

# CHAPTER X., ECLECTICISM AND REACTION

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184. The "Bankruptcy of Science"

WITH Leukippos our story should come to an end; for he had answered the question first asked by Thales. We have seen, however, that, though his theory of matter was of a most original and daring kind, he was not equally successful in his attempt to construct a cosmology, and this seems to have prevented the recognition of the atomic theory for what it really was. We have noted the growing

influence of medicine, and the consequent substitution of an interest in detailed investigation for the larger cosmological views of an earlier time, and there are several treatises in the Hippokratean corpus which give us a clear idea of the interest which now prevailed.<sup>1</sup> Leukippos had shown that "the doctrine of Melissos,"<sup>2</sup> which seemed to make all science impossible, was not the only conclusion that could be drawn from the Eleatic premisses, and he had gone on to give a cosmology which was substantially of the old Ionic type. The result at first was simply that all the old schools revived and had a short period of renewed activity, while at the same time some new schools arose which sought to accommodate the older views to those of Leukippos, or to make them more available for scientific purposes by combining them in an eclectic fashion. None of these attempts had any lasting importance or influence, and what we have to consider in this chapter is really one of the periodical "bankruptcies of science" which mark the close of one chapter in its history and announce the beginning of a new one.

## I. HIPPON OF SAMOS

### 185. Moisture

Hippon of Samos or Kroton or Rhegion belonged to the Italian school of medicine.<sup>3</sup> We know very little indeed of him except that he was a contemporary of Perikles. From a scholiast on Aristophanes<sup>4</sup> we learn that Kratinos satirised him in his *Panoptai*; and Aristotle mentions him in the enumeration of early philosophers given in the First Book of the *Metaphysics*,<sup>5</sup> though only to say that the inferiority of his intellect deprives him of all claim to be reckoned among them.

With regard to his views, the most precise statement is that of Alexander, who doubtless follows Theophrastos. It is to the effect that he held the primary substance to be Moisture, without deciding whether it was Water or Air.<sup>6</sup> We have the authority of Aristotle<sup>7</sup> and Theophrastos, represented by Hippolytos,<sup>8</sup> for saying that this theory was supported by physiological arguments of the kind common at the time, and the arguments tentatively ascribed to Thales by Aristotle are of this kind (§ 10). His other views belong to the history of Medicine.

Till quite recently no fragment of Hippon was known to exist, but a single one has now been recovered from the Geneva Scholia on Homer.<sup>9</sup> It is directed against the old assumption that the "waters under the earth" are an independent source of moisture, and runs thus:

The waters we drink are all from the sea; for if wells were deeper than the sea, then it would not, doubtless, be from the sea that we drink, for then the water would not be from the sea, but from some other source. But as it is, the sea is deeper than the waters, so all the waters that are above the sea come from it. R. P. 219 b.

We observe here the universal assumption that water tends to rise from the earth, not to sink into it.

Along with Hippon, Idaios of Himera may just be mentioned. We know nothing of him except from Sextus,<sup>10</sup> who says he held air to be the primary substance. The fact that he was a Sicilian is, however, suggestive.

## II. DIOGENES OF APOLLONIA<sup>11</sup>

### 186. Date of Diogenes of Apollonia

After discussing the three great representatives of the Milesian school, Theophrastos went on to say:

And Diogenes of Apollonia, too, who was almost the latest of those who gave themselves up to these studies, wrote most of his work in an eclectic fashion, agreeing in some points with Anaxagoras and in others with Leukippos. He, too, says that the primary substance of the universe is Air infinite and eternal, from which by condensation, rarefaction, and change of state, the form of everything else arises. R. P. 206 a.<sup>12</sup>

This passage shows that the Apolloniate was somewhat later in date than the statement in Laertios Diogenes<sup>13</sup> that he was contemporary with Anaxagoras would lead us to suppose, and the fact that his views are satirised in the Clouds of Aristophanes points in the same direction.<sup>14</sup>

