

MEDICAL THEORY IN HERACLIDES OF PONTUS

BY

I. M. LONIE

The physician and medical scientist Asclepiades of Bithynia¹⁾ was distinguished by two qualities not invariably found in the history of Greek medicine: compassion and commonsense²⁾. He avoided the drastic remedies fashionable among his contemporaries and immediate predecessors, and thereby earned himself an unmerited reputation for charlatanism: this hostile tradition is reflected in the confused and unreliable report given by the Elder Pliny³⁾. Asclepiades was a man of some originality in the theory as well as in the practice of medicine; in founding his theories upon a broad scientific view of the universe, he brought medical science back, after the lapse of over a century, to that fruitful marriage of philosophy and medicine which belongs to the best tradition of Greek medical theory.

The scientific system which Asclepiades chose was atomistic, or rather corpuscular. Although he is sometimes described as an Epicurean, his system was not that of Epicurus, but the doctrine of

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ἀναρμοὶ ὄγκοι, “loose-jointed particles”¹⁾, which had been held by the fourth-century philosopher Heraclides of Pontus, with whom Asclepiades is linked in the doxographic tradition²⁾. The striking feature of this theory, in which it is distinguished from the atomism of Democritus and Epicurus, is that the particles are not indivisible but can be pulverized into fragments, which then re-unite in other combinations³⁾. The place of void in the theory of Epicurus is taken by a system of invisible pores, which are λόγῳ θεωρητοί, apprehended by reason alone.

It is clear from the evidence that this theory was no vague fantasy, a mere scientific facade for medical theories to which it bore no real relation: here too Asclepiades is free from the charge of charlatanism. It was on the contrary carefully thought out and applied in detail to physiology and pathology. Asclepiades used it as a cardinal principle in the explanation of disease: according to him, disease is caused when the free movement of bodily ingredients, blood, πνεῦμα, and the humours, is hindered by an obstruction of particles, ἐνστασις ὄγκων, “statio corpusculorum”⁴⁾. The causes and the specific varieties of fever are referred to this obstruction⁵⁾; it is the cause of a number of acute ailments⁶⁾; and by it Asclepiades explained the sensation of pain, in which explanation he appears to have made use of the frangibility of the particles⁷⁾.

There are a number of ingredients in this theory, and one must be careful to sort out what is distinctive and peculiar in it from what is common to Greek medical theory in general and to Alexandrian

1) On the terminology see Heidel, *op. cit.*, 20-21.

2) F. Wehrli, *Herakleides Pontikos* (Basel 1953), Fr. 119ab, 120.

3) See the description in Caelius Aurelianus *De Morbis Acutis* I 14, 105 ff., which is no doubt somewhat distorted by Epicurean interpretation (cf. Heidel, *op. cit.*).

4) Cf. Cael. Aurel. I 14, 106 *sucorum ductus . . . impeditus . . . statione corpusculorum morbos efficiat*. Sextus *adv. Math.* VIII 220 ἐνστάσεως νοητῶν ὄγκων ἐν νοητοῖς ἀραιώμασιν (of fever, but the doxographical contrast with Herophilus and Erasistratus suggests a wider reference). Soranus *Gyn.* III 3 p. 95 Ilberg says: ταύτην γὰρ (sc. ἐνστασις) τῶν πλείστων παθῶν συνεκτικὴν εἶναι φασιν (οἱ Ἀσκληπιάδαιοι).

5) Cael. Aurel. I 14, 108; cf. Galen VII 615K; cfl XIV 698.

6) Cael. Aurel. I 14, 107.

7) Cael. Aurel. I 14, 119, where pain is referred to the size of the particles. Galen X 852 also adds their frangibility.

medicine in particular. In the first place, the tendency to explain disease by a blockage of the bodily channels and ducts, ἔμφραξις τῶν πόρων, is by no means peculiar to Asclepiades: it was used very generally as a pathological principle at all periods of Greek medicine, and the expression itself seems to have been a technical one. Nor are the πόροι themselves peculiar. In a sense, all Greek medical theories are theories about πόροι; the human body is simply a system of πόροι. Πόρος is used in a general sense to cover all channels of the body, and this use, already established in specifically medical writing, is taken over by Aristotle and used in his biological works. Here the word covers veins, arteries, nerves, intestines, urethra etc.; naturally, unless the context makes the immediate reference clear, the word requires particular qualification, and it is Aristotle's practice to give it such qualification ¹⁾. But apart from this usage, there grows up in the pseudo-Aristotelian *Problemata* an unqualified use ²⁾: in such passages πόροι apparently does not refer to the normal channels of the body, which are revealed by anatomy. It seems instead to refer to the interstices of bodily substances which are regarded as porous. Now these πόροι undoubtedly develop from the theory of discontinuous void, of invisible interstices in matter, postulated by Strato of Lampsacus and applied perhaps by Strato himself, but certainly by the third century medical scientist Erasistratus, to the human body. The dependence of Erasistratus on the physical theories of Strato was clearly demonstrated by H. Diels ³⁾. Erasistratus regarded the substances of the body as, roughly speaking, fibrous, the fibres being a trinity of nerve, vein, and artery (τριπλοκία τῶν ἀγγείων) ⁴⁾. Now so far as the πόροι in Asclepiades' theory are λόγῳ θεωρητοί, he seems to

1) E.g. *De Gen. An.* 719 b 29; *De Part. An.* 668 b 17.

