thing come to be pass away and exist (96a9–10). To have such an answer is to know what's really responsible for each thing (*εἰδέναι τὰς αἰτίας ἐκάστων*—96a9). It is this knowledge he pursues in natural investigation (96c7–97b7)¹⁷, in the book of Anaxagoras (97b8–99c6)¹⁸ and in the idea of form-participation (99d1–105c11).¹⁹ There is no hint that the question has changed, nor that different types of answers will be required either for different domains or for different questions. The sort of *aitia* hoped for in Anaxagoras, and those which occupy Socrates' attention from 100a onward, both attempt to substitute for, and avoid basic

15. Vlastos (1975), p. 30, wrongly claims that "he [Plato] reproaches them [the *physiologoi*] for deciding such a question as whether the earth is flat or round without first asking which of the two would be the "better" (97e)." This reverses the order clearly recommended in the text: . . . καὶ μοι φράσειν πρῶτον μὲν πότερον ἢ γῆ πλατεῖα ἔστιν ἢ στρογγύλη, ἐπειδὴ δὲ φράσειεν, ἐπεκδιηγῆσθαι τὴν αἰτίαν καὶ τὴν ἀνάγκην. Indeed, the πρῶτον μὲν πότερον . . . ἐπειδὴ δὲ . . . τὴν αἰτίαν, could hardly be more emphatic.

16. Cf. note 6 above, for the evidence.

17. Indeed the discussion has in a general way been about how to account for generation and destruction from 70d7. 71a10's πάντα οὕτω γίνεταί, ἐξ' ἐναντίων τὰ ἐναντία πράγματα, is referred to at 103a4 when Socrates notes that it doesn't contradict the idea that opposites themselves don't come to be from their opposites.

18. *Phd.* 97c6–7: εἰ οὖν τις βούλοιο τὴν αἰτίαν εὔρειν περὶ ἐκάστων ὅπῃ γίνεταί ἢ ἀπόλλυται ἢ ἔστι. . . .

19. 102e3–103b5.

problems of, explanations provided either by common sense or by the "natural investigators." Both lay out stringent, though different, Socratic constraints on what can legitimately be said to be responsible for a state of affairs.²⁰ Both provide preferred responses to *dia ti* questions. And most importantly, the method which makes use of hypothesized forms is introduced as a "second best voyage in search of the *aitia*" (99d1)²¹ implying a single search for adequate explanations in general.²²

Thus we are left with a continuous background of explanatory concerns and motives, yet two radically different accounts of explanation each with its own claims to superiority. Faced with this fact, commentators have tended to polarize around two extreme positions. At one extreme is the view that the teleological parenthesis is of no significance to the rest of the dialogue; on this view, Socrates' claim that the hypothetical use of the theory of forms is a "second best" is a bit of characteristic irony.²³

20. In the discussion of teleological explanation, purely mechanical accounts are held to state only the means for accomplishing various ends; such accounts fail to discriminate between various ends achievable by these means because they fail to inquire why the ends achieved are good (98b7–99c5). In the discussion of explanation *via* participation in hypothesized forms various common sense explanations are criticized on three grounds, summarized by David Gallop (1975), p. 186, as follows:

(i) No opposite, F, can count as the "reason" for a thing's having a property, if its opposite, G, can also give rise to that property (97a7–b3).

(ii) Nothing can count as a "reason" for a thing's having a property, if its opposite, G, can also give rise to that property (101a6–8).

(iii) A "reason" for a thing's having a property F, cannot itself be characterized by the opposite of that property, G. (101a8–b2).

21. On the meaning of *deuteros plous* in this context I am following Goodrich (1903), (1904), and Hackforth *Plato's Phaedo*, (Cambridge University Press, 1955), p. 127, note 5. I have not been convinced by K. M. W. Shipton "A good second best: *Phaedo* 99bff." *Phronesis* 24 (1979): 33–53, that the issue here is whether Socrates can acquire a "divinely revealed" and therefore certain account or whether he must proceed "hypothetically." The reference of τῆς τοιαύτης αἰτίας at 99c7 is clearly to the good achieved by intelligence. It is *this* sort of explanation Socrates failed either to discover himself or learn from another, and compared to which what he goes on to state is a *deuteros plous*. On the other hand, the other uses of this term in Plato (*Phlb.* 19c1–2, *Plt* 300c4) do not merely imply a more laborious means to the same good (*pace* Kenneth Dorter, *Plato's Phaedo, An Interpretation*, [Toronto, 1982], p. 125), but a considerably more modest approach to a subject. The explanation of each thing's coming to be, being or ceasing to be F by means of its coming to be, being or ceasing to be related to what truly is F is a *deuteros plous* with respect to the epistemic desires of 97b–99c in just this way.

22. It is thus distressing that virtually every discussion of the passage focuses either on 96a–97c/100a–105, or on 97c–99d, as a glance at the various discussions referred to in these notes shows.

23. Cf. Gregory Vlastos, "Reasons and Causes in the *Phaedo*," *Philosophical Review* 78 (1969): 291–325; E. Burge, "The Ideas as *Aitai* in the *Phaedo*," *Phronesis* 10 (1971): 1–13; Burnet (1911), pp. 103, 108.

Opposed to this are attempts to find, hidden away in the *deuteros plous*, teleological explanations of some sort.²⁴ Neither strategy works. There is no evidence for the latter position.²⁵ Against the former, one needs to consider the following facts in the context of the characteristic care taken by Plato over the structure of a dialogue. First, the philosophical intelligence of the Anaxagorean excursus, in combination with Socrates' impassioned expression of the need and importance of explanations which make use of intelligence motivated by the good, speaks for its importance. Second, the intrusiveness of the passage appears clearly intentional. Third, even as Socrates "takes to the oars," he criticizes those who say nothing about "the good or binding, that genuinely does bind and hold things together." And, with hindsight, of course, we know that the developed use of the theory of forms for various philosophical purposes did not lessen the importance of teleological explanations in Plato's system.

