



OXFORD JOURNALS  
OXFORD UNIVERSITY PRESS

---

GALEN'S THEORY OF ELEMENTS

Author(s): INNA KUPREEVA

Source: *Bulletin of the Institute of Classical Studies. Supplement*, 2014, No. 114,  
PHILOSOPHICAL THEMES IN GALEN (2014), pp. 153-196

Published by: Oxford University Press

Stable URL: <https://www.jstor.org/stable/44215142>

---

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <https://about.jstor.org/terms>



JSTOR

Oxford University Press is collaborating with JSTOR to digitize, preserve and extend access to *Bulletin of the Institute of Classical Studies. Supplement*

# GALEN'S THEORY OF ELEMENTS\*

INNA KUPREEVA

Galen characterizes his theory of elements as both Hippocratic and Aristotelian. While the attribution to Hippocrates was duly questioned,<sup>1</sup> the Aristotelian provenance of the main gist of the theory was accepted without controversy. Galen's overall motives for adopting Aristotle's system have also been rightly regarded as consistent with his commitment to a strong version of teleology, rejection of atomism, and avowed scepticism with regard to some more speculative philosophical questions.<sup>2</sup>

My goal in this paper is to consider Galen's argument for the Aristotelian view in the treatise *The elements according to Hippocrates (de Elementis ex Hippocrate)*. His account differs from the expositions of the theory of elements we find in the Aristotelian corpus. The difference can be explained by the polemical nature of his discussion, but only up to a point. The polemical framework helps to bring out some peculiar features of Galen's reading of Aristotle, but the reading itself stems from Galen's original philosophical position. Galen argues for a qualitative account of the elements against the corpuscularist view defended by atomists and Asclepiades. In doing so, he treats qualitative change as a necessary condition of sentience in a strong sense and commits himself to a particular reading of Aristotle's theory of sense perception, anticipating the 'literalist' position in modern scholarly debates.<sup>3</sup> He then argues against the purely qualitativist view of elements offered by the Pneumatists, followers of the Stoics. In doing so, he develops the analysis of the elements as simple bodies constituted by prime matter and the simple quality or qualitative principle. No such analysis is found in Aristotle, but it is attested for some Peripatetic sources of Galen's age. In his analysis of the element as a qualified body Galen draws on the conceptual framework of the Aristotelian *Categories*.

\* I am grateful to Peter Adamson for his comments on the earlier version of the paper, which helped improve it, and to Peter Adamson and Rtraud Hansberger for their editorial help.

<sup>1</sup> See R. J. Hankinson, 'Philosophy of nature', in *The Cambridge companion to Galen*, ed. R. J. Hankinson (Cambridge 2008) 210-24 (211).

<sup>2</sup> On teleology, see H. von Staden, 'Teleology and mechanism: Aristotelian biology and early Hellenistic medicine', in *Aristotelische Biologie: Intentionen, Methoden, Ergebnisse*, ed. W. Kullmann and S. Föllinger (Stuttgart 1997) 183-208; on rejection of atomism, Hankinson, 'Philosophy of nature' (n.1, above); on scepticism with respect to the questions outside the physician's remit, see M. Frede, 'On Galen's Epistemology', in *Galen: problems and prospects*, ed. V. Nutton (London 1981) 65-86, and Galen, *On my own opinions*, ed., trans., comm. V. Nutton, CMG 5.3.2 (Berlin 1999) 47-49.

<sup>3</sup> For a detailed map of the modern discussion, see V. Caston, 'The spirit and the letter: Aristotle on perception', in *Metaphysics, soul, and ethics in ancient thought: themes from the work of Richard Sorabji*, ed. R. Salles (Oxford 2005) 245-320.

1. *Hippocrates meets Aristotle: the starting points of Galen's exegesis*

Galen wrote *de Elementis ex Hippocrate* (*Hipp.Elem.*) during his second sojourn in Rome, when he composed a series of physiological treatises which included also *Mixtures*, *Natural capacities* (*Nat.Fac.*), *The best constitution of our bodies*, *Semen*, and *The shaping of the embryo*<sup>4</sup> Along with *The doctrines of Hippocrates and Plato* (*PHP*) and *The function of the parts of the body*,<sup>5</sup> these works are regarded as programmatic for his rationalist outlook in medical philosophy. The most important principle reiterated by Galen in all of them is that of natural teleology. His theories of elements and elemental mixtures or temperaments are intended as its direct extensions, which together form the foundation of Galen's humoralist physiology.