2) e.g. *Probl.* 867 b 38; 873 a 7; 872 b 35 τὸ γλυκὸν ἔμφράττει τοὺς πόρους. For other examples of ἔμφραξις τῶν πόρων in the *Problemata*, cf. 865 b 28; 966 a 24. For the medical use of πόροι cf. *περὶ διαίτης* I, VI 514L ὅπως αἱ διέξοδοι κενῶνται τοῦ ὑγροῦ καὶ μὴ φράσσονται οἱ πόροι τῆς ψυχῆς, II, VI 538L δέχονται τὴν τροφήν αἱ δίοδοι. Plato uses δίοδος, διέξοδος: *Tim.* 73e; 79cd; 91a. In the *Anonymus Londinensis* VIII 10 we hear of a Timotheus of Metapontum, for whom diseases are caused τῷ τὰς διεξόδους ἀποφράσσεσθαι.

3) H. Diels, *Über das physikalische System des Straton*, Sitz.-Ber. Berlin Ak. (1893), 101 ff.

4) Cf. Wellmann, R.E. s.v. Erasistratos, col. 336.

belong in the line of medical thought which begins with Strato. The πόροι of Asclepiades, however, are not identical with the τριπλοχία τῶν ἀγγείων of Erasistratus. Such a theory is nowhere attributed to Asclepiades; moreover, he disagreed with Erasistratus on points which seem to be essentially connected with the theory: Erasistratus' plethora pathology, and the doctrine, which Erasistratus derived from Praxagoras, that the arteries are filled exclusively with air ¹⁾).

What is peculiar to Asclepiades' medical theory, then, is neither his pathology of ἔμφραξις, nor his doctrine of invisible pores, but his atomism, and his particular interpretation of ἔμφραξις τῶν πόρων as ἐνστασις τῶν ὀγκῶν. Now that Asclepiades was the inventor of medical atomism was denied by Wellmann ²⁾, who, building upon Diels' demonstration of a corpuscular theory in Strato ³⁾, and of

1) That the arteries in Asclepiades contain blood as well as air follows from Cael. Aurel. *op. cit.* I 15, 124; II 34, 180; Galen *De Usu Part.* IV 13, 340 H. Asclepiades evidently retained plethora (Cael. Aurel. *op. cit.* I 14 112), but regarded it as προκαταρκτικόν, not συνεκτικόν of disease (Galen XVIII A 276-7), and made only a restricted use of it.

2) NJbb. (1908), 684-703.

3) This is not the place to discuss Strato's theory of matter, but perhaps the following remarks may be made: the combination of Strato's view of the corpuscular composition of matter (σώματα, μόρια are attested by Hero's preface to the *Pneumatica*, some (cf. F. Wehrli, *Straton von Lamp-sakos*, Basel 1950, 56-7) of which goes back to Strato via Philo and Ctesibius) with the doctrine of the infinite divisibility of matter which he perhaps held (cf. Fr. 48, 82 Wehrli) might suggest the divisible ὄγκοι of Heraclides (cf. Diels, *op. cit.*, 112; Susemihl in Bursian LXXIX, 288 n. 34 therefore remarks that Asclepiades' corpuscular theory developed from Strato rather than from Heraclides). Yet we hear nothing of the terminology of ἀναρμοὶ ὄγκοι in Strato nor of the shattering of the particles; and Strato's particulate theory of matter seems to have been used not so much to describe the formation of compounds by combinations of atoms moving freely in empty space, as to explain phenomena of compression or expansion by the density with which the atoms, separated by πόροι, discontinuous void, are packed together. What distinguishes Strato from Democritus is that his void is discontinuous: matter in Strato has been aptly described as a kind of sponge-rubber (by H. B. Gottschalk in an unpublished dissertation in the Cambridge University Library: G. points out that the significance of the particles in Strato is that they are parts of a larger aggregate; they are the endpoint of his thought rather than the starting point, as they are in Democritus). Diels' view (*op. cit.*, 112 n. 4) that Strato's objection to Democritus' atoms was to the fact that they were ἀγιστροειδεῖς (cf. the language of Cicero *Ac.* II 38, 121 = Strato Fr. 32 Wehrli) moves Strato nearer to Heraclides only on the

Erasistratus' dependence upon Strato for his theory of pores, regarded Asclepiades as standing at the end of a tradition of medical atomism rather than at its beginning. One of Asclepiades' predecessors, according to Wellmann, was Aegimius of Elis. Aegimius is a shadowy figure, and the evidence is scanty. However, he shared certain doctrines with Asclepiades and Erasistratus, including plethora, the absorption of nutriment in unconcocted form, and a doctrine of ἀποφοραί, effluences. In addition, he substituted the term παλμός for σφυγμός; that is, he used it to describe the natural motion of the pulse ¹). In this change he may have been influenced by Democritus' term φλεβοπαλία to describe the movement of the arteries ²). If Erasistratus, in his restriction of σφυγμός to unnatural pulsation (which is attested by Galen VIII 714; 761) was influenced by Aegimius, through Chrysippus the Younger, however ³), then there is a thin, though not particularly straight, line of evidence leading from Aegimius to Asclepiades. Clearly however it is Erasistratus who would be the central point in such a tradition, and here the question is not so much whether he did in fact hold a corpuscular theory of matter, as he may have done ⁴), as whether he made a significant use of it in his medical

assumption that the latter's ὄγκοι were without surface irregularity. But this rests on an interpretation of ἄναρμος for which there is no evidence (cf. Heidel, *op. cit.*); moreover, Asclepiades' ὄγκοι, though ἄναρμοι, are certainly ἀγκιστροειδεῖς (for their συμπλοκή, complexio, see Galen X 267; XIV 253; Cael. Aurel. I 14, 107).

1) Galen VIII 498; 752.

2) DK. II 167, 4. We are not however told whether Democritus meant natural motion or not; if not, then παλμός is used in its ordinary Hippocratic sense (cf. *De Sacro Morbo*, VI 370 L), and on this point any supposed connection between Aegimius and Democritus falls to the ground.

3) Wellmann, *Hermes* 35 (1900), 378.