I propose to take at face value both the continuity of concern to find a general explanation for the world of generated things throughout, and the clearly flagged intrusiveness of the Anaxagorean discussion. Once one does so, very natural *comparative* questions arise, questions concerning the relative virtues and shortcomings of various forms of explanation.

There is, for example, a clear preference for intentional/teleological explanations in certain explanatory contexts. Repeatedly (97c2, c5, 98a7, 98b1–5, 98c1, 99c1, 99c5–6) Socrates formulates his vision of a noetic *aitia* as an explanation for the *order* (*ὁ κόσμος*) that we find in the world. *Noûs* is an *ordering* cause, and chooses a certain order because it is best. This is not in itself surprising, in that this was just the role Anaxagoras himself claimed for Intelligence. Yet, no such concern is in evidence during the discussion of the safe, simple explanations which explain something's coming to be beautiful (*καλόν*) by participation in *τὸ αὐτὸ καλόν*. And this would appear to be an inevitable shortcoming of the safe form of explanation. The appearance of an order and pattern in the world's comings and goings is left inexplic-

24. Cf. Damascius I, para. 417–418, in L. G. Westerink, *The Greek Commentaries on Plato's Phaedo*, Vol. II, (New York, 1977); R. S. Bluck "ὑποθέσις in the *Phaedo* and Platonic Dialectic," *Phronesis* 2 (1957): 21–31.

25. Those who take this approach typically read the ideas on explanation of *Republic* VI–VII or the *Timaeus* into the passage. Gallop (1975), p. 191, is properly cautious, as is Julia Annas, "Aristotle on Inefficient Causes," *Philosophical Quarterly* 32 (1982): 311–326, esp. p. 318. Gallop himself interprets Socrates' enigmatic reference to God and the form of life (pp. 220–221) to suggest a form-explanation as a replacement for Anaxagorean teleology. While this is ingenious, it throws his earlier caution to the winds.

able. Or, to put it in a manner Aristotle was fond of, given the theory of form-explanation in the *Phaedo*, we will *still* need a theory of why things come to have the features they do as and when they do.²⁶

It remains true throughout Plato's philosophic life, in dialogues as diverse as the *Republic*, *Timaeus*, *Philebus*, and *Laws*, that intelligence is invoked to explain the *order* and *unity* in a potentially disordered and dis-integrated world. This is one clue to the centrality of craftsmanship as a metaphor for divine intelligence.

Another curious difference between the two sorts of explanations presented here can be brought out by following a clue quietly dropped by Socrates early in the discussion of form participation explanation.

When Socrates turns to the *deuteros plous*, he seeks agreement from his interlocutors that certain things exist *auto kath' hauto*. Among these things he includes "good" (100b6). This is not surprising, of course. This passage relies on the easy agreement obtained at 65d6 for the theory of forms, and *καλόν* and *ἀγαθόν* were among the forms mentioned there as well. But immediately after discussion of a theory in which the goodness of a state of affairs was said to be its *aitia*, a theory reluctantly abandoned by Socrates, the use of the good to exemplify the *deuteros plous* has curious implications. Here is a theory in which the good, or alternately participation in it, is once more said to be an *aitia*. It is instructive to see why Socrates (rightly) doesn't see this as a substitute for his preferred teleology.

What can be explained about a thing by citing its participation in the good itself on its own? Only this, that it happens to be good. But Socrates had much grander hopes for a theory which used *Noûs* bringing about various arrangements because they were good. In each case, goodness ought to account, not only for the *goodness* of a state of affairs, but *also* for that state of affairs itself—that is, we ought to be able to say, citing its goodness, why intelligence brought *that* about (e.g., brought it about that the earth is a spherical thing.)

By comparing the two examples Socrates has given us of how the good can be an *aitia*, we have isolated a crucial ingredient in the intentional/teleological accounts. Explaining by goodness is not just one more explanation of a feature (namely goodness) possessed by a number of particulars: it is a way of explaining why particulars possess

26. Compare *Phd.* 100d6–7, 102c2 with Aristotle, *Met.* A 991b3, *Met.* Z 1034a2–5, *Gen. et Corr.* B. 335b7–24. An effective reply to the claim (in G. Vlastos, "Reasons and Causes in the *Phaedo*" *Philosophical Rev.* 78 [1969]) that Aristotle has misunderstood Plato in these criticisms is to be found in Annas (1982).

the *other* features they do. We may wonder, then, whether Plato ever considered form participation as an adequate account of why a particular or sort of particular can be said to have some feature or other.

Now the issue of how goodness is related to other features of the world is one which Plato explores from a variety of directions. The *Republic's* analogy between the sun and the good is one such exploration,²⁷ the *Philebus* in its entirety is another. Whether these explorations constitute a linear development or are mutually consistent I am not prepared to say. But they all in their way deal with the issues that arise when the Anaxagorean excursus and the *deuteros plous* are treated as components of a single discussion of explanation.

I wish to consider the *Timaeus* as another such exploration. Its affinities to the Anaxagorean component of the *Phaedo* have been noted since ancient times, at least in a general way: a craftsman uses his intelligence in order to produce a good *κόσμος*.

But with a more fine-grained picture of the *Phaedo's* account of explanation, a richer understanding of this relationship is available to us. In particular, the *Timaeus* appears to develop a theory of explanation in which the distinction between forms and the world of perceptible particulars is an aspect of an intentional/teleological account of the world. The *πρώτος* and *δευτερος πλοῦς* have been united. If this appearance is not deceptive, such unification must entail an account of "good intentions" explanations and how they relate to an account of the perceptible world in terms of separate forms. Many questions are opened up: what has happened to the distinction between true causes and the means of their operating? Are forms, Intelligence and the good *all aitia*? What is the nature of the good the demiurge is seeking to achieve? Behind these questions, I shall argue, is one basic one: Why did Anaxagoras' *Nous* become a divine *craftsman* in Plato's later thought? A reasonably detailed answer to this last question goes a long way toward explaining the differences between the account of scientific explanation in the *Phaedo* and in the *Timaeus*.