In the *de Elementis ex Hippocrate*, Galen presents his theory of elements in the course of polemical exegesis of the first section of Hippocratic treatise *de Natura Hominis* (*Nat.Hom.*). This Hippocratic treatise was clearly regarded by Galen as a very important text. To our knowledge, he devoted to it a total of three separate works: *de Elementis*, the commentary on *de Natura Hominis* in three books, and a lost treatise *On the agreement between 'The nature of man' and Hippocrates' views in other works*, also in three books.<sup>6</sup> The commentary, written also during the long second sojourn in Rome, but later than the *de Elementis*, belongs to the genre of line-by-line commentaries, with lemmata, and detailed discussion of the text.<sup>7</sup> The *de Elementis*, aptly described by Jacques Jouanna as a 'synthetic commentary', also contains textual discussions, but is mainly devoted to questions of doctrine.<sup>8</sup>

The first section of *de Natura Hominis* contains the most extensive exposition of the principles of humoralism in the Hippocratic corpus.<sup>9</sup> The question whether Hippocrates accepted the four elements of the philosophers is controversial. In his commentary on *Nat.Hom.*, Galen complains that his elaborate arguments for the elements in *de Elementis* were ignored by some unnamed critics who declared that the treatise *de Natura Hominis* is inauthentic. The question of the attribution of the treatise to Hippocrates is old. Anonymus

<sup>4</sup> J. Ilberg, 'Ueber die Schriftstellerei des Klaudios Galenos', *Rheinisches Museum für Philologie* N.F. I 44 (1889) 207-39; II 47 (1892) 489-514; III 51 (1896) 165-96; IV 52 (1897) 591-623, II 504-05, 513; *Galen: On the elements according to Hippocrates*, ed., trans., with intro. and comm. by Ph. De Lacy, CMG 5.1.2 (Berlin 1996) 42-45.

<sup>5</sup> Whose composition was started earlier, Ilberg, 'Schriftstellerei' (n.4, above) I 217-19, 228-29; II, 512.

<sup>6</sup> Galen, *HNH* XV.107 K = 56.4-6 Mewaldt; *Lib.Prop.* 6.1, 155.15-22 Boudon-Millot (lacuna in Kühn); XIX 36.11-17 K = 9.12, 161.14-20 Boudon-Millot.

<sup>7</sup> On this commentary, see J. Jouanna, 'La lecture du traité hippocratique de la *Nature de l'homme* par Galien', in *Le commentaire entre tradition et innovation*, ed. M.-O. Goulet-Cazé (Paris 2000) 273-99, on Galen's Hippocratic commentaries D. Manetti and A. Roselli, 'Galeno commentatore di Ippocrate', in ANRW 2.37.2, ed. W. Haase (Berlin 1994) 1529-1635, on Galen's commentaries in general, R. Flemming, 'Commentary', in *The Cambridge companion to Galen*, ed. R. J. Hankinson (Cambridge 2008) 323-54.

<sup>8</sup> Jouanna, 'La lecture du traité hippocratique' (n.7, above) 279.

<sup>9</sup> *Hippocrate, L'art de la médecine*, eds J. Jouanna and C. Magdelaine (Paris 1999) 165-66.

Londinensis<sup>10</sup> attributes the doctrine of humours and qualities stated in *Nat.Hom.* 3-4 to Polybus (*Med.* XIX 2, 1-18 Manetti). Aristotle in *HA* III.3, 512b-513a attributes to Polybus the description of vessels which corresponds to the one found in *Nat.Hom.* 11.

