12-1971

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SAGP-1971

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One of the most influential of Aristotle's ideas, the idea that the heavenly bodies consist of a fifth element distinct from the four earthly elements (earth, water, air, and fire) is widely believed to have been introduced to the world for the first time in Aristotle's lost dialog De Philosophia. This assumption has created a host of problems which have not yet been solved. For example, Aristotle's proof for the fifth element in De Caelo I, 2-3 depends on the doctrine of natural movements set forth at length in De Caelo III - IV. This suggests that the theory of the fifth element arose in Aristotle's extension of the idea of natural movement to the circular movement of the heavens.[1] But according to the generally accepted view, Aristotle in the De Philosophia maintained that the movement of the heavens is not natural, but voluntary (Cic. Nat. D. 2.44 = De Phil. fr. 21b Ross). If Aristotle announced his theory of the fifth element in the De Philosophia, where he denied that the movement of the heavens is natural, how did he come to hold this theory and what sort of proof did he bring for its existence?

To avoid having the discovery of the fifth element grounded in the theory of natural heavenly movement some desparate alternative grounds have been proposed. For instance, it has been suggested that the fifth element, still moving by will, not naturally, was introduced in the De Philosophia on the basis of the new, more precise astronomical calculations of Eudoxus and Philip of Opus, who had shown the region of the heavenly bodies to be much larger than previously suspected, in fact, so much larger than the rest of the universe, that, if it conisted of fire, the fire would long ago have consumed the other elements.[2] Or as an alternative it has been suggested that the idea of a fifth element could have originated simply on the basis of observed differences in behavior between the heavenly bodies and earthly elements.[3]

Nor are the original grounds for the theory the only problem encountered in claiming that the fifth element was announced in the De Philosophia. When we turn to the relative chronology of Aristotle's ideas and writings, we find another problem. If the De Philosophia did not recognize the natural movement of the heavens, it must be earlier than De Caelo I, 2-3. But what is its relation to De Caelo III - IV? It has traditionally been maintained that these two books deal only with the sublunary world and its four elements, but an unprejudiced reading suggests that at the time of writing Aristotle thought these four were the only elements in the cosmos.[4] For he maintains that there are no more than two simple local movements, upward and downward (Cael. 3.4.303b5-6), and that there can be no body which is neither heavy nor light (Cael. 3.2.301a20-b30, esp. b16-17, 30-31), thus ruling out the fifth element of Book I (Cael. 1.3.269b18-270a12). Moreover, fire is given special preeminence in being the only body absolutely light and without weight even in its own place (Cael. 4.4-5, esp. 4.4.311b4-5, 8-9; 5.312b14-16). Since there is no evidence of any body in which fire sinks, we may say that fire moves towards the extremity and rises to the surface of all moving things (Cael. 4.4.311b21-27). These

statements seem to leave no room for a fifth element. Thus it would appear that De Caelo III - IV was written, or at least conceived, before the theory of the fifth element.[5]

But if De Caelo III - IV were written or conceived before De Philosophia, we are driven to the incredible conclusion that by the time of writing the De Philosophia Aristotle had already developed the concept of natural movement (De Caelo III - IV) and had even proven that every simple body without exception (cf. τινὰ πᾶσιν in Cael. 3.2.300a21) possesses a simple movement (Cael. 3.2.300a20-301a22), but failed to apply this general rule to the fifth element in the De Philosophia, where he asserts that the movement of the heavens is not natural, but voluntary. It seems incredible that after De Caelo III - IV Aristotle could have posited a fifth element, inquired into its natural movement (which he must have expected it to have as a simple body) and yet never suspected that circular motion could be as natural as linear motion. We will be forced to admit either that Aristotle was guilty of gross blindness in missing the solution he was soon to discover in De Caelo I, or that in the De Philosophia Aristotle had abandoned the rule that every simple body has a simple movement only to reestablish it a short time later in De Caelo I.

The fact is that we are confronted with an insoluble problem when we try to order chronologically a) an exposition of the fifth element in which the natural movement of the heavens is denied (De Philosophia), b) an expostion of the natural movements of all elements, not recognizing the existence of a fifth element (De Caelo III - IV), and c) an exposition of the fifth element with its own natural movement (De Caelo I).

The way out of this dilemma is easier than one might expect, for the dilemma results from the uncritical acceptance of a single crucial assumption, namely that Aristotle proposed his doctrine of the fifth element in his published dialog De Philosophia. This assumption is so widely accepted, that for many modern writers it has virtually become a "fact".[6] Many of these writers back this "fact" with a mere reference to one or both of the two great modern authorities on the early Aristotle, W. Jaeger and F. Bignone.[7] The more meticulous restate the traditional evidence with complete confidence that this evidence proves their case. Before this assumption goes any further along the road to becoming a fact, it would be well to reconsider the evidence for it. Two fundamentally different lines of proof can be discerned, one based on a passage in Cicero, and the other on the doxographic evidence.

Let us begin with the proof based on Cicero, De Natura Deorum 1.33 (= Arist. De Phil. fr. 26 Ross). Here Velleius, an Epicurean, is attempting to refute earlier views about the gods by showing how contradictory they are. He observes that in Book Three of the De Philosophia Aristotle "sometimes assigns all divinity to mind, sometimes says the cosmos itself is god, sometimes places some other being in charge of the world and assigns to it such parts that it may regulate and preserve the movement of the cosmos by some kind of rolling, and sometimes, too, says that the ardor of the heaven is god." The crucial question is what is meant by ardor. Jaeger, who is the chief spokesman for this proof, comments, "Cicero translates 'ether' by Caeli ardor. This is usual, and the description of it as divine is further evidence that what is meant is Aristotle's hypothesis of ether as the fifth element. (Cf. Cic. De Natura Deorum I.14, 37; ardorem, qui aether nominetur to which Plasberg refers in commenting on our passage)."[8] If we trace this interpretation of Cicero's statement back to its original scholarly setting, we will be able to see why