II. HUMAN CRAFTSMEN

The *Cratylus* considers the giving of appropriate names to be a craft. The good rhetorician is, according to the *Gorgias*, just like other

27. For excellent discussions of which, cf. Gerasimos Santas, "The Form of the Good in Plato's *Republic*," in J. P. Anton, A. Preus, eds., *Essays in Ancient Greek Philosophy* (Albany: SUNY Press, 1983) pp. 232–263; Nicholas P. White, *A Companion to Plato's Republic*, (Indianapolis, 1979) pp. 171–181.

craftsmen (503e1). The maker of good laws is a practitioner of statecraft, a craft parallel in many ways to weaving (*Statesman*, *passim*). And, as we've seen, the divine intelligence which is responsible for our world having the character it does is also a craftsman (*R VII* 530a6, *X* 596c4, *Lg. X* 889–906, *Ti. passim*, *Phlb.* 26e5, *Sph.* 262b5–c4). The *Republic* is already toying with the idea that the natural world is the product of a craftsman;²⁸ and the later dialogues consider it wrong-headed to treat the products of nature as anything other than *craft* products. Looking carefully at what Plato imagines to be involved in the production of a craft product is thus an integral part of understanding his philosophy of nature.

As a focal text, we can do no better than this characterization of the craftsman in the *Gorgias*:

Come now, the good man who speaks with a view to the best, surely he won't speak at random, but will look to something? He will be like all other craftsmen; each of them selects and applies his efforts looking to his own work (*βλέποντες πρὸς τὸ αὐτῶν ἔργον*), not at random, but so that what he produces will acquire some form. Look for instance if you like, at painters, builders, shipwrights, all other craftsmen—whichever one you like; see how each of them arranges in a structure whatever he arranges, and compels one thing to be fitting and suitable to another, until he composes the whole thing arranged in a structure and order (503d6–504a1; Irwin trans., with modifications).

This protean passage makes note of five distinctive features of the craftsman's activity.

1. Craftsmen proceed by looking to a paradigm, an *εἶδος*, an *ιδέα* or *ἔργον*.²⁹ Indeed, to use the language of paradigm and likeness or imitation is simply to use the natural language of craftsmanship. But lest we imagine the image of "looking to" as pictorial, it is relevant to recall that the *ὁ ἔστιν κ* locution is substitutable for any of the above names of the craftsman's intensional object. The requirement that a craftsman look to a paradigm insures that his activity is, as the above passage stresses, orderly rather than random. It does not by itself insure

28. With the reference at 530a6 the strangely playful wording of *R. X* has more force. It remains true, however, that the latter discussion is ambiguous: 596b9–10 says, "For surely none of the craftsmen craft the idea itself; for how could he?" but then asks what such a craftsman would be called (596b12). In the same vein, 596e5–9 suggests this craftsman is the one referred to at 530a6, but then hints that only a person with a mirror could produce all natural things, and only in the sense of producing *images* of them. But then the form of the craft product is reintroduced as perhaps the work of a god at 597b5, again with some hesitancy (*ἦν φαίμεν ἄν, ὡς ἐγώμμαι, θεὸν ἐργάσασθαι*). Finally, at 597c1–d1 Socrates seems straightforwardly to assume such a deity.

29. Typically, *βλέπειν πρὸς*; e.g., *Grg.* 503d8, 504d5; *Cra.* 389a5, c5, c7, d6, 390c; *R.* 472a1–7, *R. X* 596b7, *Ti.* 28ab.

that his actions produce the best possible product: the *Cratylus* warns against using a faulty paradigm (389b₁–3), and the Demiurge of the *Timaeus* fortunately looked to a timeless rather than a changing paradigm (28a₆–b₂).

2. There is no suggestion that such copies or imitations would arise *without* the activity of the craftsman. Nor is it suggested that the form or paradigm of the craft product is an *aitia* of its likenesses, copies or imitations. Within this model—that is, when the dialogues recount a discussion of craftsmanship—the language of communion and participation to describe the relationship between what-k-is and the many (sorts of) k's is absent. The *Cratylus* likes “placing the form in the materials” (389c₁, 389c₆–7, 389c₉, 389d₉–6, 389e₁–3, 390b₁–2, 390e₃–4); above, we have the craftsman placing, sometimes compelling, things into proper order, which entails having a certain form (*εἰδός τι*). In every case, being like a form is not something which just happens; it is the result of a goal-directed productive activity. Interestingly, the goal is never to make a good copy: making a good copy is a means to accomplishing some (other) good.

3. If a craftsman must *look* to a paradigm (which may simply mean that he must know *what it is* that he is making), so must he *work with* materials. Becoming a likeness of a form is not like becoming warm through being acted on by a very hot object; it is a matter of materials being structured, organized, and arranged. An unorganized, disintegrated plurality is compelled to become “a whole thing arranged with structure and order.” In fact the quoted passage introduces a section of the *Gorgias* in which Socrates suggests that just as it is the physician's task to restore or maintain *τάξις* and *κόσμος* in the body, so it is the good rhetorician's task to restore or maintain *τάξις* and *κόσμος* in the soul (504a₃–e₄).

This element of the craft model recalls that it was in contexts where the order that prevailed in nature required explanation that Socrates found the idea that Intelligence was its *αἴτιον* and the goodness of that order its *αἰτία* so compelling. Socrates spoke reprovingly of those who forgot that “the good and binding truly does bind and hold things together” (99c₅–6). This reproach echoes throughout the *Republic*. At 462b₁–2 we are told that the greatest good for a state (whatever it turns out to be) “binds it together and makes it one (ὁ ἄν συνδῆ τε καὶ ποιῆ μίαν), its greatest evil is whatever fractures it and makes it many instead of one (ὁ ἄν αὐτὴν διασπᾶ καὶ ποιῆ πολλὰς ἀντὶ μίας).” The breakdown of the good *polis* begins when it becomes two rather than one (551d₅). The fact that justice is each part of a state or soul

doing what is naturally its own is always a theory about the harmonious order achieved by a soul or *polis* being just.³⁰

4. This speaks (briefly) to the issue of the nature of the *ordering* materials receive. But it is equally central to craftsmanship that it is constrained by the fact that it is an activity of ordering *materials*, and these materials are a given, in two distinct ways. First, the nature of the craft product constrains the *choice* of appropriate materials: knives must cut; making them of soft or crumbly material won't do. Second, whatever material is used has a nature of its own: the craftsman cannot do anything he likes with his material, but only what it is capable of being compelled to do. *The Cratylus* compares the namegiver to a smith or a carpenter. If one is to produce names, awls, or shuttles, one must use letters, iron or wood (whether Greek or foreign is not relevant). If one is given letters, iron or wood, only certain sorts of copies can be made. (387e–390b₅) In neither case need we imagine that the given determines a *unique* choice; but it *constrains* the craftsman's choices and actions considerably.