Galen is well aware of this authorship problem. The question of authenticity is important for him not just as a matter of historical accuracy: he wants his own theory of elements to be authoritative in the community of medical intellectuals, and the best available authority is, of course, that of Hippocrates. It is Galen's working assumption that Hippocrates himself is the author of the first part of the treatise (*Nat.Hom.* 1-8), but he says that he is not worried by the attribution to Polybus, as long as it is agreed that the doctrines related by Polybus do go back to Hippocrates himself.<sup>11</sup> His main concern is with the position of those unnamed critics who appealed to the spuriousness of the treatise while arguing against the attribution of the theory of four elements to Hippocrates.<sup>12</sup> It is clear from Galen's discussion in the commentary that it is mainly in order to refute this position that he composed the lost treatise on the agreement between *de Natura Hominis* and the Hippocratic doctrines in the rest of the corpus.<sup>13</sup>

Galen himself used the weapon of athetesis in similar cases: we have evidence that he did not recognize as genuine the treatise *On ancient medicine*, whose author clearly speaks against adopting the four cosmic elements as principles of medical theory. This passage comes from Galen's commentary on *Epidemics* II (composed after 193):<sup>14</sup>

<sup>10</sup> Anonymus Londinensis, *de Medicina*, ed. D. Manetti (Berlin 2011).

<sup>11</sup> Galen, *HNH* XV.11.14-12.4 K = 8.22-28 Mewaldt; XV.13.11-14.1 K = 9.19-24 Mewaldt. Galen mentions a lost treatise *On the genuine and spurious works of Hippocrates*, where it is argued that the received text of *de Natura Hominis* is composite, consisting of the two original parts, namely, the treatise on elements (*Nat.Hom.* 1-8) and *On regimen in health* which go back to Hippocrates (the former being likely to be by Hippocrates, the latter by Polybus), and the spurious second book, an interpolation added in the Alexandrian period. See *HNH* XV.9.16-11.10 K = 7.21-8.18 Mewaldt; XV.108.1-109.14 K = 57.4-21 Mewaldt, cf. XV.105.2-10 K = 55.6-14 Mewaldt. See also J. Mewaldt, 'Galenos Über echte und unechte Hippokratika', *Hermes* 44.1 (1909) 111-34 (131-34) and 'Praefatio' in *CMG* 5.9.1, ix-xi, who assumes that the treatise Galen refers to is his own, but cf. A. Roselli in Manetti and Roselli, 'Galenos commentatore' (n.7, above) 1555 n.95. Galen's commentary on the Hippocratic treatise consists, accordingly, of three books (entitled in Greek *hupomnēmata*): the first, on Chapters 1-8 (on the elements), the second, on Chapters 9-24 (the rest of our treatise), and the third, on *On regimen in health*. In *de Libris Propriis* Galen mentions two books of the commentary (see *Galien: Tome 1 (Introduction générale, Sur l'ordre de ses propres livres, Sur ses propres livres, Que l'excellent médecin est aussi philosophe)*, ed., trans., comm. V. Boudon-Millot (Paris 2007) 9.12, 161.15, and 212 n.4, and Jouanna, 'La lecture du traité hippocratique' (n.7, above) for the analysis of the argument of the treatise that might suggest the original bipartite structure).

<sup>12</sup> Galen, *HNH* XV.13.7-11 K = 9.15-19 Mewaldt; *Lib.Prop.* 9.12, XIX 36.13-15 K = 161.15-17 Boudon-Millot.

<sup>13</sup> Galen, *HNH* XV.13.11-14.1 K = 9.19-24 Mewaldt.

<sup>14</sup> Ilberg, 'Schriftstellerei' (n.4, above) II 510.

(T1) Galen, *Hipp.Epid. II* 220.6-17 Pfaff

In my view it makes no difference if I also mention those who have interpreted this passage in a way contrary to Hippocrates' opinion. They say that the words of Hippocrates in this passage are the same as those in the treatise entitled *On ancient medicine*, and the author has here only shortened and confirmed them: namely, one cannot, according to his words, take hot, cold, wet, and dry as the principles in the healing of diseases – as if we did not find Hippocrates in his book *On the nature of man* and the *Aphorisms* and the other genuine writings declaring that the nature of man is made up of these things.<sup>15</sup>

The interpreters whom Galen criticizes could be Empiricists.<sup>16</sup> The system of four humours, on this view, should not be regarded as a theoretical foundation of medical reasoning, but only as a part of a strictly empiricist conceptual framework; the part that is related to the way bodily structures are presented to a practitioner through medical experience.<sup>17</sup> The contrast between *On ancient medicine* and *The nature of man* could not be drawn more clearly. Galen recognizes the latter work as genuine and excises the former as spurious, and there are some commentators who act in exactly the opposite way.