it must be tested before it can be accepted. Bernays, trying to establish that the references in the extant works of Aristotle to "exoterikoi logoi" and "enkyklia philosophemata" were really references to the lost dialogs, had to find identity of substance between the fragments attributed to the De Philosophia (like the passage from Cicero) and the extant works. Hence he had polemical reasons to welcome this interpretation of Cicero's statement.[10] Moreover, Bernays wrote before anyone came to suspect an evolutionary development in Aristotle's thought, and he would have shared the common tendency to synthesize and harmonize apparent discrepancies. Consequently, he was predisposed to see caeli ardor as a reference to the fifth element of De Caelo. But this interpretation was not originated by Bernays. By 1850 it was already entrenched among commentators on Cicero, as the influential commentary of G.F. Schoenmann shows.[11] Commentators on Cicero both before and after Bernays followed the good philological principle that an author should be allowed to interpret himself; and so looked to Cicero's discussions of Stoicism, where Cicero explicitly states that the ardor of the heavens is called aether (Nat. D. 1.37; 2.41; cf. 2.91-92). From this they reasoned 1) that ardor in 1.33 translates the Greek word αἰθήρ and 2) that this Greek word refers to Aristotle's fifth element. Following these commentators Aristotelian scholars concluded that Aristotle promulgated the doctrine of the fifth element in the De Philosophia.

Before we can accept this conclusion, however, we must ask whether the two premises are correct. There can be no doubt that the Stoics believed that the cosmos consists of only four elements and that the element of the celestial region is a subtle fiery substance which can be called by various names, including heat, fire, and aether.[12] Thus when Cicero attributes to the Stoics the belief that both ardor and aether are legitimate names for the element of the heavens, we accept this as a correct statement of Stoic doctrine. But can we infer from Cicero's statement of Stoic doctrine that it is a peculiarity of Cicero's Latinity to translate the Greek word αἰθήρ by the Latin word ardor? The evidence of De Natura Deorum suggests that we cannot. In Nat. D. 2.91 Cicero tells us that aether, like aer, was originally a Greek word, but has been taken over by Latin and is now used as a Latin word. He quotes a line from Pacuvius, in which Pacuvius provides his audience with a translation, which is perhaps a sign that the word was unfamiliar to them. But the word had also been used by Ennius in his Euhemerus (apud Lact. 1.11.63) and Annales (line 472). And in the century since Ennius and Pacuvius it must have become increasingly more common, at least in Latin poetry, so that Lucretius could use it abundantly without any reservations to describe the celestial region.[13] If Cicero admits the Greek word can be simply transliterated to form a Latin word aether, why should he translate it with a misleading word like ardor, a word so closely associated with heat and burning? Hence it is extremely difficult to maintain with Jaeger that ardor must be Cicero's usual translation for αἰθήρ.

We might try to escape this conclusion by suggesting that Cicero was so imbued with the language of Stoicism that it made little difference to him whether he called the celestial element ardor or aether. But if his translation is so free, how can we say he is more likely translating αἰθήρ than θερμότης or πῦρ. Then all we can deduce from Nat. D. 1.33 is that Aristotle believed the celestial element to be divine, and we have

no way of telling whether the celestial element was one of four elements or one of five elements.[14] Hence we are forced to conclude that we cannot really prove that Cicero used caeli ardor to translate the Greek word αἰθήρ. Thus the first step in the line of reasoning leading from Cicero's words to Aristotle's fifth element must be considered pure conjecture.

Nevertheless, let us assume that Cicero was translating the Greek word αἰθήρ. Does the presence of the term αἰθήρ in the De Philosophia presuppose the presence of the fifth body? In Cael. 1.3.270b20-24 and Meteor. 1.3.339b21-27 Aristotle approves the traditional term αἰθήρ for the celestial element because its assumed etymology (from ἀεὶ θεῖν) suggests its eternal movement, but he himself never uses this term. He consistently calls it τὸ πρῶτον σῶμα (or στοιχεῖον), τὸ ἄνω σῶμα, τὸ ἐγκύκλιον σῶμα or some similar term referring to its position or movement. As a matter of fact, in the genuine treatises Aristotle rarely uses the term αἰθήρ except when speaking of Empedocles, Anaxagoras, or common usage. To my knowledge the only exception is Phys. 4.5.212b20-22 where Aristotle gives the stratification of the cosmos; and here to our great surprise he says, "The earth is within the water; the water within the air; the air within the aether; and the aether within the heaven (= the universe, cf. 212b17-20) but the heaven is not in anything else." Indeed, the aether seems to be identified with fire, a practice for which he chides Anaxagoras in Cael. 1.3.270b24-25; 3.3.302b4-5; and furthermore, the universe seems to consist of only four elements. Perhaps we could infer that when Aristotle discovered the fifth element, he refrained from calling it "aether" because of its association with fire. In any case the occurrence of a Latin translation of the term αἰθήρ in Cic. Nat. D. 1.33 is no guarantee whatsoever that Aristotle discussed his theory of the "first body" in the De Philosophia.

To be sure, nothing prevents us from conjecturing that the Epicurean source of Cicero read Aristotle's exposition of his newly discovered fifth element, perhaps without a name attached to it (just as in De Caelo), and then gave to it the name which had subsequently become common for this element. But this is no more likely than that the Epicurean reader saw Aristotle's enraptured discussion of celestial fire and gave to this the name "aether." We could, if we like, even think that Aristotle himself called this fire "aether," the name he seems to use in Phys. 4.5.212b20-22. Nevertheless, the fact remains that we are left without proof that in the De Philosophia the element of the stars is a fifth element, distinct from fire, air, water, and earth.