### 187. Writings

Simplicius affirms that Diogenes wrote several works, though he allows that only one survived till his own day, namely, the Περὶ φύσεως.<sup>15</sup> This statement is based upon references in the surviving work itself, and is not to be lightly rejected. In particular, it is very credible that he wrote a tract *Against the Sophists*, that is to say, the pluralist cosmologists of the day.<sup>16</sup> That he wrote a *Meteorology* and a book called *The Nature of Man* is also quite probable. This would be a physiological or medical treatise, and perhaps the famous fragment about the veins comes from it.<sup>17</sup>

### 188. The Fragments

The work of Diogenes seems to have been preserved in the Academy; practically all the fairly extensive fragments which we still have are derived from Simplicius. I give them as they are arranged by Diels:

(1) In the beginning any discourse, it seems to me that one should make one's starting-point something indisputable, and one's expression simple and dignified. R. P. 207.

(2) My view is, to sum it all up, that all things are differentiations of the same thing, and are the same thing. And this is obvious; for, if the things which are now in this world--earth, and water, and air and fire, and the other things which we see existing in this world--if any one of these things, I say, were different from any other, different, that is, by having a substance peculiar to itself; and if it were not the same thing that is often changed and differentiated, then things could not in any way mix with one another, nor could they do one another good or harm. Neither could a plant grow out of the earth, nor any animal nor anything else come into being unless things were composed in such a way as to be the same. But all these things arise from the same thing; they are differentiated and take different forms at different times, and return again to the same thing. P. P. 208.

(3) For it would not be possible for it without intelligence to be so divided, as to keep the measures of all things, of winter and summer, of day and night, of rains and winds and fair weather. And any one who cares to reflect will find that everything else is disposed in the best possible manner. R. P. 210.

(4) And, further, there are still the following great proofs. Men and all other animals live upon air by breathing it, and this is their soul and their intelligence, as will be clearly shown in this work; while, when this is taken away, they die, and their intelligence fails. R. P. 210.

(5) And my view is, that that which has intelligence is what men call air, and that all things have their course steered by it, and that it has power over all things. For this very thing I hold to be a god,<sup>18</sup> and to reach everywhere, and to dispose everything, and to be in everything; and there is not anything which does not partake in it. Yet no single thing partakes in it just in the same way as another; but there are many modes both of air and of intelligence. For it undergoes many transformations, warmer and colder, drier and moister, more stable and in swifter motion, and it has many other differentiations in it, and an infinite number of colours and savours. And the soul of all living things is the same, namely, air warmer than that outside us and in which we are, but much colder than that near the sun. And this warmth is not alike in any two kinds of living creatures, nor, for the matter of that, in any two men; but it does not differ much, only so far as is compatible with their being alike. At the same time, it is not possible for any of the things which are differentiated to be exactly like one another till they all once more become the same.

(6) Since, then, differentiation is multiform, living creatures are multiform and many, and they are like one another neither in appearance nor in intelligence, because of the multitude of differentiations. At the same time, they all live, and see, and hear by the same thing, and they all have their intelligence from the same source. R. P. 211.

(7) And this itself is an eternal and undying body, but of those things<sup>19</sup> some come into being and some pass away.

(8) But this, too, appears to me to be obvious, that it is both great, and mighty, and eternal, and undying, and of great knowledge. R. P. 209.

That the chief interest of Diogenes was a physiological one, is clear from his elaborate account of the veins, preserved by Aristotle.<sup>20</sup> It is noticeable, too, that one of his arguments for the underlying unity of all substances is that without this it would be impossible to understand how one thing could do good or harm to another (fr. 2). In fact, the writing of Diogenes is essentially of the same character as a good deal of the pseudo-Hippokratean literature, and there is much to be said for the view that the writers of these curious tracts made use of him very much as they did of Anaxagoras and Herakleitos.<sup>21</sup>

### 189. Cosmology

Like Anaximenes, Diogenes regarded Air as the primary substance; but we see from his arguments that he lived at a time when other views had become prevalent.