It might be useful to see whether Hippocrates' text gives us any clear ground for attributing to Hippocrates the theory of four elements, as Galen suggests. In this treatise, the author is arguing that the elements of the human body are the four humours: blood, phlegm, yellow and black bile. He begins by rejecting the monist theories of both philosophers and medical writers, e.g. those who take blood alone to be the element of the human body. It is only the complete quartet of the main humours that can claim the status of the elements of a human body.

(T2) Hippocrates, *Nat.Hom.* VI.38.19-40.6 Littré = 172.13-174.3 Jouanna

- (1) The human body contains blood, phlegm, yellow bile and black bile. (2) These are the things that make up its constitution and cause its pain and health. (3) Health is primarily that state in which these constituent substances are in the correct proportion to each other, both in strength and quantity, and are well mixed. (4) Pain occurs when one of the substances presents either a deficiency or an excess, or is separated in the body and not mixed with others.<sup>18</sup>

Trans. J. Chadwick, W. N. Mann

<sup>15</sup> Translated after Schiefsky (Hippocrates, *On ancient medicine*, ed., trans., comm. M. Schiefsky (Leiden 2005), 65-66; cf. W. M. Smith, *The Hippocratic tradition* (Ithaca, N.Y. 1979) 209-10).

<sup>16</sup> This is suggested by M. Schiefsky in *On ancient medicine* (n.15, above) 66. On Galen's knowledge of Empiricist commentaries, see Manetti in Manetti and Roselli, 'Galeno commentatore' (n.7, above) 1593-1600 (on the use of the commentary by Heraclides of Tarentum in *Hipp.Epid.II*, 1597-98), and Flemming, 'Commentary' (n.7, above) 335.

<sup>17</sup> On the Empiricist reception of humoralism, see Manetti in Manetti and Roselli, 'Galeno commentatore' (n.7, above) 1593.

<sup>18</sup> (T2) (1) Τὸ δὲ σῶμα τοῦ ἀνθρώπου ἔχει ἐν ἑαυτῷ αἷμα καὶ φλέγμα καὶ χολήν ξανθὴν τε καὶ μέλαιναν, (2) καὶ ταῦτ' ἐστὶν αὐτέῳ ἢ φύσις τοῦ σώματος, καὶ διὰ ταῦτα ἀλγέει καὶ ὑγιαίνει. (3) Ὑγιαίνει μὲν οὖν μάλιστα, ὀκότεν μετρίως ἔχη ταῦτα τῆς πρὸς ἄλληλα κρήσιος καὶ δυνάμιος καὶ τοῦ πλήθεος, καὶ μάλιστα μεμιγμένα ἦ. (4) ἀλγέει δὲ ὀκότεν τι τουτέων ἔλασσον ἢ πλέον ἢ ἦ

There is no reason to disagree about the humoralism of the author: it is clearly stated in this passage. The humours are present in a living body (T2.1) and are its main constituents responsible for its health and sickness (T2.2). More specifically, it is the excess of deficiency of one or the other of the humours with respect to a proper (healthy) amount that accounts for pain (T2.4).

What becomes contentious in subsequent discussions is the role assigned to the four elemental qualities, the hot, the cold, and the dry and the moist. The Hippocratic author certainly considers them to be the properties of the four humours. Galen would like to see this as a reference to the four cosmic elements.<sup>19</sup>

In the first section of *Nat.Hom.*, there are two references to the four qualities. The first passage is a discussion of the direct role of these qualities in the functioning of the human body:

(T3) Hippocrates, *Nat.Hom.* VI.38.2-18 Littré = 170.11-172.12 Jouanna

(1) Again, generation would be impossible unless the hot stood in a fair and reasonable proportion to the cold, and likewise the dry to the wet; if, for instance, one preponderated over the other, one being much stronger and the other much weaker. (2) Is it likely, then, that anything should be generated from one thing, seeing that not even a number of things suffice unless they are combined in the right proportions? (3) It follows, then, such being the nature of the human body and of everything else, that man is not a unity but each of the things contributing to the formation preserves in the body the power which it contributed. (4) It also follows that each must return to its original nature when the body dies; the wet to the wet, the dry to the dry, the hot to the hot and the cold to the cold. (5) The constitution of animals is of this kind, and of everything else too. All things have a similar generation and a similar dissolution, for all are formed of the substances mentioned and are finally resolved in the same constituents as produced them; that too is how they disappear.<sup>20</sup>

Trans. J. Chadwick, W. N. Mann

χωρισθῆ ἔν τῷ σώματι καὶ μὴ κεκρημένον ἢ τοῖσι ζύμπασι. English translation by J. Chadwick and W. N. Mann, in *Hippocratic Writings*, ed. with an introduction by G. E. R. Lloyd, new ed. (Harmondsworth 1983).

<sup>19</sup> Cf. n.24, below.

<sup>20</sup> (T3) (1) Καὶ πάλιν, εἰ μὴ τὸ θερμὸν τῷ ψυχρῷ καὶ τὸ ξηρὸν τῷ ὑγρῷ μετρίως πρὸς ἄλληλα ἔξει καὶ ἴσως, ἀλλὰ θάτερον θατέρον ποὺλὸν προέξει καὶ τὸ ἰσχυρότερον τοῦ ἀσθενεστερέου, ἢ γένεσις οὐκ ἂν γένοιτο. (2) Ὡστε πῶς εἰκὸς ἀπὸ ἐνός τι γεννηθῆναι, ὅτε γε οὐδ' ἀπὸ τῶν πλείονων γενῶνται, ἢν μὴ τύχη καλῶς ἔχοντα τῆς κρήσιος τῆς πρὸς ἄλληλα; (3) Ἀνάγκη τοίνυν, τῆς φύσιος τοιαύτης ὑπαρχούσης καὶ τῶν ἄλλων ἀπάντων καὶ τῆς τοῦ ἀνθρώπου, μὴ ἔν εἶναι τὸν ἄνθρωπον, ἀλλ' ἕκαστον τῶν ξυμβαλλομένων ἐς τὴν γένεσιν ἔχει τὴν δύναμιν ἐν τῷ σώματι, οἷην περ ξυμβάλετο. (4) Καὶ πάλιν γε ἀνάγκη ἀποχωρεῖν ἐς τὴν ἑωυτοῦ φύσιν ἕκαστον, τελευτῶντος τοῦ σώματος τοῦ ἀνθρώπου, τό τε ὑγρὸν πρὸς τὸ ὑγρὸν καὶ τὸ ξηρὸν πρὸς τὸ ξηρὸν καὶ τὸ θερμὸν πρὸς τὸ θερμὸν καὶ τὸ ψυχρὸν πρὸς τὸ ψυχρὸν. (5) Τοιαύτη δὲ καὶ τῶν ζῶων ἐστὶν ἡ φύσις, καὶ τῶν ἄλλων πάντων· γίνεται τε ὁμοίως πάντα καὶ τελευτᾷ ὁμοίως πάντα· ξυνίσταται τε γὰρ αὐτέων ἡ φύσις ἀπὸ τουτέων τῶν προειρημένων πάντων, καὶ τελευτᾷ κατὰ τὰ εἰρημένα ἐς ταῦτ' ὅθεν περ ξυνέστη ἕκαστον, ἐνταῦθα οὖν καὶ ἀπεχώρησεν.