The second major proof that Aristotle announced the theory of the fifth element in the De Philosophia is what may be call the doxographic proof. This proof occurs in so many variations that no single author will serve as spokesman. In modern times Bignone gave this proof its biggest impetus, but it goes back at least as far as E. Heitz, who made the second big advance in reconstructing the De Philosophia just two years after Bernays published his work.[15] Unlike Bernays, Heitz had no preconception that the De Philosophia had to be doctrinally similar to the Aristotelian treatises. In an adumbration of Jaeger's evolutionary hypothesis, Heitz suggested Aristotle's early philosophy was still under Platonic influence. Hence he saw no justification for the attempts to explain away apparent differences between the De Philosophia and the later works. In fact, he exploited these differences to add to our knowledge of the early

works. His method was approximately as follows: If a later writer attributes to Aristotle any doctrine which cannot be found in the extant works, this writer has either misunderstood the extant Aristotle or has derived the doctrine from one of his lost works. Now it is obvious that as the probability of misunderstanding decreases, the probability increases that a given doxographical item goes back to the lost Aristotle. Since we can measure the probability of misunderstanding by an evaluation of the reliability of the doxographer and his sources and by the extent of consensus among witnesses, we can add somewhat to our knowledge of the lost Aristotle. To be sure, the doxographic approach initiated by Heitz is subjective and at best produces probability; but it has been widely accepted because it has achieved dramatic results.

This approach is used extensively for the De Philosophia Book III, where the general content (cosmology and theology) is established, but specific references are few. Let us look specifically at the application of this approach to the fifth element. There are a large number of references in later literature to a "fifth body" (πεμπτον σῶμα) or a "body moving in a circle" (κυκλοφορικὸν or κυκλοφορητικὸν σῶμα). A number of these are assigned to Aristotle, but not to any specific work; and a few say explicitly that Aristotle called this element the "fifth body" (Aet. 1.7.32; 2.30.6). Our first thought, of course, will be that all such references are derived from the De Caelo. But closer examination shows that in the De Caelo Aristotle never speaks of a fifth body and never uses the adjectives κυκλοφορικόν or κυκλοφορητικόν. Hence some scholars conclude that these doxographies must derive from some lost discussion which did use these terms.[16] Moreover, Cicero and the Clementine Recognitions say that Aristotle added to the traditional four elements a "fifth nature" or "class" (quinta natura, quintum genus) which constitutes the heavenly bodies and human souls (fr. 27 = Cic. Acad. 1.26; Tusc. 1.22, 41, 65-66; Clem. Rom. Recog. 8.15). This fifth nature is "without name" (ἀκατονόμαστον). In the extant works Aristotle neither says it is without name, nor does he say it is the substance of the soul. Therefore some conclude that these reports too go back to the De Philosophia.[17]

Further confirmation for the presence of the fifth element in De Philosophia may be garnered by the same method. Cicero says, "Since some living beings are born on earth, some in water, and some in the air, it seems absurd to Aristotle to think that no living being is born in that element which is most fit for giving birth to living things. Moreover, the celestial bodies occupy the region of the aether. Since this is most subtle and is always lively and in motion, it is necessary that the living being which is born in it be endowed with the keenest sense and swiftest mobility. Therefore since the heavenly bodies are born in the aether, it is reasonable that sensation and intelligence be present in them." (Nat. D. 2.42) Though this passage mentions aether, the presence of the word itself does not point to the fifth element, for the argument offers a series of only four elements. However, some of the variations of this argument, preserve the same analogical reasoning and also make use of a series of five elements.[18] Taking all of these together, some have inferred that originally Aristotle used an analogical argument to prove that since there are living things in each of the four elements, there must be living things in the fifth, i.e. the heavenly bodies.[19] Since this argument

is not found in the extant writings, it too must be from the De Philosophia.

Once we are convinced that this method has proven the presence of the fifth element in the De Philosophia, we may use it to add almost any reference to the aether or the fifth element, if not as a fragment, at least as an echo of Aristotle. For, as some recent writers have observed, either all the doxographies regarding the fifth element already assigned to the De Philosophia can be considered misinterpretations of De Caelo or else all the remaining references to a fifth element will have to be considered, at least hypothetically, echoes of the De Philosophia.[20] Everyone which diverges from the De Caelo may be adding to our stock of information on the De Philosophia. This line of reasoning has produced a flood of alleged echoes.[21] Even the apparently generalized polemics of Epicurus as found in Lucretius V and elsewhere may be interpreted as directed against the De Philosophia.[22]

P. Wilpert has warned against the circular reasoning inherent in this method: "On the basis of attested fragments we form for ourselves a picture of the content of a lost writing, and this picture in turn serves to interpret new fragments as echoes of that writing. So our joy over the swift growth of our collection of fragments is clouded by the thought that we are not thereby really nearing the original character of the work, but we are entangling ourselves ever more tightly in a picture we ourselves have created." As a corrective Wilpert calls for a critical retracing of our steps since 1830 to establish on firm grounds whether our picture of the De Philosophia is correct or not.[23] Heeding his admonition, we must ask whether the doxographic method inevitably produces the conclusions based on it, or whether it is being manipulated to bolster a theory we would like to believe.

Though in the De Caelo Aristotle calls the element of the stars the "first body", there is really no cogent reason for believing the term "fifth body" is his earlier designation for the same thing. It is at least as easy to explain it as a doxographer's term. The term "first body" implies a value judgment and is appropriate only for one who believes in the exalted value of this body (cf. Cael. 1.2.269a18-32, b13-17). The term "fifth body" is an objective term, and though it could be used by one who believes that the fifth element is best, in itself it merely describes an element of a cosmological system without judging it. This is precisely the term that one would expect to find preferred by a doxographer who grew up in a world that had to a great extent come to accept as canonical the four elements of Empedocles, Plato, and the very popular Stoics. Even Aetius' allegation that Aristotle himself called it "the fifth body" is insufficient evidence to establish the presence of the fifth element in the De Philosophia. For the term "fifth element" was eventually accepted even by Aristotelians as a suitable term for the celestial element in De Caelo (cf. Xenarchus of Selencia and Nicolaus of Damascus apud Simpl. Cael. 13.18; 20.12; 21.33); and so confusion in the doxographic terminology would be quite understandable. Furthermore, even if the doxography is not in error, the most it can prove is that Aristotle at sometime used the term; where he used it cannot be decided from the doxography.[24] It seems even more hypercritical to use κυκλοφορικόν or κυκλοφορητικόν as evidence that the doxographies do not go back to De Caelo, when Aristotle does call this body τὸ ἐγκύκλιον σῶμα (Cael. 2.3.286a11-12, b6-7),

τὸ κυκλικὸν σῶμα (Cael. 2.7.289a30) and even τὸ κύκλῳ φερόμενον σῶμα (Cael. 1.3.269b30). As long as doxographers were passing down a tradition rarely, if ever, checked against the sources, their terminology is no satisfactory indicator of the terminology of the original source.