5. Finally, Socratic discussions of craftsmanship present a curiously ambiguous attitude toward the good intended by the craftsman's work. This ambiguity results from a distinction which periodically emerges within the craft model between the person who *directs* or *oversees* production and the producer himself. The maker of a shuttle produces an instrument for the weaving of other things; it is the *weaver* who will know what a good shuttle ought to be like, and will use this knowledge to guide the actions of the carpenter. In such cases, the user of the instrument is said to have knowledge of what a good instrument consists in and to direct the builder (*R. X* 601e–602a, *Crat.* 390b–d).³¹

30. These passages, which all suggest the good is a unity achieved through mathematical bonds, are a clue to the relevance of the increasingly mathematical course of study recommended in *R. VII* to grasping the nature of the good. In a variety of Platonic texts it is suggested that goodness for a plurality is to be found in the principles which bind it into a unity, principles of proportion (*ἀναλογία*) and commensurability (*συμμετρία*) or measure (*μέτρον*). The same language appears in the *Statesman's* characterization of statecraft (308c–311a) and the *Timaeus's* characterization of the Demiurge's work (32b, 69c). Such passages make it less surprising that, as Aristoxenus relates, Aristotle reported that Plato's lecture “On the Good” turned out to be a discussion of arithmetic, geometry, and astronomy, culminating in the claim that *τὸ πέρας ὅτι ἀγαθὸν ἔστιν ἓν* (Aristoxenus, *Elementa harmonica* 2: 30–31). Cf. Konrad Gaiser, “Plato's Enigmatic Lecture ‘On the Good,’” *Phronesis* 25 (1980): 5–37; John Cooper, “The Psychology of Justice in Plato,” *American Philosophical Quarterly* 14 (1977): 151–157, esp. 155. The development of this section of this paper owes much to suggestions by David Furley and Joan Kung.

31. A related but somewhat different distinction is drawn in the *Statesman* between

The idea that the good achieved by craftsmen is instrumental is at times subordinated to a quite different notion of goodness, one which "faces in the other direction," so to speak. The very existence of the craft product, because it represents the triumph of order, unity, proportionality, and harmony over their opposites in a given domain is viewed as a good in itself. In the passage with which we began, for example, the usefulness of the craft product is not discussed, for the production of a good soul, the focus of the discussion, is not measured by its instrumentality but simply by the unity and harmonious order of its parts. This counterentropic concept of goodness is relative to the random, uncoordinated dis-integration that would exist in the absence of the goal-directed intelligence of the craftsman—relative perhaps to that world of universal flux which, surprisingly, the world we live in is not.³²

III. DIVINE CRAFTSMEN

It is not news that the *Timaeus* fulfills the fondest wishes of the Socrates of *Phaedo* 97–99. But while this is often noted in a general way, the comparison between the hope and the fulfillment is seldom looked at in detail. I now propose to do just that. The first order of business is to establish that *Phaedo* principle *P* is in place, and to explore the rich theory of causality in the *Timaeus* against the background of the *Phaedo*. Then I wish to explore in some detail the influence of the model of craftsmanship just discussed on the role of intelligence in the *Timaeus*.

Timaeus opens his portion of the feast being served up to Socrates by stating the reason why (δι' ἡντινα αἰτίαν) the framer of the entire universe (τὸ πᾶν) did so.

the overseer of a craft such as weaving or governing and those who supply the materials necessary for weaving. Cf. *Plt.* 281a–e, 287d; and compare Aristotle, *EN* I.2, 1094a26–1094b11.

32. Aristotle's claim that Plato's desire to separate forms from particulars grew out of the influence of Heraclitus and Cratylus and their doctrine of radical flux has been used to shed light on the development of Plato's thought by Terry Irwin, "Plato's Heracliteanism," *Philosophical Quarterly* 27 (1977): 1–13; and R. W. Jordan, *Plato's Arguments for Forms*, *Proceedings of the Cambridge Philological Society* (Cambridge, 1983). *Thl.* 179d3–183b7 and *Cra.* 439d–440 indicate Plato's concern with this doctrine, and it is common to suggest that Plato may have held some such view of the physical world. I believe that, at least from the *Timaeus* onward, Plato's view could be stated counterfactually as follows: If the physical world were not the product of a good and efficacious craftsman, it would be as the friends of flux describe it. The initial description of the Receptacle prior to divine craftsmanship is remarkably like the account of the flux doctrine in the *Theaetetus*, but it is important to recall that that passage does *not* describe the physical world as it actually is.

For the god, wishing all things to be good and nothing to be bad in so far as possible, took over everything which was visible—not at rest but moving in a discordant and disorderly manner—and led it from disorder to order, judging this to be in all respects better. (30a2–5)

The explanatory role of the good to be achieved by a state of affairs coming about is no longer expressed in the language of αἰτία. The αἴτιον/αἰτία distinction is reserved for the divine craftsman and the necessary motions of materials or for propositional accounts of their respective causal functions. The typical explanation has it that the divine craftsman uses or persuades various unintelligent cooperative materials to bring about a certain state of affairs, *in order that* some good is achieved, or *for the sake of* some good.³³ Thus the divine craftsman of the *Timaeus* acts with intelligence, and what is thus brought about does so *because* that state of affairs is good—the best, given the possibilities. Which is to say, *Phaedo* principle *P* is at the heart of *Timaeus*' plausible story about the cosmic likeness of the Living Thing Itself.