What exactly the author believes about the status of elemental qualities and about the cosmic elements is not straightforwardly clear. In (T3.1) and (T3.2) we have the admission that the right proportions of elemental qualities are somehow responsible for the generation and subsistence of a living body. The main thesis in (T3.3), that causal powers of constituents are preserved in the human body when it has been formed, is not specific enough with regard to the precise nature of those constituents. If the constitutive 'elements' are qualities, then all it says is that these qualities continue to play a causal role in the formed body. In (T3.4), the claim seems to be stronger, if we assume that the 'original nature' (ἡ ἔωστοῦ φύσις) amounts to the concept of an element, but the elements in this case are identified as the hot, the cold, the dry, and the moist. (T3.5) might suggest that the author says that all nature, animate and inanimate, consists of these same elements. This would be Galen's preferred reading, the one he defends in *de Elementis* and in the commentary on *Nat.Hom.* He says, commenting on (T3.2) that Hippocrates was the first among the known thinkers to claim that the elements mix, adopting all the same elements as Empedocles, but differently from the latter, treating them as changeable in the process of mixture.<sup>21</sup>

But this reading of the passage is not the only possible one. (T3) could be understood as describing the dissolution of a living body without making any further claims about the nature of the cosmic elements as such. The qualities of living bodies are produced in the process of animal generation. When a living body dissolves, its constituents lose their organic status and become a part of the larger cosmos. The organic liquids remain liquid upon dissolution, but stop being organic, and this new, inanimate, liquid state cannot by itself produce an organism. If we adopt this reading, we do not need to look for a further structural level of a living body in Hippocratic analysis: it is the four humours that are the main constituents of human body, and this is due to their special causal history. This view could be made compatible with any theory of cosmic elements: atomist, Stoic-style qualitativist, or Aristotelian. In fact, it could also be compatible with a non-committal or sceptical position with regard to the cosmic elements. It could be argued, for instance, that proximate, organic elements are the proper object of the art of medicine, while their cosmic counterparts are not, despite all the similarities. The Hippocratic text does not rule out any of these possibilities.

The second passage which mentions the elemental qualities also admits of several interpretative options, although Galen is confident that he can take it as evidence that Hippocrates did subscribe to the theory of four elements.

(T4) Hippocrates, *Nat.Hom.* VI.48.20-50.9 Littré = 184.16-186.9 Jouanna

(1) All these substances [*viz.* the four humours], then, are all always present in the human body, but vary in their relative quantities, each preponderating in turn according to its natural characteristics. (2) The year has its share of all: heat, cold, dryness, and wetness. (3) None of these could exist alone for a moment without all of them being present in this order of the world, while, on the other hand, had even one of them gone missing, all would have disappeared, for they are all constituted by the same necessity and are nourished by each other. (4) In the same way, if any of these primary bodily substances were absent from man, life would

<sup>21</sup> Galen, *HNH* XV.49.8-50.3 K = 27.20-27 Mewaldt.

cease. (5) And just as the year is governed at one time by winter, then by spring, then by summer and then by autumn; so at one time in the body phlegm preponderates, at another time blood, and another time yellow bile, and this is followed by the preponderance of black bile.<sup>22</sup>

Trans. J. Chadwick, W. N. Mann, modified

The context here, as previously, is the argument for humoralism. The author has argued that the four humours are present in any human body constantly and connaturally, and each has its prevalence in a particular season: phlegm in winter, blood in spring, yellow bile in summer, and black bile in autumn. He summarizes this in (T4.1), saying that their relative quantities may vary 'in turn', κατὰ μέρος, and in accordance with nature, κατὰ φύσιν.<sup>23</sup> The parallel with a year, where each of the four seasons manifests the preponderance of one of the four qualities, is confirmed in (T4.2). Galen is referring to this passage when he argues that Hippocrates always means the four elements, viz. earth, air, fire, water, when he speaks of qualities (dry, moist, hot, and cold).<sup>24</sup> These qualities, constitutive of the year, are fully interdependent (T4.3), just like the four humours within the body (T4.4-5). Galen takes this on board when attacking the Pneumatist defence of the 'proximate' elements.