The references of Cicero and the Clementine Recognitions (cited as De Phil. fr. 27Ross) to a fifth nameless nature which serves as the common substance of the celestial bodies and human souls, or at least of the intellective faculty of the soul, presents an entirely different problem. For here it is not only the terminology which appears to be absent from the treatises, but the very idea itself, and this makes it all the more tempting to attribute this idea to a lost work. However, it is very difficult to reconcile the views expressed here with Aristotle's philosophy in general, even if we make allowance for development. First of all, Aristotle studied under a teacher who believed the soul to be incorporeal. Even if Aristotle's own views of the soul may have changed during his lifetime, at no time does he ever seem to have believed the soul to be corporeal.[25] But if in the De Philosophia souls consist of the same substance as the celestial bodies, they must be as corporeal as the celestial bodies. How are we to fit a materialistic phase into the evolution of his theory of the soul?[26] One imaginable solution is to assume the fifth element is incorporeal.[27] But how can we harmonize such a theory with the De Caelo or account for a change to the mature doctrine of De Caelo, which considers the element of the stars corporeal? Such questions have caused a considerable amount of discussion and widespread rejection of the correctness of Cicero's apparent assertion that the soul consists of the fifth element. The arguments for and against this identification are too complex to be repeated here and need not be.[28] For even if Cicero can be used only as evidence that Aristotle considered the soul to be of a nature distinct from that of the four elements (as Aristotle does also in his later writings), and Cicero is mistaken in his identification of the soul with the fifth element (Acad. 1.26), the fact that he makes this mistake shows that he is familiar with the Aristotelian doctrine of the fifth element.

We are confronted with the fact that Cicero, who is familiar with Aristotle's early published works and quotes them freely, but who knows relatively little about Aristotle's treatises, here shows an acquaintance with the doctrine of the fifth element. This fact creates a strong presumption that Cicero derived his knowledge from one of the early published works. This presumption is increased for some scholars by the common belief that Aristotle's treatises were virtually unknown up to Cicero's time. According to Strabo 13.1.54 (C608-609) and Plutarch Sulla 26.1-2, Aristotle's treatises were willed by Theophrastus to his student Neleus of Skepsis in Asia Minor. Neleus' descendants hid them in a cellar or cave to keep them from the book-collecting kings of Pergamum, until they were sold to Apellicon of Teos, a book collector who took them to Athens and perhaps tried to copy the mutilated text early in the first century B.C. When Sulla returned from his capture of Athens, he brought them back to Rome, where, added to the growing book collections there, they contributed to a renaissance of Aristotelian studies in the Augustan Age.[29] The leader of the renaissance was Andronicus of Rhodes, who produced adequately reconstructed copies of the text and inquired into the logical order and content of Aristotle's treatises.[30] Since Cicero does not mention Andronicus, his work was probably done after Cicero's death.

Now there can be no doubt that after Andronicus, Aristotle's doctrine of the fifth element was well known in scholarly circles. During the Augustan Age a peripatetic, Xenarchus of Seleucia, wrote a refutation of the doctrine based on the De Caelo and entitled Against the Fifth Substance.[31] Nicolaus of Damascus, the philosopher-friend of Antony and Cleopatra, King Herod of Palestine, and the emperor Augustus, summarized the doctrine of the De Caelo for popular consumption in his compendium On the Philosophy of Aristotle.[32] Philo of Alexandria, the Jewish philosopher, discussed and sometimes used the doctrine of the fifth element.[33] Hence in Augustan or post-Augustan sources, knowledge of the fifth element or references to it by the term "fifth substance or body" need in no way be considered dependent on the De Philosophia for lack of knowledge of the De Caelo.

Nevertheless, prior to Andronicus, the doctrines of Aristotle's De Caelo were less accessible. Though we now know that Strabo's and Plutarch's assertions that the treatises were entirely unknown before Andronicus are exaggerations, a list of the works of Aristotle which seems to reflect holdings of the library at Alexandria in the third century B.C. omits most of the physical and biological works, including the De Caelo.[34] Whether this should be taken as evidence that the physical works were totally unavailable is still not certain.[35] But we do know that the peripatetics after Strato (died ca 270 B.C.) showed little interest in physical subjects until the renaissance in the Augustan Age.[36] And even if Aristotle's books were available, the physical works certainly were not much read.

Still it would be rash to conclude that all knowledge of Aristotle's physical doctrines during the second and first centuries B.C. came from the published works. Since not all the evidence is in yet, Cicero's knowledge of the fifth substance might equally well be interpreted as evidence that the De Caelo was not totally unknown before the unearthing of Aristotle's library in Skepsis. Moreover, Cicero's source for his knowledge of the fifth element may be Antiochus of Ascalon, head of the Academy when Cicero visited Athens in 79 B.C., or Posidonius, whom Cicero must have met in Rhodes on the same journey.[37] By this time Apellicon had brought the treatises to Athens, and it is not impossible that some scholars had already seen the manuscripts or a copy of them. Nor is it inconceivable that the treatises were in the major libraries to be read by the few who were interested. Finally, we must not forget that the history of philosophy, a subject begun by Aristotle and carried to great heights by Theophrastus and Eudemus, was never abandoned in the Hellenistic period. Though pursued with less understanding than Theophrastus had shown, this subject produced many biographies of philosophers, now known only by title, and also doxographies, of which even the authors and titles have been forgotten. That these doxographies existed can be deduced from the fact that this doxographical information survived into the early centuries of our era to be used by Diogenes Laertius and Aetius. Hence, regardless whether Aristotle's treatises were available or lost and regardless whether the peripatetic school was interested in physical questions or not, it is likely that the main outlines of Aristotle's doctrine survived throughout the Hellenistic period and so could find literary expression at any time.