4) Even on this point the evidence is unsatisfactory, and what was said above about atomism in Strato of course applies to Erasistratus also. Apart from the Stratonian doctrine of discontinuous void, which implies a particulate theory of matter, the direct evidence for atomism in E. is as follows: pseudo-Galen XIV 699 οἱ δὲ τὰ στερεὰ σώματα τὰ ἀρχικά καὶ στοιχειώδη ὑποθέμενοι, τὰ τε φύσει συνεστῶτα ἐκ τούτων, καὶ τῶν νόσων τὰς αἰτίας ἐντεῦθεν λαμβάνουσιν, ὡς Ἐρασίστρατος καὶ Ἀσκληπιιάδης (Wellmann in RE, col. 336 adds Dietz, Schol. in Hipp. et Gal. I 240, but τῶν ἀτόμων there is used in its logical sense, meaning indivisible species); Anon. Lond. XXI 23 ff. ὁ μὲν γὰρ Ἐρασίστρατος καὶ πόρρω τοῦ ἱατρικοῦ κανόνος προῆλθε· ὑπέλαβεν γὰρ τὰ πρῶτα σώματα λόγῳ θεωρητὰ εἶναι, ὥστε τὴν αἰσθητὴν φλέβα συνεστάναι ἐκ λόγῳ θεώ-

theory; whether, in fact, there is any trace in Erasistratus of the pathology of ἐνστασις τῶν ὀγκῶν, which is the peculiar feature of Asclepiades' theory. Now this is a possibility which the evidence seems to exclude: not only is there not a word of it in the tradition, but it seems to conflict with what we are told of Erasistratus' pathology. The difference between the two men is put succinctly by pseudo-Galen XIV 728 κατὰ δὲ Ἐρασίστρατον καὶ Ἀσκληπιάδην, ὡς ἐπίπαν μίαν αἰτίαν ἐπὶ πάσης νόσου, καθ' ὃν μὲν ἡ παρέμπτωσις εἰς τὰς ἀρτηρίας τοῦ αἵματος· καθ' ὃν δὲ ἡ ἔκτασις (? ἐνστασις) τῶν ὀγκῶν ἐν τοῖς ἀραιώμασιν.

I have noted above Asclepiades' universal reliance on the principle of ἐνστασις τῶν ὀγκῶν; by it, he explained phrenitis¹⁾, quotidian, tertian, and quartan fever, lethargy, pleurisy, and acute fever, in all of which it functions as αἰτία συνεκτική²⁾. The importance which Asclepiades gave to ἐνστασις, was given by Erasistratus to plethora and its consequences, to which he referred all these maladies³⁾. As in Asclepiades, plethora is αἰτία προκαταρκτική (Soranus *Gyn.* III 4, p. 96 Ilberg). It originates in a digestive malfunction, and one of its effects is inflammation, φλεγμονή; this occurs by a sort of wedging (σφηνοῦσθαι) of the blood in the limits of the arteries, and is the αἰτία συνεκτική of the maladies mentioned (Soranus, *Ib.*; Galen XI 153; III 493). Now in the latter passage,

ρητῶν σωμάτων. *Ib.* XXX 43 ff. and XXXIII 25: the doctrine of ἀποφοραί, effluences of invisible σώματα. Yet Galen, who after all records E. in considerable detail, was able to deny altogether that he held a doctrine of atomism (*De Nat. Pot.* II, p. 175 H); and even among the Erasistrateans themselves it was disputed (*Ib.* II p. 172 H καὶ γὰρ καὶ περὶ τούτου τοὺς Ἐρασιστρατεῖους ὁρῶ διαφερομένους, the question being whether the ἀγγεῖον is συνεχές or divisible into ἕτερα στοιχειώδη) so that clearly there was no definite text on the subject, and it therefore cannot have played any important part in his medical theory. Now the atomistic interpretation to which Galen refers is given in Asclepiadean terms (ἄναρμα στοιχεῖα etc.). This may be because Asclepiades' theory was the only form of medical atomism with which Galen was familiar (thus he occasionally uses ὄγκοι to refer to the atoms of Epicurus). But it may also be because the followers of E. *after* Asclepiades read back into him Asclepiadean doctrines: this would account for their association in pseudo-Galen XIV 699, which is not paralleled elsewhere.

1) Cael. Aurel. I Praef. 6.

2) *Ib.* I 14, 107.

3) Galen III 493; VII 537 ff.; XI 236; Wellmann RE, col. 344, 49 ff.

Galen refers to phrenitis as one of the diseases resulting from inflammation. We are told by Themison¹⁾ that phrenitis and lethargy in Erasistratus are caused by a πάθος of ψυχικὴ δύναμις in the dura mater: i.e. by a stoppage, ἔμφοραξις, of ψυχικὸν πνεῦμα. The cause of the stoppage is not given there, but Galen's evidence supplies it: φλεγμονή. In other cases where Erasistratus used the principle of ἔμφοραξις, we are given the cause: in dropsy, it is sclerosis²⁾, in apoplexy, the ἔμφοραξις is caused by the formation of a cold and viscous phlegm³⁾; in paralysis, by a viscous and thick humour⁴⁾. In jaundice⁵⁾, the cause is not given, but since Diocles is there credited with the same view, it may be inflammation, and is certainly not ἐνστασις τῶν ὀγκῶν. Perhaps the clearest example of the difference in pathology between the two men is in their account of fever: while Erasistratus attributed it to plethora⁶⁾, Asclepiades not only attributed it to ἐνστασις, but explained its specific differences by differences in the size of the obstructing particles⁷⁾. It seems unlikely, then, that Asclepiades was indebted to Erasistratus for the peculiar features of his theory.