In this passage the parallel between the organic and the cosmic elements is much clearer. But the main point of the parallel is that all the four qualities have to be present in the living body just as they are present 'in this world-order' (ἐν τῷδε τῷ κόσμῳ), i.e. in the ordered world that surrounds us. The only causal mechanism in charge of the elemental qualities that is mentioned is 'the same necessity' which accounts for the existence of each of the four qualities (ἀπὸ γὰρ τῆς αὐτέης ἀνάγκης πάντα ξυνέστηκέ) (T4.3). This is a significant remark, in that it does acknowledge a common causal mechanism underlying the four qualities in the cosmos as well as in the living body. And yet it is too general to support a more specific interpretation of the nature of this mechanism: it is not clear that it would rule out the theory of adventitious heat or the

<sup>22</sup> (T4) (1) Ἔχει μὲν οὖν ταῦτα πάντα αἰεὶ τὸ σῶμα τοῦ ἀνθρώπου, ὑπὸ δὲ τῆς περισταμένης ὥρης ποτὲ μὲν πλείω γίνεται αὐτὰ ἐωυτέων, ποτὲ δὲ ἐλάσσω, ἕκαστα κατὰ μέρος καὶ κατὰ φύσιν. (2) Ὡς γὰρ ὁ ἐνιαυτὸς μετέχει μὲν πᾶς πάντων καὶ τῶν θερμῶν καὶ τῶν ψυχρῶν καὶ τῶν ξηρῶν καὶ τῶν ὑγρῶν, (3) οὐ γὰρ ἂν μείνειε τουτέων οὐδὲν οὐδένα χρόνον ἄνευ πάντων τῶν ἐνεόντων ἐν τῷδε τῷ κόσμῳ, ἀλλ' εἰ ἐν τί γε ἐκλίπτοι, πάντ' ἂν ἀφανισθεῖη· ἀπὸ γὰρ τῆς αὐτέης ἀνάγκης πάντα ξυνέστηκέ τε καὶ τρέφεται ὑπ' ἀλλήλων· (4) οὕτω δὲ καὶ εἴ τι ἐκ τοῦ ἀνθρώπου ἐκλίπτοι τουτέωντων συγγεγονότων, οὐκ ἂν δύναίτο ζῆν ἄνθρωπος. (5) Ἴσχύει δὲ ἐν τῷ ἐνιαυτῷ ποτὲ μὲν ὁ χειμῶν μάλιστα, ποτὲ δὲ τὸ ἦρ, ποτὲ δὲ τὸ θέρος, ποτὲ δὲ τὸ φθινόπωρον· οὕτω δὲ καὶ ἐν τῷ ἀνθρώπῳ ποτὲ μὲν τὸ φλέγμα ἰσχύει, ποτὲ δὲ τὸ αἷμα, ποτὲ δὲ ἡ χολή, πρῶτον μὲν ἡ ξανθή, ἔπειτα δ' ἡ μέλαινα καλεομένη.

<sup>23</sup> In the commentary, Galen gives several alternative interpretations of these two expressions, referring them in different ways to parts of the year or parts of the body, and the nature of the year or the nature of the body. All these alternatives seem to be taken from the existing commentaries on the treatise. Galen, *HNH* XV.91.12-92.9 K = 48.15-25 Mewaldt.

<sup>24</sup> Galen, *HNH* XV.93.1-4 K = 49.4-7 Mewaldt. Τὸ θερμὸν καὶ τὸ ψυχρὸν καὶ τὸ ξηρὸν καὶ τὸ ὑγρὸν οὐ τὸ κατ' ἐπικράτειαν ὀνομαζόμενον τε καὶ νοούμενον, ἀλλὰ τὸ στοιχειῶδες λέγων καὶ κατὰ τὴν προκειμένην ῥῆσιν ἐδήλωσε, τὸν ἐνιαυτὸν εἰπὼν ἅπαντα πάντων μετέχειν.



theory according to which the organic generation is a *sui generis* process which has nothing in common with the elemental changes in the environment.

Galen is convinced that the view endorsed by the Hippocratic treatise is the one that corresponds to his own version of medical rationalism and that it rules out both the atomist/corpuscularist view, according to which the elemental qualities might be derivative from the more fundamental properties of bodily particles, and the narrow qualitativist view defended by the Pneumatists, according to which the elemental qualities within a living body are the exclusive subject of the art of medicine and have no direct, causal connection with their cosmic counterparts.