Moreover, Cicero's statements that the human soul or mind consists of some fifth substance is the same idea attributed to Critolaus, a Peripatetic of the second century B.C.[38] Cicero knew and approved Critolaus' ideas on the virtues of the soul (Tusc. 5.51). Hence we cannot rule out the possibility that Critolaus or some other member of the Peripatetic school is the source for Cicero's statements about Aristotle, either directly, or indirectly through Antiochus of Ascalon. All in all, we are forced to conclude that Cicero's knowledge of Aristotle's doctrine of the fifth element is no solid proof that this doctrine was found in the De Philosophia.

One major doxographical reference remains, namely Cicero Nat. D. 2.42 (De Phil. fr. 21 Ross), where the Stoic Balbus appears to attribute to Aristotle the argument that since earth, water, and air are filled with living things, the occupants of the aether, that is, the celestial bodies, must likewise be living and endowed with swift movement and keen senses. Since this same analogical argument occurs with a series of five elements, it has been claimed that in the version of the De Philosophia the celestial bodies consisted of the fifth element. On this theory the version in Cicero is a Stoic remodeling of Aristotle's version to bring it into line with the Stoic theory of four elements.[39]

However, a careful analysis of the surviving versions shows that the same argument is being used for three different purposes. One set proves the divinity of the celestial bodies; another assumes that the celestial bodies are the living things in the aether and tries to prove that spirits must be present in the air; and the third proves that the universe is eternal. There is also a hybrid attempting to prove both the divinity of the stars and the existence of demons in the air.[40] Since the proof for spirits in the air and the proof for the eternity of the cosmos both assume the conclusion of the proof that the heavenly bodies are divine living beings, we are tempted to assign the "spirit" proof and "eternity" proof to a later period than the proof of the divinity of the stars. Now the five elements occur only in the "spirit" proof and the "eternity" proof, not in the presumably earlier proof of the divinity of the stars. From this we should conclude that a four-element proof for the existence of god was remodeled into the later proofs by someone who believed in the five elements. Such a theory is at least as tenable as the theory that the four-element "god" proof, the four- and five-element "demon" proofs, and the five-element "eternity" proof were all remodeled from Aristotle's five-element "god" proof. It is only by an exceedingly arbitrary choice of elements from here and there that the latter theory can pretend to reconstruct Aristotle's original proof.[41] Thus we are faced either with admitting that Aristotle actually used a loose four-element proof as Cicero's Stoic asserts or with despairing altogether of reconstructing Aristotle's original argument. In either case, this fragment loses all value as proof for Aristotle's theory of the fifth element in the De Philosophia. In the last analysis all proofs based either on Cicero's ardor caeli or on doxographic reports must be abandoned as worthless, and the claim that Aristotle announced his fifth element to the world in the De Philosophia must be considered at best an unproven conjecture.

The evidence on the other side has now to be considered. We have just seen that Cicero Nat. D. 2.42 (= De Phil. fr. 21), if it be taken as evidence for the De Philosophia, speaks of a universe of four elements, with the heavenly bodies made of fire. We have also seen that ardor caeli

in Cicero Nat. D. 1.33 (= De Phil. fr.26), the fundamental passage for reconstructing Book III of the De Philosophia, cannot be taken as evidence of the presence of the fifth element. The word ardor literally means "heat" and otherwise refers to celestial phenomena that are bright, if not hot (e.g. lightning, comets, and stars). And so if this reference points to anything, it points to the presence of a word like θερμότης or θερμόν in the Greek original. It may thus be an indication that Aristotle has not yet come to the conlusion that the element of the heavens is different from fire.

Slightly more valuable may be several passages from Philo which have been assigned to the De Philosophia on the basis of their content. In one passage Philo describes how a man viewing with awe the order of the cosmos comes to the conclusion that these are the works of god (Leg. Alleg. 3.97-99 = De Phil. fr. 13). Cicero Nat. D. 2.95-6 (= fr. 13) assigns such a proof for God's existence to Aristotle. But Philo's version describes the cosmos region by region: the earth, the water, the air, and the heavens--a series of only four regions. Philo also records anonymously several proofs for the eternity of the cosmos, a subject which Simplicius (In. Cael. 289.1-15 [= fr. 16]) assures us belongs to the De Philosophia. In one of these proofs Philo states that the four elements of men are borrowed from the cosmos and return to their natural places at death. But in the cosmos all four elements are already in their natural places, earth at the center, water spread over the earth, air in the region between water and fire, and fire in the highest region of all (ἀνωτάτω, Aet. Mund. 33 = De Phil. 19b). "Highest" cannot mean just under the fifth element because Aristotle is basing his argument on the fact that each and every one of its parts is in its natural place. His argument would be incomplete and seriously weakened if he failed to mention one of the elements, the element of the stars. Hence we can only conclude that the element of the stars is fire.

Philo's evidence is important because Philo himself was undecided whether the cosmos consists of four or five elements and so seems to follow his source, with the result that he sometimes speaks in terms of a five-element cosmos and sometimes (more often) in terms of the Stoic four-element cosmos.[42] Hence we can be reasonably sure Philo has not altered his source on this point. Nor is there any evidence of Stoicism in his arguments to make us suspect that Panaetius, one of the few Stoics who believed the cosmos to be eternal, was an intermediary for this argument. Both arguments sound Aristotelian and the second one with its use of the idea of natural places and four elements is very close to De Caelo III-IV. Hence if these arguments are from the De Philosophia, we have substantial grounds for suspecting Aristotle in this work had not yet come to the conclusion that the heavens consisted of an element different from fire.

In sum, it is surely significant that a search of the fragments attributed to the De Philosophia is able to turn up several references to a four-element cosmology (with fire at the periphery), but not a single reference to a five-element cosmology. Though it may be possible to explain away the references to a four-element cosmology as later adaptations, such a procedure would require at least one indisputable reference to the presence of the fifth element in the De Philosophia. And no reference of this kind has yet been found. Thus we are forced to conclude that the theory of the fifth

element was probably not introduced in the De Philosophia.