Whereas the aetiological role of the good in the *Timaeus* is virtually always expressed by prepositional phrases or final clauses expressing purpose, there are two sorts of causal agents reference to which is taken to be essential to a fully adequate explanation of any stable feature of the world. At 68e7–8 these explanations are referred to as the divine αἴτια, which makes reference to intelligence or the craftsmen of beautiful and good things as a cause (46e4, 48a2), and the necessary αἴτια, which makes reference to whatever produces in a random and disorderly fashion in the absence of the divine αἴτια (46c7, d1, e6, 76d6). The latter are cooperative causes (συναίτια, συμμεταίτια), used (46c9, 76c6) and ruled through persuasion (48a2) by the former.

The compatibility of these two "agencies" and the consistency of the idea of a "necessity" which can be ruled and persuaded and which is equated with chance when not so ruled was persuasively argued some years ago by Cornford, followed by Morrow, and others. The brilliant Epilogue to *Plato's Cosmology* reveals the extent to which such ideas were a legacy bequeathed to Plato rather than inventions of his own.

But Cornford, in attempting to avoid the idealism of earlier accounts of this distinction, was misled into positing two *realms* in the cosmology of the *Timaeus* corresponding to this distinction, and Vlastos

33. ἵνα and ὅπως with final clauses used at 32a1, 33a2, 38b6, 38c4, 39b2, 5, 39d9, 40a2, 41c3, 47b6, 69e3, 70b3, c7, d3, e5, 71b3, 74b4, e5, 77a4, c8, e3, e6; ἐνεκα at 39d7, 47a1, c5, 74a7, 75d6, 76d1, d7; χάριν at 33c1, 72b7, 72c2, 75e1; διὰ τὴν αἰτίαν at 33a6, 38d7, 40b4. Notice the virtual absence of these expressions from *Ti.* 49–69.

has recently followed.³⁴ These authors both imagine that the Demiurge had a better world than the one actually produced in mind, that the inherent powers of the world's basic constituents were recalcitrant, that the Demiurge was thus forced to compromise with his ideals, and as a consequence this world has an irreducible realm where necessity reigns, unpersuaded by intelligence.

The first premise in this argument is crucial, for it determines what will count as evidence for the others. If one postulates a world quite different from our own as the Demiurge's goal, then the world we see necessarily falls short, and one might look to the distinction between the two *αἴτια* as an account of this.

But in none of the statements of the Demiurge's aims is any goal mentioned other than to bring the maximum order and perfection possible to the materials at hand. And it is consistently maintained that this is achieved.

The central portion of Timaeus' story, concerning what occurs of necessity, drops copious hints that necessity is an aspect of every part of the Demiurge's construction and that within that construction it is always a servant of intelligent ends.

First, the random flux described in the language of chance and disorder is explicitly described as what the Receptacle, *absent intelligence*, would be like (48b, 53b, 69b). This suggests that, even as an account of the physical world, Plato could not buy the ontology of radical flux described at *Thi.* 179–83 and *Cra.* 440. It is rather an ontology of a world uncontrolled by intelligence working for the good.

Second, "the productions of necessity" rely throughout on intelligent design. Only the random traces of the elements would occur in the absence of intelligent design, but much, much more than that is described at 46a–c and 53c–68d.

Finally, the description of the necessary powers and properties of the physical world as *sunaitia* is a give-away.

The necessary causes in the *Timaeus* are *always* the inherent necessities possessed by the materials at hand, used or persuaded by divine intelligence "to lead (*ἄγειν*) the greatest part of the things that come to be to the best" (48a3). It is important to stress that it is the material necessities that are the subject of *ἄγειν* here. The role of intelligence is clearly circumscribed. Plato does not conceive of intelligence as superimposing *other* sorts of activities on a recalcitrant matter with its own—intelligence uses those very material powers, insuring that they shall *work together* for the best result.

34. F. M. Cornford, *Plato's Cosmology* (London: Routledge and Kegan Paul, 1937), pp. 173–175; Vlastos (1975), pp. 28–30.

When our creator made our heads shaggy with hair, he used the aforementioned causes (*αἰτίαις*), while reasoning that this rather than flesh ought to be the covering around the brain for the sake of protection (*ἔνεκα ἀσφαλείας*). . . . (76c5–d1)

Among "the aforementioned causes" is the necessary behavior of thin skin when acted on by the heat and moisture necessarily emanating from the brain. "Nail was crafted by these agents (*τοῖς συναίτιοις*), but due to the most responsible reasoning (*τῇ αἰτιωτάτῃ διανοίᾳ*) for the sake of (*ἔνεκα*) the fashioning of the things which were to be later." (76d6–8) Here then are the necessary results of drying on a compound of sinew, skin, and bone.

Such passages indicate clearly that a *συναίτια* is the physical *agency by means of which* intelligence achieves good ends. Plato doesn't conceive of *nous* superimposing other kinds of activity on those of matter, but as insuring certain specific interactions will take place among all those possible, namely, just those which will cooperatively produce the best possible cosmos. His model is of a reasonable counsel who accomplishes his ends by *persuading* various agencies to operate cooperatively, according to a plan, for some end.

These explanations recall the relationship between the master weaver (and by analogy the statesman) and the subordinate craftsmen in the *Statesman* who are referred to as *τὰ συναίτια* (281d11–e10). They are described as "that without whose attendance the ruler of each of the arts would never produce" (281e2–4), words which again recall the *Phaedo's* notion of "that without which the cause would not be a cause." The statesman, and the true weaver, act by directing and commanding their subordinates.³⁵ This image, perhaps borrowed from the world of craftsmanship, captures well the nature of the relationship between reason and "necessity." Viewed independently of the *guidance* and *coordination* of intelligence these active materials are "wandering" causes (48a7), producing in a disorderly manner whatever chances to occur (46e5). Without intelligence, only fleeting traces of the four elements would appear, and then only by chance (69b5–c2). But *they* are capable of being persuaded to produce the best order possible (46c7–8; 48a1–4). To call them *sunaitia* is to describe them as operating and interacting according to a plan which is, however, not their own, much like the *productive* craftsmen are guided in their work by the *directive* craftsmen.