That Asclepiades should have returned to the fourth century and to Heraclides for his corpuscular theory seems strange, when the highly developed system of Epicurus lay much closer to hand. Epicureanism, with its compassionate attitude to mankind, its sense of the importance of techniques in the development of civilization, and above all its thorough rejection of all teleological principles of explanation, might well have seemed to offer more attractions to a person of Asclepiades' cast of mind. For Asclepiades himself was equally thorough in adopting a purely mechanistic theory of causation, which was the main motive for Galen's hostility to him⁸⁾; whereas a mechanistic causality in Heraclides would

1) R. Fuchs, *Aus Themisons Werk*, RhM. 58 (1903), 69, 73.

2) R. Fuchs, *Anecdota Medica Graeca*, RhM. 49 (1894), p. 555.

3) RhM. 58 (1903), p. 80. Here moreover E.'s view is identical with that of Praxagoras and Diocles, given earlier in the same passage.

4) Galen V 125.

5) Cf. RhM. 49 (1894), 554. 6) Galen VII 541.

7) Galen VII 615; cf. Sextus *adv. Math.* VIII 220, where the two views are explicitly contrasted.

8) Cf. e.g. Galen's elaborate contrast of the "two schools in medicine and in philosophy" in *De Nat. Pot.* I, cap. 12.

conflict with all we know of that philosopher ¹⁾. On the other hand, the Epicureans seem to have taken little interest in medical theory, although it is possible that Epicurus himself wrote *περὶ νόσων* ²⁾. It is therefore tempting to suppose that Asclepiades was indebted to Heraclides not only for his corpuscular theory but also, to some extent, for its medical application; that Heraclides in fact used his *ἄναρμοι ὄγκοι* in the pathology of disease. If so, the most likely source of which we know for such a theory would be Heraclides' dialogue which is variously titled as *Περὶ τῆς ἄπνου*, *περὶ νόσων* and is perhaps identical with the work listed by Diogenes Laertius as *αἰτίαι περὶ νόσων* ³⁾. Yet the direct evidence is meagre, to say the least. In the fragments which Wehrli associates with this dialogue, only one, to be discussed later, mentions Asclepiades, and there he is not directly connected with Heraclides; moreover the allocation to this dialogue is conjectural. The earlier collection of O. Voss was far more catholic in its inclusion of fragments associated wholly with Asclepiades ⁴⁾: these however are included on the grounds of the identity of the corpuscular theory held by the two men rather than because of their medical content ⁵⁾. That the corpuscular theory may have been used in the *Περὶ τῆς ἄπνου* is not even envisaged as a possibility by Wehrli, who indeed goes so far as to doubt whether there was any considerable discussion of medical matters in this work ⁶⁾. There are therefore two distinct questions

1) Cf. Wehrli, 102. In Fr. 75 Wehrli, Heraclides gave expression to the two cardinal religious principles of Plato's *Laws*, that the gods exist and that they are actively concerned with mankind: the very principles which aroused Epicurus' deepest antagonism. Such too was the tendency of the dialogue *Περὶ Εὐσεβείας*.

2) Cf. Diogenes' list, cap. 28 with Usener's text. See Bailey's note *ad loc.*

3) Hirzel, *Der Dialog*, I, 325 suggests that the title of the whole work was *Ἄπνου ἢ περὶ νόσων*. O. Voss, *De Heraclidis Pontici vita et scriptis* (Diss. Rost. 1896) comments: „Immo liber ἄπνου pars dialogi περὶ νόσων fuisse videtur” (p. 69). There seems no way of deciding the question, and I refer to it as *Περὶ τῆς ἄπνου* for convenience.

4) O. Voss, *op. cit.* Fr. 55, 63, 64. Voss remarks p. 65: “Ubi vestigia huius doctrinae (the *ἄναρμοι ὄγκοι*) apud Asclepiadem invenimus, nostro iure Asclepiadem Heraclideam sententiam proferre statuemus”.

5) Voss however says: “certum esse iudico Heraclidem, cum ageret de morbis, a doctrina sua elationum . . . profectum et Asclepiadem in hac re eum secutum esse” (*op. cit.* p. 68). The matter is not quite so simple.

6) *Op. cit.*, 88: “ein ernsthaftes Eingehen auf medizinische Einzelfragen

to be considered: was there a general theory of pathology in *Περὶ τῆς ἄπνου*; and if so, was it, like the pathology of Asclepiades, based on the *ἄναρμοι ὄγκοι*? No-one can give a definite answer to such questions, but certain considerations can be advanced which suggest a positive answer to both.

The dialogue was celebrated in antiquity for, among other things, its record of the case of a woman who lay for thirty days in a state of suspended animation, "without respiration or pulsation" (D.L. VIII 60 = Fr. 77 Wehrli), and who showed no sign of life except for a faint warmth in the middle parts of her body (Galen VIII 414 = Fr. 79 Wehrli). Her case perplexed the physicians, until it was explained, and the woman cured, by Empedocles (for this probable conjecture, see Wehrli's note on Fr. 77).

Wehrli understands Heraclides' purpose in the dialogue, or in this part of it, to be to emphasize the contrast between the rational monism¹⁾ of the professional physicians, which fails to account for the phenomena, and the transcendental dualism of Empedocles, who explains that the woman's soul is in a state of ecstasy. This being its purpose, it is unlikely that it contained any serious discussion of medical questions; any physiological explanation would be, in Heraclides' view, false²⁾. This seems a somewhat surprising thing to say about a dialogue with the alternative title *περὶ νόσων*, and Wehrli here and elsewhere seems concerned to set Heraclides in an inappropriate mould: Heraclides is characterized by a naive and indeed superstitious piety, which is opposed to the more rationalist and scientific approach of other thinkers³⁾. Yet this kind of antithesis is more accurately applied to the nineteenth century than it is to fourth century Greece, where there is indeed a contrast, but one of an essentially different nature. It is also particularly inappropriate to Heraclides, who showed a greater and more intelligent interest in scientific questions than did some of his contemporaries. The true fourth century contrast

ist wegen der Tendenz des Dialoges unwahrscheinlich". It is precisely this "Tendenz" which requires discussion.