We began this investigation of the evidence for the fifth element in the De Philosophia because the assumption of its presence caused serious difficulties in determining both the grounds for the invention of the theory and the relative chronology of the De Philosophia and the De Caelo. Let us see what may be gained by abandoning this assumption and assuming instead that the element of the stars in the De Philosophia is fire. In Cicero Nat. D. 2.44 the Stoic Balbus commends Aristotle for his idea that all things which are moved are moved either by nature, force, or will. The circular movement of the celestial bodies is not due to nature, because nature causes motion either downward by weight or upward by lightness. Nor is this circular movement due to force, for there is no stronger force which could move them contrary to their nature. Therefore their movement is voluntary. This is the passage that causes such difficulties if one considers the stars to be made of the fifth element. For we noted earlier that if the movement of the fifth element is not natural, we are left in the dark as to the grounds for its introduction into Aristotle's cosmology at all. Moreover, the argument is cogent only if there are two natural movements and no more, that is, only if circular movement can be excluded a priori from natural movements.[43] But how could Aristotle introduce a fifth element above four naturally moving elements and fail to see that circular movement can be as natural as the linear movement of the other four?

The difficulty disappears as soon as we assume that in the De Philosophia the cosmos consists of only four elements and these move in accord with the theory of natural movements which is developed in De Caelo III - IV, and mentioned in a fragment attributed to the De Philosophia (fr. 19b = Philo, Aet. Mund. 28-34). According to this theory, there are only two natural movements, up and down. Elements displaced from their natural place will move either up or down until they again reach their natural place, where by nature they will rest. This does not mean they must necessarily remain at rest. It is possible that some things will be moved by some stronger force which pushes them either contrary to nature out of their natural place (as a ball thrown into the air) or not contrary to nature withingtheir natural place (as a ball rolled along the ground). Then there is still a third possibility, exemplified by a man walking along the ground. This is not natural movement, for as a heavy, earthy thing the natural movement of a man would be downward toward the earth and would occur only if he were to fall from a height. Nor is this forced movement, like the movement of a man riding in a truck or a ball rolled on the ground. His walking motion can only be voluntary, due to his own free will. So, too, if the heavenly bodies are made of fire, their natural movement would be upward toward the periphery, where we could expect them to rest. The fact that they are moving withing their natural place proves their motion is due to something other than nature. Since no force is strong enough to move these most powerful, divine beings, we must conclude their motion is voluntary, of their own free will.[44] But the many problems relating to the movement of the heavenly bodies are beyond the scope of this discussion. Our discussion can establish only that the voluntary movement of the heavenly bodies is unintelligible except in the context of a four-element universe with fire as the element of the stars.

A four-element cosmology in the De Philosophia also allows a more

satisfactory reconstruction of the evolution of Aristotle's ideas about the element of the heavens. For we may postulate that in the first stage Aristotle accepted the four elements of the Platonic universe. He thoroughly explored the natural movement of these four elements to their natural places in De Caelo III-IV. About the same time he explored the very regular circular movement of the heavenly bodies. On the basis of his current theory of natural movements (reflected in De Phil. frg. 19b and 21b) he concluded that this circular movement must be due to the free will of the divine, rational, ensouled stars; and he expounded the theory in De Philosophia III.

Upon further consideration he revised this theory of the movement of the stars. He discovered it was possible to extend his physical approach, based on natural movements, to the movement of the heavenly bodies simply by grounding the whole theory in geometry. The two basic kinds of lines, straight and curved, could serve as models for the two types of natural motion, circular and linear (up and down). This theory forced Aristotle to postulate for the heavens a fifth element distinct from the other four. This second stage is found in De Caelo I.

Further confirmation for his theory that the stars were composed of a fifth element came from the new scientific calculations of the size of the heavenly bodies and their orbits. These were now shown to be much larger than formerly believed; and if the heavenly bodies and the spaces between them consisted of fire, there would be so much more fire in the universe than other elements, that the fire would long ago have consumed the other elements (Meteor. 1.3.339b30-340a3). When Aristotle ceased to focus his attention on the movement of the elements and heavenly bodies and began to investigate actual atmospheric phenomena, his neat symmetrical scheme of five elements in concentric spheres became useless. The element of fire became a nuisance, for meteorological phenomena could not be explained by concentric spheres of air and fire, but required a region occupied by a mixture of two exhalations. What is more, the heat in living things proved to be most unlike fire. So fire virtually lost its status as an element, and Aristotle arrived at the third stage in which he again envisioned a universe of four layers, but this time with the heavens made of a unique element different from fire.[45] The net result of his research was not to add an element, but to depose fire, and replace it with a more divine substance which in its celestial form is not hot, but nevertheless is the source of all heat and life, and is the counterpart of the vital heat in living things.

1) Cf., e.g., F. Solmsen, Aristotle's System of the Physical World (Ithaca 1960) 287-303, and G.A. Seeck, Über die Elemente in der Kosmologie des Aristoteles, Zetemata 34 (Munich 1964) 122-158.

2) W. Jaeger, Aristotle: Fundamentals of the History of His Development (Oxford 1948) 139 and note 1; cf. 143, 153.

3) Seeck (above, note 1) 122.

4) Cf. Solmsen (above, note 1) 293-303 and Seeck (above, note 1) 123-126. The references to the fifth element in Cael. 3.1.298a24-27, b6-7 are accprdingly taken as part of a transition added later to integrate Books III-IV with Books I-II (cf. Solmsen, 299 and note 39).

5) Solmsen (above, note 1) 300-301 points out that Book I presupposes the ideas of III-IV, but III-IV do not presuppose anything discussed in Book I.

6) I am aware of only two published rejections of this assumption, namely W.D. Ross, Aristotle's Physics (Oxford 1936) 96-97, and D.J. Furley, "Lucretius and the Stoics," BICS 13(1966) 22-23. But neither has affected the trend. In fact, one recent writer is so convinced of the truth of this assumption that he is prepared to doubt Cicero's reliability as a witness to Aristotle's De Philosophia on the grounds that Cicero Nat. D. 2.42 does not acknowledge the existence of the fifth element (B. Effe, Studien zur Kosmologie und Theologie der Aristotelischen Schrift "Über die Philosophie", Zetemata 50[Munich 1970] 127-128).