The chief methodological message of the *Timaeus* is that, of any feature of the physical world we must ask two distinct questions, and seek

35. *Plt.* 281a–e; 287d.

out two distinct "because's": (i) What are the physical interactions required to produce this result? (ii) What is the good for the sake of which these physical processes are *cooperating* to produce this result?

... he (the demiurge) made use of causes of this sort as subservient, while he himself contrived the good in all things that come to be. We must accordingly distinguish two kinds of causal account, the necessary and the divine. (68e₄-7)

We must speak of both kinds of causes but separate those which, with intelligence, are craftsmen of fine and good things, from those which in the absence of foresight, produce their sundry effects at random and without order. (46e₃-6)

The *Timaeus* recommends that *we*, as far as possible, distinguish these two sorts of explanation. But this is a recommendation concerning how best to understand the world, not an account of distinct aspects of the world's makeup. These passages do *not* picture a layer of the operations of the world where necessity is unconstrained, nor does it distinguish, as Prof. Vlastos suggests, between triumphs of "pure teleology" and compromises between teleology and necessity. Precisely, it characterizes a world which, at every level of structure, is the product of necessary physical interactions ordered and coordinated for the sake of some good.

The *Timaeus* thus develops the teleology of the *Phaedo* in rich and complex ways. In contrast with the *Phaedo*, however, the *Timaeus* never describes *forms* as causes. This, and the introduction of a third element in Plato's ontology, the Receptacle, are directly attributable to Plato's use of the image of divine craftsmanship, an image absent from the *Phaedo*.

A common image used by commentators to characterize the Receptacle in the *Timaeus*, though not one used by Plato, is the image of the mirror.³⁶ The things which come to be are images of the forms, reflected in the Receptacle. This image is dangerously misleading, for it ignores the fact that anything which has a stable enough existence to be named at all is *constructed* by intelligence (69b₃-c₂). Thus there is no sense in which the world we perceive is due to simple reflection. Plato *does* describe a precosmic activity in the Receptacle (52d₂-53c₂; 69b₅-c₃), which involves mere chance occurrences of traces (ἔχουσα, 53b₂) and characters (52d₆) of the four elements. This suggests that,

36. Cf. R. E. Allen, "Participation and Predication in Plato's Middle Dialogues," in *Studies in Plato's Metaphysics*, ed. R. E. Allen, (London: Routledge and Kegan Paul, 1965) pp. 55-58; Cornford (1937), p. 181; Kenneth M. Sayre, *Plato's Late Ontology: A Riddle Resolved*, (Princeton University Press, 1983) p. 249. Indeed all three writers talk as if 52c discusses the Receptacle as a mirror. It doesn't; R. X, 596c, uses the notion of mirror images, but with reference to the relationship between images and their imitations.

without intelligent guidance the receptacle may, somehow, participate in the two basic sorts of triangles out of which the elements are constructed.³⁷ But what is crucial for Plato is that the world is *not* such an indeterminant and nameless flux, though if intelligence were not present it would be. In so far as "space" has the character of the rational, ensouled mathematically structured and stable organization that it does, it is due to intelligent persuasion.

Participation, then, understood as a relation between copy and paradigm in virtue of which the copy may bear the name of the paradigm, is not something which occurs independently of an intelligent agent aiming to achieve some good.³⁸ Thus the explanation of some feature of our world in terms of its likeness to a paradigm is, in the *Timaeus*, only an aspect of the nature of intelligent production, not worthy of independent identification as a cause. As we were led to expect by our brief look at Plato's human craftsmen, paradigms within a craft model are not *aitia*.

But again, everything which comes to be does so from necessity by some cause (ὅτι αἰτίου τιτός); for in all cases it is impossible for there to be a generation apart from a cause. Now, whenever the craftsman, looking to (βλέπων . . . , πρὸς . . .) that which is always the same³⁹ and using some such paradigm,

37. It is startling that the standard English commentaries on the *Timaeus* don't really face the issue of the nature of the basic elements which the craftsman encounters in the Receptacle. The triangles themselves are never explicitly said to be constructed—earth, air, fire, and water are constructed from them by god (53b), or traces or *pathē* of this chance to occur (52d, 53b, 69b-c). On the other hand, forms of earth, air, fire and water—accounts of their stereometric configurations, perhaps—are mentioned, but *not* forms of the two basic triangles used in the god's stereometry. Plato leaves us with the material for two inferences, and I can't see any obvious means of deciding between them. The first, suggested by Mary Louise Gill at the *Princeton Ancient Philosophy Colloquium* on "Plato's Natural Philosophy" in "Matter and Flux in Plato's *Timaeus*" is that the triangles are the basic physical constituents of the Receptacle. Gill does not discuss the possibility of there being permanent images of Forms of the Right Angle Scalene and Isosceles Triangles. There are difficulties with either view. On the one hand, no such forms are mentioned. On the other hand, the radically indeterminate and unmeasured nature of the pre-crafted contents of the Receptacle is difficult to reconcile with the view that it is replete with geometrical objects.

In either case it remains true that all those *gignomena* for which forms are mentioned are *constructed out of basic elements*. This view of the physical world, furthermore, is detachable from the mythic imagery of the *Timaeus*, for it is mentioned in virtually *all* later dialogues.

38. Thus Plato himself seems to have answered Aristotle's critique of form-participation explanations in the *Phaedo* (discussed in note 26 above). He accepts the view that without the activity of a goal-directed agent, participation will not provide an account of coming-to-be. The Demiurge is a response to such complaints. Cf. Annas (1982), pp. 313, 315.