1) Cf. Wehrli, 86. Yet this attitude to Sicilian medical theory (Philistion) was not shared by Plato.

2) Wehrli, 88.

3) Cf. his remarks on the dialogue *Περὶ Εὐσεβείας*, pp. 73-4.

is the one that is expressed by Plato's substitution of *physis* for *tyche* in the *Laws*¹⁾; it is an opposition between two kinds of *scientific* explanation, the theological or teleological mode, and the mechanistic mode. The point in Plato's answer to the mechanists is that he calls for, not *no* science, but what he genuinely regards as *better*, that is, more scientific, science. For Heraclides, we should I think imagine something like the science of Plato's *Timaieus*, varying between the more and the less mythical according to the needs of a particular work.

Heraclides elsewhere shows an interest in the scientific thought of Empedocles, whose theory of perception he adopted²⁾, and it is not difficult to see why. Empedocles' combination of science and mysticism was exactly the sort of blend which would appeal to Heraclides, himself religiously minded and at the same time occupied with a wide variety of scientific questions. Heraclides, according to Diogenes (VIII 60 = Fr. 77 Wehrli) called Empedocles *ἱατρός* as well as *μάντις*. It was no doubt in this double character, so significant for Heraclides, that Empedocles appeared at the bedside of the *ἄπνοος*, to give an explanation which might satisfy scientific reason as well as religious faith, or rather, that peculiarly Platonic compound of the two. Origen (*adv. Cels.* II 16 402 = Fr. 78 Wehrli) couples the *ἄπνοος* with Plato's *Er* and applies them against the scepticism of those who disbelieved in the Resurrection; while in the elder Pliny (*N.H.* VII 52, 175 = Fr. 81 Wehrli) the tradition is linked with similarly miraculous stories³⁾. Both these sources suggest that some account was given in Heraclides of the sights seen by the woman's soul during its absence from her body. But if the tradition suggests this, it suggests equally that account was taken of, and explanation given for, the physiological facts as well, including the "slight warmth about the middle parts of the body" which Heraclides was careful to mention. However, quite apart from the tradition, it is unlikely that Empe-

1) *Laws* 892bc.

2) Fr. 122 Wehrli.

3) On these and their relation to Heraclides' dialogue, see J. D. P. Bolton, *Aristeas of Proconnesus* (Oxford 1962), 153 ff. Bolton, following Wehrli, assumes that an apocalyptic vision was involved; C. H. Kahn in *Arch. f. Gesch. d. Philos.* 42 (1960), 34, n. 12 is sceptical.

docles, known to Heraclides as a scientific thinker with elaborate physiological theories, would have offered an explanation which completely disregarded the physiological symptoms; and it takes only a little reflection to see that, had he done so, the point would have been largely lost. For the physicians were perplexed, and what perplexed them was that the woman showed *some* of the symptoms of life, in conjunction with some of the symptoms of death. She was neither clearly dead nor clearly alive; and she was not simply asleep. What Empedocles must have offered was some explanation of how this was possible: how the soul could wander and cease to inhabit the body, while the body remained technically alive; how, therefore, the functions of organic life were not, or not wholly, dependent on the presence of conscious soul. In short, Empedocles must have explained that the soul was something essentially different from a mere principle of organic life, and to that extent Wehrli is justified. But, in order to do this convincingly, he must also have explained how life could persist in the body in the absence of conscious soul. And it was no doubt this that, *ιατρός* as well as *μάντις*, he triumphantly did ¹).

1) Having given the physiological part of his explanation, Empedocles would presumably have turned to the separable soul itself. With hesitance, I suggest that we may have a trace of this part of the dialogue in Plutarch, *De Exilio* 607 c 10 ff. In that passage, Plutarch, after quoting the well-known lines from the *Katharmoi*, *ἔστιν ἀνάγκης χρῆμα . . .* continues, in prose: 'οὐ γὰρ αἶμα', φησὶν 'ἡμῖν οὐδὲ πνεῦμα συγκραθέν, ὃ ἄνθρωποι, ψυχῆς οὐσίαν καὶ ἀρχὴν παρέσχευ, ἀλλ' ἐκ τούτων τὸ σῶμα συμπέπλασται γηγενὲς καὶ θνητόν,' τῆς δὲ ψυχῆς ἀλλαχόθεν ἡκούσης δεῦρο τὴν γένεσιν ἀποδημίαν ὑποκορίζεται τῷ πραοτάτῳ τῶν ὀνομάτων. Now a prose paraphrase is in itself odd in a work where verse quotations lie strewn thick as autumnal leaves, though one might explain it by a desire for brevity or variety. But on closer inspection, it is clear that the passage is not even a paraphrase, but rather an *interpretation*: since the words *ψυχῆς οὐσίαν καὶ ἀρχήν* involve not simply an alien terminology, but a set of logical concepts alien alike to Empedocles and to the fifth century. The passage is cast in Academic form. Yet remote as the passage must be from Empedocles' thought, words, and style (*ἐκ τούτων . . .* . . . *θνητόν* has a remarkably Platonic cadence), there is also an element in it, and that an altogether inessential one, which suggests direct quotation: *ὃ ἄνθρωποι*. The sentence is brief, and coherent. What I wish to suggest is that the words may indeed be a quotation, not from Empedocles himself but from Empedocles as presented in Heraclides' dialogue. They would fit very well into the context, if that was such as I have supposed it to be: Empedocles, having demonstrated how the body can remain alive while the soul is absent