7) Jaeger (above, note 2) 139, 142-154; E. Bignone, L'Aristotele perduto e la formazione filosofica di Epicuro (Florence 1936)

8) Jaeger (Above, note 2) 139, note 1. This proof is also adopted by recent writers, e.g., P. Moraux, "Quinta Essentia," RE 47(1963) 1196-1209; E. Berti, La filosofia del primo Aristotele (Padua 1962) 369; and J. Pepin, Théologie cosmique et théologie chrétienne (Paris 1964) 151-152.

9) J. Bernays, Die Dialoge des Aristoteles in ihrem Verhältniss zu seinen übrigen Werken (Berlin 1863) 99-100.

10) For the polemical purpose of his work, see pages 30-42; cf. also Berti (above, note 8) 19-21.

11) G.F. Schoenmann, ed., M. Tullii Ciceronis: De Natura Deorum (Leipzig 1850, 1857, 1865, 1876) notes on 1.13.33. It should be noted that Jaeger cites Plasberg, a commentator on Cicero, to support his interpretation. The other major commentators on this work concur; cf. J.B. Mayor, M. Tulii Ciceronis: De Natura Deorum (Cambridge 1891) 1.122; A.S. Pease, M. Tulii Ciceronis: De Natura Deorum (Cambridge, Mass. 1955) 1.242.

12) Cf. H. von Arnim, Stoicorum Veterum Fragmenta (Leipzig 1903-1905) Vol. 2, Fragments 413, 527, 555, 558, 580, cf. 434. The use of "fire" and

"aether" as alternative names for the celestial element is stated explicitly by Diog. Laert. 7.137 (= von Arnim, vol. 2, fr. 580). In general, Stoic texts use "fire" and "aether" interchangeably.

13) Cf. J. Paulson, Index Lucretianus (Göteborg 1911) s.v. "Aether". The meaning of the term in Lucretius is not completely clear, perhaps because the traditional elements play only a small part in the Epicurean system. Cf. C. Bailey, ed., Titi Lucreti Cari: De Rerum Natura (Oxford 1947) 3.1393-1394.

14) Jaeger (above, note 2) 139, note 1, finds confirmation for his hypothesis in the fact that this ardor is considered divine. But Plato considered the stars to be divine even though made of fire (Tim. 39e-40b; cf. Leg. 7.821b-c; 10.886d, 899a-b); and the Stoics, too, attributed divinity to the cosmic fire (cf. von Arnim [above, note 12] Vol. 1, fr. 157; Vol. 2, frs. 423, 593, 1027, 1031, 1032). Hence by itself divinity is not proof of Aristotle's fifth element.

15) E. Heitz, Die Verlorenen Schriften des Aristoteles (Leipzig 1865) 179-189.

16) Cf., e.g., Heitz (above, note 15) 185-186 and J. Pepin (above, note 8) 222-223. I have presented the proof in its bluntest form. It is usually toned down somewhat and qualified with a word like "probably". For example, Pepin, after admitting these expressions could be derived from De Caelo by an imprecise doxographer, continues, "But nothing prevents us from supposing that these expressions in reality belong to an earlier state of his terminology." He then chooses the latter interpretation because Cicero's divergence from the extant treatises has convinced him that the doxographic tradition is inspired by the De Philosophia as well as the De Caelo. Jaeger (above, note 2) 144, note 2, uses the doxography only as evidence for Aristotle's terminology, since he has already accepted the presence of this element on the basis of the text of Cicero.

17) Cf. e.g. Heitz (above, note 15) 186-188; Pepin (avove, Note 8) 223 and note 2.

18) Philo, De Gig. 2.7-8; De Plant. 3.12; Aet. Mund.14.45 (collected by R. Walzer, Aristoteles Dialogorum Fragmenta [Florence 1934] 87-88 as De Phil. fr. 22). Cf. also Plato, Epin. 984d-985b.

19) Jaeger (above, note 2) 143-146.

20) S. Mariotti, "Nuove testimonianze ed echi dell' Aristotele giovanile," Atene e Roma 42 (1940) 56, note 22; Pepin (above, note 8) 223.

21) Cf. the list of books and articles in Moraux (above, note 8) 1215 and Berti (above, note 8) 103-107. The flood shows no signs of abating as the book of Pepin (above, note 8) well illustrates.

22) Cf. Bignone (above, note 7) 2.406-503. Bignone, 425 and note 3, takes the term "aether" in Lucr. 5.128 and 143 as further confirmation of the

presence of the fifth element in the De Philosophia. He apparently has not noticed that in Lucr. 5.143 it occurs in a series consisting of earth, fire, water, and aether, and therefore more likely designates air than Aristotle's fifth element.

23) P. Wilpert, "Die aristotelische Schrift 'Über die Philosophie,'" Autour d'Aristote (Louvain 1955) 102-103.

24) The doxographic tradition is drawn from too many Aristotelian sources to allow us to trace a given placitum back to a single work. H. Diels, Doxographi Graeci (Berlin 1929) 215 lists some of the references to extant treatises. Moreover, if the doxographic tradition concerning the fifth element is assumed to be drawn from the De Philosophia, we encounter further difficulties. Aetius 1.12.3 then contradicts Cic. Nat.D. 2.44 in asserting that the fifth element moves in a circle by nature, and Aetius 5.20.1 contradicts the whole notion of a five-sphere universe in asserting (in harmony with Plato) that the heavenly bodies are the last in a series of four classes of living animals--land, marine, winged, and celestial.

25) Cf. F. Nuyens, L'evolution de la psychologie d'Aristote (Louvain--Paris 1948). The evolution of Aristotle's psychology has been the subject of much debate since Nuyens. For a brief survey see W. Fortenbaugh, "Recent Scholarship on the Psychology of Aristotle," CW 60 (1967) 318-320.

26) This is the question posed by Moraux (above, note 8) 1224-1226, and H. J. Easterling, "Quinta Natura," MusHelv 21 (1964) 73-85, and one reason for their refusing to admit the correctness of Cicero's testimony on this subject.