He speaks clearly of the four Empedoklean elements (fr. 2), and he is careful to attribute to Air the attributes of Nous as taught by Anaxagoras (fr. 4.). The doxographical tradition as to his cosmological views is fairly preserved:

Diogenes of Apollonia makes air the element, and holds that all things are in motion, and that there are innumerable worlds. And he describes the origin of the world thus. When the All moves and becomes rare in one place and dense in another, where the dense met together it formed a mass, and then the other things arose in the same way, the lightest parts occupying the highest position and producing the sun. [Plut.] *Strom.* fr. 12 (R. P. 215).

Nothing arises from what is not nor passes away into what is not. The earth is round, poised in the middle, having received its shape through the revolution proceeding from the warm and its solidification from the cold. Diog. ix. 57 (R. P. 215).

The heavenly bodies were like pumice-stone. He thinks they are the breathing-holes of the world, and that they are red-hot. Aet. ii. 13, 5 = Stob. i. 508 (R. P. 215).

The sun was like pumice-stone, and into it the rays from the aether fix themselves. Aet. ii. 20, 10. The moon was a pumicelike conflagration. *Ib.* ii. 25, 10.

Along with the visible heavenly bodies revolve invisible stones, which for that very reason are nameless; but they often fall and are extinguished on the earth like the stone star which fell down flaming at Aigospotamos.<sup>22</sup> *Ib.* ii. 13, 9.

We have here nothing more than the old Ionian doctrine with a few additions from more recent sources. Rarefaction and condensation still hold their place in the explanation of the opposites, warm and cold, dry and moist, stable and mobile (fr. 5). The differentiations into opposites which Air may

undergo are, as Anaxagoras had taught, infinite in number; but all may be reduced to the primary opposition of rare and dense. We may gather, too, from Censorinus,<sup>23</sup> that Diogenes did not, like Anaximenes, speak of earth and water as arising from Air by condensation, but rather of blood, flesh, and bones. In this he followed Anaxagoras (§130), as it was natural that he should. That portion of Air, on the other hand, which was rarefied became fiery, and produced the sun and heavenly bodies. The circular motion of the world is due to the intelligence of the Air, as is also the division of all things into different forms of body and the observance of the "measures" by these forms.<sup>24</sup>

Like Anaximander (§ 20), Diogenes regarded the sea as the remainder of the original moist state, which had been partially evaporated by the sun, so as to separate out the remaining earth.<sup>25</sup> The earth itself is round, that is to say, it is a disc: for the language of the doxographers does not point to the spherical form.<sup>26</sup> Its solidification by the cold is due to the fact that cold is a form of condensation.

Diogenes did not hold with the earlier cosmologists that the heavenly bodies were made of air or fire, nor yet with Anaxagoras, that they were stones. They were, he said, pumice-like, a view in which we may trace the influence of Leukippos. They were earthy, indeed, but not solid, and the celestial fire permeated their pores. And this explains why we do not see the dark bodies which, in common with Anaxagoras, he held to revolve along with the stars. They really are solid stones, and therefore cannot be penetrated by the fire. It was one of these that fell into the Aigospotamos. Like Anaxagoras, Diogenes affirmed that the inclination of the earth happened subsequently to the rise of animals.<sup>27</sup>

We are prepared to find that Diogenes held the doctrine of innumerable worlds; for it was the old Milesian belief, and had just been revived by Anaxagoras and Leukippos. He is mentioned with the rest in the *Placita*; and if Simplicius classes him and Anaximenes with Herakleitos as holding the Stoic doctrine of successive formations and destructions of a single world, he has probably been misled by the "accommodators."<sup>28</sup>

#### 190. Animals and Plants

Living creatures arose from the earth, doubtless under the influence of heat. Their souls, of course, were air, and their differences were due to the various degrees in which it was rarefied or condensed (fr. 5). No special seat, such as the heart or the brain, was assigned to the soul; it was simply the warm air circulating with the blood in the veins.

The views of Diogenes as to generation, respiration, and the blood, belong to the history of Medicine;<sup>29</sup> his theory of sensation too, as it is described by Theophrastos,<sup>30</sup> need only be mentioned in passing. Briefly stated, it amounts to this, that all sensation is due to the action of air upon the brain and other organs, while pleasure is aeration of the blood. But the details of the theory can only be

studied properly in connexion with the Hippokratean writings; for Diogenes does not really represent the old cosmological tradition, but a fresh development of reactionary philosophical views combined with an entirely new enthusiasm for detailed investigation and accumulation of facts.