Moreover, if these two aspects were present in the dialogue, Heraclides will have given a more faithful representation of Empedocles' mind than Wehrli suggests. "Dualism" there is indeed in Empedocles, but it is a dualism not so much between body and soul, as a dualism between two kinds of soul: the organism of the *Περὶ Φύσεως*, for which νόημα is αἷμα περικάρδιον and for which, according to one testimony ¹⁾, soul dies with body; and the immortal δαίμων of the *Καθαρμοί*. This is a vexed question, to which various answers have been given. But it is pertinent to say so much about it here: the dualism of Empedocles and the contradiction, if it is such, between the two poems, is part of a tradition in Greek thought which extends from Empedocles to Aristotle. It is found for example in the two forms in which the soul-harmonia doctrine was held by the Pythagoreans: soul as κρᾶσις of the four bodily opposites, and soul as a self-subsistent harmonia. These two forms of the theory may have been held by different branches of the school belonging to the same period; they are not necessarily incompatible, and in some cases, both within the school and in thinkers influenced by Pythagorean theories, the doctrine of soul as a harmonia of the four opposites seems to have been thought quite compatible with a belief in its immortality ²⁾. The dualism is found again in the two

from it for a temporary period, then turns to his rapt audience and says: "For see, o mortals, that the principle and essential nature of the soul is neither blood nor breath".

If on the other hand the composition is due to Plutarch, then the formulation αἷμα-πνεῦμα is significant. αἷμα ἢ πνεῦμα is a doxographic phrase: cf. *Nemesius, De Nat. Hom.* C. 2, PG XL 541 πρὸς δοξάζοντας αἷμα ἢ πνεῦμα εἶναι τὴν ψυχὴν; *Hermeias (Dox. Graec.* 651 13) οἱ δὲ τὸ αἷμα, οἱ δὲ τὸ πνεῦμα (sc. φασιν ψυχὴν εἶναι).

1) DK I, 301, 17.

2) On the tradition of dualism in Greek thought, and Empedocles' place in it, see G. S. Kirk and J. E. Raven, *The Presocratic Philosophers* (Cambridge 1957), 360; C. H. Kahn, *Religion and Natural Philosophy in Empedocles' Doctrine of the Soul*, *Arch. f. Gesch. d. Philos.* 42 (1960), 3-35; W. K. C. Guthrie, *A History of Greek Philosophy*, Vol. I (Cambridge 1962), 317 ff. On the two senses of the Pythagorean theory, and the evidence that some held harmonia of the four bodily opposites to be compatible with a belief in immortality, see Guthrie, 307 ff. and Kahn, 28, n. 70. Guthrie mentions the Pythagorean Echecrates (*Phaedo* 88d), and Alcmaeon and Empedocles, who held similar views, as cases in point. We should perhaps add Clearchus of Soli (on whom see below) to their number; in this connection

forms of soul which Plato describes in the *Timaeus*; and it is significant that Aristotle compares Empedocles' perceptive soul to that of Plato¹). The dualism reappears in another form in Aristotle's own soul-entelecheia and separable Nous.

For Heraclides himself, an example from the Peripatos is particularly illuminating: this is the dialogue *Περὶ ὕπνου* written by Clearchus of Soli²). In that dialogue, Aristotle was represented in attendance at a seance, in which a Judaeen seer persuaded him of the soul's separability by giving him visible demonstration of the soul's departure and re-entry while the body remained in a trance-like condition, in a state of perfect preservation but without sensation. We have here precisely the same situation as that presented in Heraclides' dialogue. Now Theodoretus (*Graec. Affect. Cur.* V 18 = Fr. 9 Wehrli) in a doxographical passage attributes to Clearchus the doctrine that the soul is a harmonia of the four elements. Wehrli adopts the suggested alteration to Dicaearchus³), assuming that such a doctrine is inconsistent with Clearchus' belief in the soul's immortality, while it was undoubtedly held by Dicaearchus, who denied immortality. Admittedly, one can hardly imagine a more irresponsible source than Theodoretus, but it seems all the same unlikely that he would mistake the less familiar Clearchus for the more celebrated Dicaearchus; and if the grounds for altering the text are a supposed incompatibility of doctrine, then they are insufficient. The apparent incompatibility is neither greater nor less than it is in Empedocles, who held something similar to the doctrine of harmonia and at the same time believed in the soul's immortality; or than it is, for that matter, in Aristotle's doctrine of separable νοῦς.

A study of the remnants of Heraclides' writings suggests a talent whose originality is somewhat superficial: the originality, that is, of an ardent and gifted disciple who does not so much strike out on new paths but who gives an expression, unmistakably his own, to

it is significant that the fragments of Clearchus' dialogue, like those of Heraclides, are coloured with Pythagoreanism.

1) *De An.* 404 b 11; cf. H. A. T. Reiche, *Empedocles' Mixture, Eudoxan Astronomy, and Aristotle's Connate Pneuma* (Amsterdam 1960), 14.

2) F. Wehrli, *Klearchos* (Basel 1948), Fr. 5-8.

3) Wehrli, *op. cit.*, 47.

the attitudes he has inherited from his master. If this intuition is a correct one, Heraclides must have returned again and again to the *Timaeus*, which was at once the manifesto and the masterpiece of what one may perhaps call the New Science of the fourth century. Indeed the sum of Heraclides' writings on astronomy and on physics gives the impression of an elaborate and highly fanciful commentary on the *Timaeus*. Now the antecedent for a work περὶ νόσων already existed in the *Timaeus*, in that section where Plato discusses τὸ δὲ τῶν νόσων ὅθεν συνίσταται¹). There were of course other works of the same title, including the περὶ νόσων of Democritus listed by Diogenes, and the Hippocratic treatises of the same title; however, the dialogue form of Heraclides' work suggests that the *Timaeus* was the closest analogy. The essential features of the Platonic passage are a developed physiological theory, and an aetiology of disease which is based upon systematic classification; one might expect these features to appear in the structure of Heraclides' dialogue. In addition, Plato's physiology and pathology are founded upon his theory of the constitution of matter, and Plato refers the causes of debility and death to the gradual dissolution of the elementary triangles. Here one is reminded of Heraclides' ἀναρμοὶ ὄγκοι, which are themselves composites of θραύσματα; and Asclepiades, as we have seen, referred the sensation of pain to the size of the ὄγκοι, just as Plato referred it to the size of the elementary bodies (*Tim.* 64 E.). In addition Asclepiades seems to have made use of the frangibility of the ὄγκοι in his explanation of pain, so that it is reasonable to conjecture that he referred physical dissolution to the same cause.