39. Taking the *αἰεί* in *πρὸς τὸ κατὰ ταῦτα ἔχον βλέπων αἰεί* with *ἔχον* rather than *βλέπων* in light of 29a1-7, where *τὸ κατὰ ταῦτα καὶ ὡσαύτως ἔχον* (29a1) is the equivalent of *τὸ αἰδίον* (29a3-a5).

fashions (*ἀπεργάζασθαι*) the *idea* and capacity of it, everything thus completed is from necessity beautiful (*καλόν*). But whenever he looks to a generated thing, using a generated paradigm, what is thus completed is not beautiful. (28a4–b1)

Out of an extensive list of questions this passage raises, the one I wish to focus on is why it is stressed that the craft product will only be *καλόν* if the divine craftsman uses a changeless model.⁴⁰ This is not justified in our passage, and on a certain interpretation of what it is the craftsman hopes to achieve, it is unjustifiable. For if he simply wants to make a living thing, and has no desire to make it changeless, why should it matter whether the paradigm is changeless?

The same question can be raised about arguments that the copy must be single and unique (30c2–31b3), that air and water are needed to make the body one and insoluble (31b4–33b1), that all movements but one are to be removed from it (34a2–6), that it be made if not eternal without qualification, at least an everlasting likeness (37b6–d8). As David Keyt has noted, such arguments seem to confuse copying the form of *living thing* with copying *the form* of living thing, *qua* form. Any paradigm has properties *qua* paradigm that it is “mad” to instantiate in one’s copy—houses, as copies of blue prints, should not be made of blue paper.⁴¹

The consistent stress of the above arguments in the *Timaeus* on producing a copy with these “formal” features make us doubtful that such a criticism understands Plato’s motives. The assumption of this criticism is that the goal of the Demiurge is to produce a living being (or living beings). This assumption is false. What the Demiurge aims to do, as we’ve seen, is to bestow maximum unity, order, and persistence on his materials, because this is, in itself, *good* for those materials. The *means* of achieving this is to copy the form of Living Thing in these materials. Reconsidered in this light, the Demiurge is, at least from an economic point of view, sane.

One can achieve *this* sort of goodness only by looking to the changeless paradigm, for only it truly instantiates those features you strive for in your model. Your copy must be, if possible, unique (*μονογενής*)⁴² for a number of related reasons, all given by Plato.

40. As Cornford notes (p. 27), the background is likely the distinction between true producers and mere imitators in *R. X*, 597–598. Another use of this distinction in the *Timaeus* is Plato’s reference to the created gods, who base their mortal constructions on the Demiurge’s created model, as *imitators* of his work.

41. David Keyt, “The Mad Craftsman of *Timaeus*,” *Philosophical Review* 80 (1971): 230–235; for criticisms in a similar vein, cf. Santas (1983), Richard Mohr, “What Plato’s Demiurge Does” (unpublished).

42. *μονογενής*: cf. Parmenides, fragment VIII: *ὡς ἀγέννητον ἔόν και ἀνωλεθρόν ἐστιν/οὔλον μονογενές τε και ἀτρεμές ἤδὲ τελεστών.*

First, the form of living things is pictured as a genus/species hierarchy (30c5–6, 39e3–40a7). If the god made two animals, each would be a *μέρος* and thus a copy of one *sort* of living thing, but not a copy of Living Thing itself. “Now we must never suppose the maker composed the world of those things which are in the form of parts—for nothing akin to the incomplete could ever come to be beautiful—but of that of which the other animals, individually and by kinds, are parts. . . .” (30c3–6) Thus Plato views making “two or a plurality” of living things as akin to making copies of subkinds of Living Thing. But an obvious alternative view seems possible—why could the craftsman not work with many distinct parcels of material, providing each parcel with copies of *all* the living things, and therefore a complete copy in the relevant respect. Plato’s response to this alternative is parallel to his response to supposing that there are two *forms* of Living Thing. On what grounds do we claim that more than one copy has been produced? Each of these “parcels of material” contains the same four kinds of living thing, under the same (generic) kind. If there were two islands that possessed the same four species of the genus finch, no biologist would argue that we had two finch kinds and eight distinct species.

A response to this argument carries me to my next point. One might say that Plato has to admit the possibility that a good craftsman could construct two animals, at least in so far as they are spatially differentiated, even if they are of one kind.⁴³ But this is false, because a good craftsman is out to unify and organize his material to the greatest extent possible, and this would not be accomplished by the construction of two formally identical but materially distinct universes. It must never be forgotten that the materials of *this* craftsman make up the *entire* visible flux. If it can become one, unified, bound together whole, it will be better than if it remains to whatever extent a plurality.

Which introduces a third reason for the Demiurge’s monomania—a composite body, if acted on from without, can be destroyed. An antidote to this possibility is to produce one, self-contained physical system, as the Demiurge is craftily aware. (33a–b)⁴⁴

Briefly consider the other Demiurgic activities, remembering that the goal of the informing process is not in the first instance to make a

43. This response was suggested to me by a comment from Richard Perry during the Princeton Colloquium; cf. his “The Unique World of the *Timaeus*,” *JHP* 17.1 (1979): 1–10. I agree with Perry that the Demiurge’s primary concern is to craft an orderly and harmonious perceptible world. But I believe the argument set forth here allows that without requiring us to abandon the standard account of the Living Thing itself embracing its four *genē* as something like a relation between kind and subkinds.

44. Cf. 32c5–33b1.

living thing, but to provide maximum unity and harmonious structure (mathematically conceived throughout) to the visible and tangible world. Take the puzzling account of why the world body consists of just the four elements. Fire and earth are introduced as implications of our world's visibility and tangibility. Air and water, however, are provided with a very different explanation. "But two things alone cannot be satisfactorily united without a third; for there must be some bond (*δεσμός*) between them, drawing them together. And of all bonds the best is that which makes itself and the terms it connects a unity in the fullest sense (*μάλιστα ἐν ποιῆ*) and this is naturally effected best by a proportion (*ἀναλογία*)." (31b8–c4) The three dimensional nature of the cosmos requires a four-term proportion and thus (with some work), air and water are explained.⁴⁵

Notice that two goods are effected by the creation of precisely four elements. One is that the visible and tangible plurality becomes a *unity*; the second is that it becomes *indissoluble* (*ἀλυστον*), except by the one who bound it together. This is the beginnings of a world that is as far from the randomly shifting flux of the *Theaetetus* and *Cratylus* as a physical world can be. Behind the world revealed to us by our sense organs is an organization and stability which is due to intelligent production of the good.