### III. ARCHELAOS OF ATHENS

#### 191. Anaxagoreans

The last of the early cosmologists was Archelaos of Athens, who was a disciple of Anaxagoras.<sup>31</sup> He is also said, by Aristoxenos and Theophrastos, to have been the teacher of Sokrates, and there is not the slightest reason for doubting it.<sup>32</sup> There is no reason either to doubt the tradition that Archelaos succeeded Anaxagoras in the school at Lampsakos.<sup>33</sup> We certainly hear of Anaxagoreans,<sup>34</sup> though their fame was soon obscured by the rise of the Sophists, as we call them.

#### 192. Cosmology

On the cosmology of Archelaos, Hippolytos<sup>35</sup> writes as follows:

Archelaos was by birth an Athenian, and the son of Apollodoros. He spoke of the mixture of matter in a similar way to Anaxagoras, and of the first principles likewise. He held, however, that there was a certain mixture immanent even in Nous. And he held that there were two efficient causes which were separated off from one another, namely, the warm and the cold. The former was in motion, the latter at rest. When the water was liquefied it flowed to the centre, and there being burnt up it turned to earth and air, the latter of which was borne upwards, while the former took up its position below. These, then, are the reasons why the earth is at rest, and why it came into being. It lies in the centre, being practically no appreciable part of the universe. (But the air rules over all things),<sup>36</sup> being produced by the burning of the fire, and from its original combustion comes the substance of the heavenly bodies. Of these the sun is the largest, and the moon second; the rest are of various sizes. He says that the heavens were inclined, and that then the sun made light upon the earth, made the air transparent, and the earth dry; for it was originally a pond, being high at the circumference and hollow in the centre. He adduces as a proof of this hollowness that the sun does not rise and set at the same time for all peoples, as it ought to do if the earth were level. As to animals, he says that when the earth was first being warmed in the lower part where the warm and the cold were mingled together, many living creatures appeared, and especially men, all having the same manner of life, and deriving their sustenance from the slime; they did not live long, and later on generation from one another began. And men were distinguished from the rest, and set up leaders, and laws, and arts, and cities, and so forth. And he says that Nous is implanted in all animals alike; for each of the animals, as well as man, makes use of Nous, but some quicker and some slower.

It is clear from this that, just as Diogenes had tried to introduce certain Anaxagorean ideas into the philosophy of Anaximenes, so Archelaos sought to bring Anaxagoreanism nearer to the old Ionic views by supplementing it with the opposition of warm and cold, rare and dense, and by stripping Nous of that simplicity which had marked it off from the other "things" in his master's system. It was probably for this reason, too, that Nous was no longer regarded as the maker of the world.<sup>37</sup> Leukippos had made such a force unnecessary. It may be added that this twofold relation of Archelaos to his predecessors makes it very credible that, as Aetios tells us,<sup>38</sup> he believed in innumerable worlds; both Anaxagoras and the older Ionians upheld that doctrine.

### 193. Conclusion

The cosmology of Archelaos, like that of Diogenes, has all the characteristics of the age to which it belonged--an age of reaction, eclecticism, and investigation of detail.<sup>39</sup> Hippon of Samos and Idaios of Himera represent nothing more than the feeling that philosophy had run into a blind alley, from which it could only escape by trying back. The Herakleiteans at Ephesos, impenetrably wrapped up as they were in their own system, did little but exaggerate its paradoxes and develop its more fanciful side.<sup>40</sup> It was not enough for Kratylos to say with Herakleitos (fr. 84.) that you cannot step twice into the same river; you could not do so even once.<sup>41</sup> The fact is that philosophy, so long as it clung to its old presuppositions, had nothing more to say; for the answer of Leukippos to the question of Thales was really final.