The condition of the ἄπνοος was one familiar enough to the medical knowledge of antiquity: it is called πνιξ ὑστερική in the *Γυναικεῖα* of Soranus, and it receives detailed treatment in the Hippocratic treatise on the diseases of women. Now it is significant that this condition of hysterical suffocation had already been mentioned in Plato's *Timaeus* (91c)²). The passage is as follows: αἱ δ' ἐν

1) *Tim.* 81e-86a. The hypomnematic character of the Hippocratic treatises, even if it were likely that Heraclides knew of them, excludes them from consideration.

2) J. Bidez, *La Biographie d'Empédocle* (Gand 1894), 26, first drew attention to the relevance of this passage for Heraclides' dialogue.

ταῖς γυναιξίν αὖ μητραί τε καὶ ὑστέραι λεγόμεναι διὰ τὰ αὐτὰ ταῦτα, ζῶον ἐπιθυμητικὸν ἐνὸν τῆς παιδοποιίας, ὅταν ἄκαρπον παρὰ τὴν ὥραν χρόνον πολὺν γίγνηται, χαλεπῶς ἀγανακτοῦν φέρει, καὶ πλανώμενον πάντῃ κατὰ τὸ σῶμα, τὰς τοῦ πνεύματος διεξόδους ἀποφράττον, ἀναπνεῖν οὐκ ἐὼν εἰς ἀπορίας τὰς ἐσχάτας ἐμβάλλει καὶ νόσους παντοδαπὰς ἄλλας παρέχει κτλ.

With this, we should compare the following passage from Galen (VII 615 = Fr. 82 Wehrli): 'Ἀσκληπιάδης γοῦν οὐ μόνον τὸ θερμὸν ἀλλ' οὐδ' ἄλλην τινὰ τιθεὶς ἔμφυτον δύνανται ἅπαντα πυρετὸν ἐπὶ τισιν ἐμφράξεσιν ὄγκων ἐν πόροις ἀεὶ συνίστασθαι λέγων, ἐν μεγέθεσι πόρων τὴν διαφορὰν τιθέμενος αὐτοῦ, οὕτω φιλοτεχνεῖ δεικνυσί τε τίσι μὲν ἀνάγκη ῥῖγος ἐξεῦχθαι τίσι δ' οὐ. καὶ ἔγωγ' ἂν εἰ μὴ μακρότερόν τε τοῦ καιροῦ τὸν λόγον ἡλπιζον ἔσεσθαι . . . ἐξῆς ἂν ὑπὲρ ἀπασῶν τῶν δοξῶν ἐπισκεψάμενος . . . ἐπὶ τὴν ἡμετέραν ἦκον δόξαν. . . . οὐδὲ γὰρ Ἀθηναῖον ἐπαινῶ περὶ μὲν Ἀσκληπιάδου καὶ Ἡρακλείδου τοῦ Ποντικοῦ καὶ Στράτωνος τοῦ φυσικοῦ λέγοντά τι, τῶν δ' ἄλλων οὐδενὸς μνημονεύοντα. καίτοι γε οὐ τὰς τούτων δόξας μόνον περὶ ῥίγους, ἀλλ' ἑτέρας πολὺ πλείους οὐδὲν ἥττον ἐνδόξους τε καὶ πιθανὰς εἶχεν εἰπεῖν.

Galen is here criticizing Athenaeus' theory of ῥῖγος, which is similar to the theory of Plato (*Tim.* 62b), whom Athenaeus quoted in support of his view (cf. Galen VII 609-10). According to Plato, τρόμος and ῥῖγος arise as a consequence of the resistance of smaller particles within the body to larger particles which enter from outside and compress them. It is interesting to find Athenaeus, the great founder of the Pneumatic school, apparently approving an atomistic doctrine. Galen is critical of Athenaeus' selection of the theories of Asclepiades, Heraclides, and Strato: there were, he says, better ones available. Athenaeus clearly had a motive for selecting precisely these three; and his quotation of Plato on ῥῖγος indicates what that motive was. Heraclides, like Asclepiades, must have given an account of ῥῖγος similar to that of Plato, and of Athenaeus himself. If Strato did so also, then this passage of Galen is additional evidence for Wellmann's hypothesis. Plato's theory however is easily adaptable to a theory of porous matter: indeed Athenaeus, who perhaps held to the Stoic doctrine of the continuity of matter, and who was in any case not an atomist, must have made some adaptation of Plato's theory.