27) This is proposed by Pepin (above, note 8) 245-247. But it is impossible to prove for De Philosophia and is incorrect if deduced from Cael. 1.3. It seems to be an act of desparation designed to save the reputation of Cicero.

28) For a summary of the controversy to 1961 see Berti (above, note 8) 395-399. To the works cited there we may now add M. Untersteiner, Aristotele: Della Filosofia, Temi e Testi 10 (Rome 1963) 265-267; Easterling (above, note 26) 73-85; Moraux (above, note 8) 1213-1231; Pepin (above, note 8) 226-234; "L'interpretation du De Philosophia d'Aristote d'apres quelques travaux recents," REG 77 (1964) 473-488; cf. Berti, "Studi recenti sul di Aristotele," Giornale di Metafisica 20 (1965) 310-311; Effe (above, note 6) 148-155.

29) On the history of Aristotle's books see I. Düring, Aristotle in the Biographical Tradition (Göteborg 1957) 393-395. For a summary of Peripatetic activity in the Augustan age cf. J. Moreau, Aristote et son école (Paris 1962) 279-283.

30) Cf. M. Plezia, "De Andronici Rhodii Studiis Aristotelicis," Polska Ak. Archivum Filologiczne 20 (Krakow 1946) and During (above, note 29) 420-425.

31) See P. Moraux, "Xenarchos (5)," RE Reihe 2, Vol. 18 (1967) 1423-1426.

32) This summary has been preserved in a Syriac translation, edited with an English translation and commentary by H. J. Drossaart-Lulofs, Nicolaus Damascenus: On the Philosophy of Aristotle (Leiden 1965). For the life and philosophical activity of Nicolaus see 1-5, 20-23, and for his summary of De Caelo see 82-87 and commentary 152-165. Unfortunately his summary of Cael. 1.1-2.1 is missing in the Syriac MS.

33) Quis Heres 283; De Plantat. 3, cf. 12; Quaest. Gen. 3.6; 4.8; Quaest. Ex. 2.73. Philo himself seems to consider the question of the nature of the heavenly bodies insoluble (De Somn. 1.21-24), and so he uses both the Stoic view that the heavens consist of a special kind of fire (Quis Heres 133-136; Mos. 2.148) and the Peripatetic view that they consist of a fifth element. For full discussion see J. Drummond, Philo Judaeus: The Jewish and Alexandrian Philosophy in its Development and Completion (London 1888) 1.273-279, and Moraux (above, note 8) 1235-1236.

34) P. Moraux, Les listes anciennes des ouvrages d'Aristote (Louvain 1951) has shown that the catalog of Diog. Laert. 5.22-27 goes back to the Hellenistic period. He conjectures that it represents the holdings of the Peripatetic library about 200 B.C. I. Düring, "Ariston or Hermippus?" Class. et Med. 17 (1956) 11-21; Biog. Trad. (above, note 29) 67-69 has pointed out the weaknesses in Moraux's conjecture and argues again for the traditional ascription to Hermippus (3rd Cent. B.C.).

35) Cf. Moraux, Listes (above, note 34) 313-320; Düring, Class. et Med. 17 (1956) 20-21; and Notes on the History of the Transmission of Aristotle's Writings, Acta Universitatis Goteburgensis 56 (1950) Pt. 3, pages 35-70, esp. 57-70.

36) Cf. Moreau (above, note 29) 272-278, esp. 272; or K. O. Brink, "Peripetos," RE, Suppl. 7 (1940) 931-938 for a survey of the Peripetos in this period.

37) G. Luck, Der Akademiker Antiochos (Bern--Stuttgart 1953) 36-40 finds Antiochus behind Cicero's statements about the fifth nature as the substance of the soul; and Düring, Notes (above,note 35) 60 suggests that Cicero may have learned about Aristotle in general from Posidonius and could have seen Aristotle's works in a library at Rhodes.

38) Aet. 1.7.21; Tert. De An. 5.2; Macrobius In Somn. Scip. 1.14.20. It is not absolutely clear that the fifth substance or essence of Tertullian and Macrobius is the same as the material element of the celestial bodies. Both could be making the same mistake which has been imputed to Cicero, and Critolaus may actually have said simply that the soul is the form of the body and distinct from the four elements.

39) Jaeger (above, note 2) 143. Though Jaeger himself does not use this as proof or even confirmation for the presence of the fifth element in the De Philosophia, his theory has become part of the overall reconstruction of the position of the fifth element in the De Philosophia and so must be dealt with in this context.

40) Proof for divinity of celestial bodies: Cic. Nat.D. 2.42; Sext. Emp. Adv. Phys. 1.49; cf. Aet. 5.20.1. Proof for spirits: Philo De Somn. 1.135; De Gig. 2.7-8; De Plantat. 3.12; Apuleius De Deo Socr. 8.137; Plato Epin. 984d-985b. Proof for eternity of cosmos: Philo Aet. Mund. 14.45. Hybrid proof: Sext. Emp. Adv. Phys. 1.86. Cf. the discussion of K. Reinhardt, Kosmos und Sympathie (Munich 1926) 62-64.

41) Cf. Reinhardt (above, note 40) 62-86, esp. 62-68.

42) See above, note 33.

43) This observation was made already by W. Theiler, Zur Geschichte der teleologischen Naturbetrachtung bis auf Aristoteles (Zurich--Leipzig 1925) 83, note 1; but he failed to see the way out of the difficulty.

44) Presumably this voluntary movement of the heavenly bodies is analogous to the movement of human beings discussed in Mot. An. 6-7. 700b4-701b32. As men need sensation and intellect to perceive a goal and move toward it, so the heavenly bodies are endowed with sensation and intelligence (Cic. Nat. D. 2.42=De Phil. fr. 21; cf. fr. 24), which they doubtless use for the same purpose.

45) For full discussion of this final revision see H. Strohm, Untersuchungen zur Entwicklungsgeschichte der aristotelischen Meteorologie, Philologus, Suppl. 28.1 (1935) 1-12; and F. Solmsen (above, note 1) 397-398.