It will be observed that all these warring systems found their way to Athens, and it was there, and there alone that the divergent theories of Ionia and the West came into contact. Such questions as whether the earth was round or flat, and whether "what we think with" was Air or Blood, must have been hotly debated at Athens about the middle of the fifth century B.C., when Sokrates was young. On any view of him, it is surely incredible that he was not interested in these controversies at the time, however remote they may have seemed to him in later life. Now, in the *Phaedo*, Plato has put into his mouth an autobiographical statement in which he tells us that this was actually the case,<sup>42</sup> and the list of problems there given is one that can only have occupied men's minds at Athens and at that date.<sup>43</sup> All the scientific schools end at Athens, and it was the Athenian Sokrates who saw that the questions they had raised could only be met by making a fresh start from another point of view.

1. Cf. what is said in Chap. IV. p. 150, n. 2, of the *Περὶ διαίτης*. The *Περὶ ἀνθρώπου φύσιος* and the *Περὶ ἀρχαίης ἰατρικῆς* are invaluable documents for the attitude of scientific men to cosmological theories at this date.

2. Cf. Chap. VIII. p. 329, n. 2.

3. Aristoxenos said he was a Samian (R. P. 219 a). In Menon's *Iatrika* he is called a Krotoniate, while others assign him to Rhegion (Hipp. *Ref.* i. 16) or Metapontion (Censorinus, *De die nat.* 5, 2). This variation implies that he belonged originally to the Pythagorean school. The evidence of Aristoxenos is, in that case, all the more valuable. Hippon is mentioned along with Melissos as a Samian in Iamblichos's Catalogue of Pythagoreans (*V. Pyth.* 267).

4. Schol. on *Clouds*, 94 *sqq.*
5. Arist. *Met.* A, 3. 984 a 3 (R. P. 219 a).
6. Alexander in *Met.* p. 26, 21 (R. P. 219).
7. Arist. *De an.* A, 2. 405 b 2 (R. P. 220).
8. Hipp. *Ref.* i. 16 (R. P. 221).
9. *Schol. Genav.* p. 197, 19. Cf. Diels in *Arch.* iv. p. 653. The extract comes from the Ὀμηρικά of Krates of Mallos.
10. Sext. *Adv. Math.* ix. 360.
11. Stephanos of Byzantion *s.v.* Ἀπολλωνία says this was Apollonia in Crete, but that seems improbable. Zeller doubted it on the ground that Diogenes wrote in Ionic, but Ionic was the regular dialect for scientific works, and we cannot found on that. On the other hand, it seems much more likely in itself that he came from Apollonia on the Pontos, a Milesian colony which regarded Anaximander as its founder (p. 52, n. 1). Aelian (*V. H.* ii. 31) calls him Διογένης ὁ Φρύξ, which shows that he took this view.
12. On this passage see Diels, "Leukippos and Diogenes von Apollonia" (*Rhein. Mus.* xlii. pp. i *sqq.*). Natorp's view that the words are merely those of Simplicius (*ib.* pp. 349 *sqq.*) can hardly be maintained.
13. Diog. ix. 57 (R. P. 206). The statement of Antisthenes, the writer of *Successions*, that he had "heard" Anaximenes is due to the usual confusion. He was doubtless, like Anaxagoras, "an associate of the philosophy of Anaximenes." Cf. Chap. VI. § 122.
14. Aristoph. *Clouds*, 227 *sqq.*, where Sokrates speaks of "mixing his subtle thought with the kindred air," and especially the words ἡ γῆ βίαι' ἔλκει πρὸς αὐτὴν τὴν ἰκμάδα τῆς φροντίδος. For the ἰκμάς, see Beare, P. 259.
15. Simplic. *Phys.* p. 151, 24 (R. P. 207 a).
16. Simplicius says Πρὸς φυσιολόγους, but he adds that Diogenes called them σοφισταί, which is the older word. This is, so far, in favour of the genuineness of the work.
17. Diels gives this as fr. 6 (*Vors.* 51 s 6). I have omitted it, as it really belongs to the history of Medicine.
18. The MSS. of Simplicius have ἔθος, not θεός; but I adopt Usener's certain correction. It is confirmed by the statement of Theophrastos that Diogenes called the air within us "a small portion of the god" (*de. Sens.* 42); and by Philodemos (*Dox.* p. 536), where we read that Diogenes praises Homer, τὸν ἄερα γὰρ αὐτὸν Δία νομίζειν φησίν, ἐπειδὴ πᾶν εἰδέναι τὸν Δία λέγει (cf. Cic. *Nat. D.* i. 12, 29).
19. The MSS. of Simplicius have τῶ δέ, but surely the Aldine τῶν δέ is right.
20. Arist. *Hist. An.* Γ, 2. 511 b 30.
21. See Weygoldt, "Zu Diogenes von Apollonia" (*Arch.* i. pp. 161 *sqq.*). Hippokrates himself represented just the opposite tendency to that of those writers. His great achievement was the separation of medicine from philosophy, a separation most beneficial to both (Celsus, i. pr.). This is why the Hippokratean corpus contains some works in which the "sophists" are denounced and others in which their writings are pillaged. To the latter class belong the *Περὶ διαίτης* and the *Περὶ φυσῶν*; to the former, especially the *Περὶ ἀρχαίης ἰατρικῆς*.
22. See Chap. V1. p. 252, n. 6.
23. Censorinus, *de die natati*, 6, 1 (*Dox.* p. 190).
24. On the "measures" see Chap. III. § 72.
25. Theophr. *ap. Alex.* in *Meteor.* p. 67, 1 (*Dox.* p. 494).
26. Diog. ix. 57 (R. P. 215).