Again the craftsman, while he cannot turn what is by nature created into something eternal, can, and does, endow it with an orderly and simple change "revolving according to number, an imitation of eternity" (37d–e). Likewise, as we've seen, the mathematical structure it embodies allows it to be indestructible. It is self-sufficient (68e), and possessed of every sort of measure, order and harmonious proportion (30a, 68b–d). In this way each aspect of the cosmos possesses a *symmetria* both relative to itself and to everything else (69d2–5).⁴⁶ Finally, while he cannot remove the world of becoming from the realm of change altogether, he does his best. "He caused it to turn uniformly in the same place and within its own limits and made it revolve round and round; he took from it all the other six motions and gave it no part in their wanderings." (34a2–6)

The constant stress, then, on the creation of as Parmenidean a universe as possible is not a mistake—or if it is, it derives from a mistaken

45. For an interesting conjecture on the mathematical background to the passage, cf. Cornford (1937), pp. 45–52.

46. Cf. the interesting account of *συμμετρία* in *R.* VII in A. D. P. Mourelatos, "Plato's 'Real Astronomy': *Republic* 527d–531d" in J. P. Anton, ed., *Science and the Sciences in Plato* (New York, Eidos, 1980), pp. 33–73. In particular, the important discussions of the parallel between *R.* 530a–b and *Ti.* 69b3–5, pp. 39–40 and 56–58.

theory of goodness. Given the conception of the good that is operative, and given the goodness of the Demiurge (which we dare not deny!), his activities as characterized in the *Timaeus* are as we should expect.

Where does this concept of goodness as a mathematical ordering and unifying of a diverse plurality come from? We have seen it as a natural feature of the craft model. But the notion of order and unity is given a very precise meaning in the *Timaeus*. An ordering and unifying of elements is here achieved by creating relations of proportionality and commensurability among them and their changes.⁴⁷ And this is carried through in the production of mortals by the created, imitating gods⁴⁸ and in the transformations undergone by the solids which constitute earth, air, fire, and water. Plato did not have to invent the idea of a mathematical account of any of these domains. But for him that such accounts were possible itself required explanation. He accounted for the underlying measurability of the *cosmos* by identifying that measurability with the good aimed for by a divine craftsman.

It is this mathematical version of counterentropic goodness which the Demiurge seeks to achieve by his actions and is perhaps most explicitly articulated in the following comment of Socrates near the close of the *Philebus*: "[Surely no one is ignorant of this] that every compound which does not in any way partake of measure and the nature of proportion necessarily destroys both the mixture and first of all itself. . . ." (*Phlb.* 64d 9–11) Rather, you end up with, in the inspired translation of Hackforth "a miserable mass of unmixed messiness" [64e 2–3]. This is the *δύναμις* of the good [64e5] found in the nature of the beautiful, in that beauty and excellence turn out to be a matter of measure and proportion.⁴⁹

Likewise, in a quiet reference to the *demiurgos* of the heavens in the *Republic* (530a3–b4), we are told that it is the astronomer that focuses on the nature of the *συμμετρία* which the heavenly movements exemplify as well as physical bodies can, that may hit on the nature of the beautiful and the good (531c5).

And indeed, apprehension of *this* good is the teleological explanation why our eyes interact with the physical world as they do.

But for our part, let us speak of eyesight as the cause (*αἰτία*) of this benefit, for the sake of these things:⁵⁰ the god invented and gave us vision in order

47. Cf. *Ti.* 73c1, 74c5, 85c5, 86c5, 87c–d, 90a2.

48. Cf. *Ti.* 59a1, 62a3, 64d9, 66b1, 66d3, 67c7.

49. Compare, *R.* VII: 529e3–530b1; Aristotle, *Met.* M.3, 1078a36–1078b6.

50. Following Cornford (1937) on 47b5–6; cf. p. 158, note 2.

that (*ἔνα*) we might observe the circuits of intelligence in the heavens and apply them to the circuits of our own thought, which are akin to them, the orderly to the disorderly; thus by learning from them and taking part in correct calculations in accordance with nature, and imitating the completely stable circuits of the divine, we might stabilize the wanderings in ourselves. (47b5–c4)

Notice that sight is the *αἰτία* of the good which results, and that we have eyesight because (*ἔνα*) of the good which results. Vision is the mechanism by means of which we may discover the good. But this is not an end in itself. We are provided with vision in order that we might get our souls in shape. The Demiurge aims at this, of course, because we are a part of the visible world he wishes to be good.

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9 THE PRIMACY OF ΟΥΣΙΑ: Aristotle's Debt to Plato

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In this essay I shall attempt to clarify some of Aristotle's early views concerning the nature of being and substance. My approach will be based on the assumption, shared by many students of Aristotle today, that to see how Aristotle's thought develops, in these crucial areas at least, we must compare his views with those of Plato. Two of the best known exponents of this approach to the study of Aristotle's metaphysics are Werner Jaeger and G. E. L. Owen. On a very general level, one might say that, according to Jaeger's interpretation, Aristotle begins at Platonic starting points and gradually develops a position which is, in most essential respects, quite different from Plato's. Owen, on the other hand, has tried to show that Aristotle's relationship to Plato is much more complex: that in relation to some issues Aristotle starts from a position antithetical to Plato's and eventually arrives at views much more in harmony with those of his mentor. A good example is the development of Aristotle's conception of metaphysics as a science of being in general. According to Owen, in his early works Aristotle associates the idea of a general science of being with Platonic dialectic, and argues that such a science is impossible; there can only be departmental sciences, sciences dealing with specific kinds of entities. Later, in the central books of the *Metaphysics*, he seems to be much more sympathetic towards the Platonic project and describes his own inquiry as a science of being in general.

Owen suggests that the reason for this surprising reversal was Aristotle's discovery that the categories of being exemplify the relationship he labels "focal meaning." As a result of this discovery Aristotle came to see that there was a unity in the concept of being that had earlier

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