It was probably in the *περὶ τῆς Ἄπνου* that Heraclides discussed ῥῆγος; not merely because we know of no other work in which he was likely to have done so, but because the topic fits in well with the little we know of that work. For ῥῆγος, when present, is along with increased σφυγμός and rapid breathing one of the symptoms usually associated with fever by Greek medical theory. Now these are precisely the symptoms directly opposed to those of the ἄπνους and the contrast is in fact made by Galen, who cites her as an example of the condition opposite to fever (VII 773= Fr. 80 Wehrli). Hence any physiological explanation of the condition of the ἄπνους would be likely at least to touch on the causes and symptoms of fever; the phenomena are pathologically related. According to Galen, Asclepiades in consistency with his general pathology explained fever as caused by the obstruction of pores by the ῥῆγος, and he appealed to the same principle for an explanation of the presence or absence of ῥῆγος. Asclepiades' account of ῥῆγος was atomistic: so was that of Plato. Moreover, Plato before Heraclides had linked the condition of hysterical suffocation with obstruction of the πόροι (cf. also Plato's use of ἔμφορξις in his third class of disease, *Tim.* 84d ff.). A comparison of the two passages therefore suggests very strongly that Asclepiades found not only his corpuscular theory in Heraclides, but also some of its specifically medical applications.

The condition of hysterical suffocation clearly occupied the central place in Heraclides' dialogue, and Galen's references to Heraclides' work suggest that it was for him an important part of the medical literature upon the subject¹). At the head of this litera-

1) This circumstance in itself indicates that there must have been more to Heraclides' account than a mere description of symptoms, especially in a condition of which Galen himself had made professional observation (cf. VIII 420). Wellmann (*Die Pneumatische Schule*, 91 ff.) on the grounds of the closely parallel passage in Aetius XVI (from Philumenus) and in Aretaeus II 11, argued that the common source for Galen, Philumenus-Aetius, and Aretaeus was Archigenes, from whom, he thinks, the greater part of Galen's passage on hysterical suffocation, from 413 to 425, is taken, almost without change. If this is so, then the reference to Heraclides goes back to Archigenes (and probably to Athenaeus). Kalbfleisch however (GGA 1897, 818 ff.) thought Wellmann's view intrinsically improbable. To his reasons, one might add the consideration that Galen's whole discussion seems carefully designed to lead up to the view that the uterus is not 'a living thing'—i.e. to a *refutation*

ture stood the passage from Plato which Galen quotes in full in the course of his discussion of the subject (cf. VIII 425). Galen then continues: 'Such being Plato's opinion, some made the addition that when the matrices, in their wandering over the body, encounter the diaphragm, they hinder respiration; while others deny that the womb wanders over the body like a living thing, but say that when there is retention of the menses, the womb becomes dry and ascends to the viscera in its desire to be moistened; and when in the course of its ascent it comes into contact with the diaphragm, then the animal is deprived of breath'. Now the first theory which Galen mentions can be identified as that of the Pneumatic school (cf. Aretaeus II 11, p. 32 ff. Hude). The author of the second is unknown. It is, however, similar to the theory of Soranus, who denied that the uterus was animated, and explained hysterical suffocation by its contraction upwards (Soranus p. 177, 1 ff. Rose; p. 326, 14-17); but in this theory, the contraction is caused by a chilling in consequence of an inflammation. Soranus criticized the treatment of Asclepiades, which included binding of the hypochondrion, and water-drinking. This treatment suggests the pathological theory which Galen describes; moreover, Soranus stands in the Asclepiadean tradition, and it is altogether probable that Asclepiades would have rejected the somewhat mystical theory of the animated uterus. Now Galen, introducing his criticism of this second view, remarks (p. 426) that it is likely to appeal to those who are ignorant of the phenomena revealed by anatomy, and who have not given their consideration to natural functions or faculties. The reference to natural faculties here is explained by a passage shortly preceding this (p. 421 ff.) in which Galen gives his own explanation

of the view of Aretaeus-Archigenes; it can therefore hardly be taken from Archigenes. Moreover, part of Galen's theory is the belief that the female emits seed in reproduction; and this was denied by the Pneumatics. All that can be certainly claimed for Archigenes, out of this passage of Galen, is the brief passage on p. 425, which corresponds to Aretaeus. This passage consists mainly of the quotation from Plato, and that it was quoted by Archigenes to prove his point is shown by a comparison of Galen XVI 179, where, referring again to the same theory, he says *φασὶ γὰρ τοῦτ' ἐκ Πλάτωνος γεγραμμένον εὐρίσκεισθαι* (the passage from the *Timaeus* follows). Archigenes *may* have quoted Heraclides as well, but there is no evidence whatsoever for supposing this from the present passage of Galen.

of the condition, which he regards as caused by retention either of the menses or of the female seed. This retained deposit, though small in amount, works a change throughout the whole body by ἀλλοίωσις; and among the illustrations which Galen then gives of how small things can produce extensive effects by ἀλλοίωσις he includes the example of a series of iron objects attached to a magnet. Now this example is perhaps less apt for his particular point here than his other illustrations; in any case, its use at this point is significant. For the theory which Galen criticizes is surely that of Asclepiades, who admitted neither ἀλλοίωσις nor natural faculties of any kind ¹⁾, whom Galen accused of ignorance of anatomy ²⁾, and against whose denial of a natural attractive faculty Galen quoted this very example of the magnet ³⁾.

We cannot tell Heraclides' precise place in the development of the theory of hysterical suffocation. If he developed Plato's theory, he may have done so in the direction subsequently taken by the Pneumatic school, and Athenaeus may have quoted him on the subject as he certainly quoted him on the subject of ῥῆγος. Clearly his dialogue was important in the history of the question. One would like to be more definite, but it is worth while in the meantime to trace even tentative lines of connexion, in the hope that further research into the history of science and medicine in the Hellenistic era may be able either to fill them in with greater detail, or to obliterate them with the more solid masonry of demonstrable fact.

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1) *De Nat. Pot.* I, p. 120 H.

2) III 467; 473.

3) *De Nat. Pot.* I, p. 133 ff. For Asclepiades' own (probable) theory on magnetism, see R. A. Fritzsche, *op. cit.*, RhM. 57, 363-391; it is a particularly good illustration of A.'s place in an *Academic*, rather than Epicurean, tradition.