27. Aet. ii. 8, 1 (R. P. 215).
28. Simpl. *Phys.* p. 1121, 12. See Chap. I. p. 59.
29. See Censorinus, quoted in *Dox.* p. 191 *sq.*
30. Theophr. *de Sens.* 39 *sqq.* (R. P. 213, 214). For a full account, see Beare, pp. 41 *sqq.*, 105, 140, 169, 209, 258. As Prof. Beare remarked, Diogenes "is one of the most interesting of the pre-Platonic psychologists" (p. 258).
31. Diog. ii. 16 (R. P. 216).
32. See Chiapelli in *Arch.* iv. pp. 369 *sqq.* Ion of Chios said that Sokrates accompanied Archelaos to Samos (fr. 73 Köpke). If this refers to the siege of Samos, it is interesting to think of the youthful Sokrates serving against a force commanded by Melissos.
33. Euseb. *P. E.* p. 504, c 3, ὁ δὲ Ἀρχέλαος ἐν Λαμψάκῳ διεδέξατο τὴν σχολὴν τοῦ Ἀναξαγόρου.
34. Ἀναξαγόρειοι are mentioned by Plato (*Crat.* 409 b 6), and in the *Δισσοὶ λόγοι* (cf. p. 29, n. 3). It is also to be noted that Plato (*Parm.* 126 a, b) represents certain φιλόσοφοι from Klazomenai as coming to Athens after the death of Sokrates for the purpose of getting an accurate account of the famous conversation between Parmenides and the young Sokrates (§ 84).
35. Hipp. *Ref.* i. 9 (R. P. 218).
36. Inserting τὸν δ' ἄερα κρατεῖν τοῦ παντός, as suggested by Roeper.
37. Aet. i. 7, 14=Stob. i. 56 (R. P. 217 a).
38. Aet. ii. i, 3.
39. Windelband, § 25. The period is well described by Fredrich, *Hippokratische Untersuchungen*, pp. 130 *sqq.* It can only be treated fully in connexion with the Sophists.
40. For an amusing picture of the Herakleiteans see Plato, *Theaet.* 179 e. The new interest in language, which the study of rhetoric had called into life, took with them the form of fantastic and arbitrary etymologising, such as is satirised in Plato's *Cratylus*.
41. Arist. *Met.* Γ, 5.1010 a 12. He refused even to speak, we are told, and only moved his finger.
42. Plato, *Phaedo*, 96 a *sqq.*
43. I have tried to show this in detail in my notes on the passage in my edition of the *Phaedo* (Oxford, 1910). It is a remarkable proof of Plato's historical sense that he should have been able to give an account of the state of scientific opinion at Athens some twenty-five years before his own birth, without, so far as I can see, a single anachronism.