Galen establishes his reading of Hippocrates in polemic against these two different theories. His debate against the corpuscularists should be taken in the context of his more general polemic concerning natural teleology, which Galen usually construes as a disagreement between the atomists and all the other philosophers. Galen is aware of the differences that exist among the teleological theories developed by different schools, but arguing against corpuscularism he usually suppresses those differences, treating atomism and teleology as two major conceptual alternatives, which correspond to two philosophical movements broadly opposed to each other on a number of key issues.<sup>25</sup> Each of these two movements has intellectual counterparts in medical philosophy: Asclepiades is a corpuscularist, even if not an atomist, whereas Galen's fellow teleologists, including the Pneumatists discussed in this paper, are humouralists and therefore accept qualitative accounts of the elements.<sup>26</sup> In his dialectical argument for the qualitative theory of elements against the atomists, Galen draws on Aristotle's account of qualitative change, which, he argues, is essential in the explanation of basic sentience present in all living bodies and which cannot be reduced to the corpuscularist model of combination by juxtaposition. But his theory of elements is not meant to be just a generic endorsement of any kind of qualitativism. In order to make his main claim more precise, Galen has to engage in a second kind of debate, this time with his fellow teleologists and rationalists from the Pneumatic school.

In this second debate, Galen discusses a methodological question regarding the status of medicine as a discipline and its relation to philosophy. Already in the Hippocratic corpus, we find some evidence of polemic about the principles of medicine as a rational discipline led by the defenders of its integrity as an autonomous art against the view of medicine as a part (albeit a very important one) of the larger, philosophically inspired, project of the study of nature. One characteristic example of such polemic is the discussion in *On ancient medicine*, where the Hippocratic author argues for the

<sup>25</sup> I. Kupreeva, 'Aristotelian dynamics in the 2nd century school debates: Galen and Alexander of Aphrodisias on organic powers and movements', in *Philosophy, science and exegesis in Greek, Arabic and Latin commentaries*, eds P. Adamson, H. Baltussen, and M. W. F. Stone, 2 vols (London 2004) I 71-95 (77).

<sup>26</sup> On corpuscularism and atomism, see J. Pigeaud, 'La physiologie de Lucrèce', *Revue des Études Latines* 58 (1980) 177-200; J. T. Vallance, *The lost theory of Asclepiades of Bithynia* (Oxford 1990); on pneumatism, see M. Wellmann, *Die pneumatische Schule bis auf Archigenes in ihrer Entwicklung dargestellt* (Berlin 1895). On Galen's views on atomism see also David Leith's contribution in this volume.

methodological autonomy of medicine.<sup>27</sup> It is not surprising that Galen treats this work as spurious.

One of the crucial issues of this methodological discussion is whether or not the 'cosmic' elements of the natural philosophers should be of any interest to the art of medicine, its practitioners and theorists. This question did not lose its relevance by Galen's time, and Galen defends a strong rationalist solution. It may be useful to note that medical rationalism does not amount to adopting a full-scale philosophy based on a medical outlook. There is indeed a whole list of philosophical questions which Galen himself considers to be of little importance for the medical doctor.<sup>28</sup> The question about the nature of the elements is different. Galen takes it seriously, as lying within the doctor's professional remit. This has to do also with the question whether the elements constitutive of living bodies are the same as those that make up the rest of nature, which Galen answers in the affirmative. In this he differs from the Pneumatists, who seem reluctant to discuss this question. When they do discuss it, they answer it in the negative. In his debate with them, Galen develops a second line of defence of the Aristotelian theory of elements, arguing that the simple constituents of human body do not differ in kind from the cosmic elements and that the logical status of these elements should be defined as substance, not quality, contrary to what the Pneumatists claim.

In both these debates, Galen claims to be relying on the Aristotelian version of the theory of four elements, *viz.* earth, air, fire, water, each constituted by a pair of elemental qualities. These elements form the most basic structural level of a living organism. The main building blocks of corporeal structures within a *living* body are the four humours of the humoral theory whose prototype is found in some Hippocratic treatises: blood, black bile, yellow bile, and phlegm. The basic living tissues are formed from numerous homoeomerous substances made up by the combinations of the organic building blocks.<sup>29</sup> The organs, *i.e.* anatomical structures whose function depends not just on texture, but also on shape, are made of these homoeomerous tissues. This hierarchy, with the exception of the four humours, has many parallels with the description of the structural levels constitutive of animal anatomy in Aristotle's treatise *On Parts of Animals* II.1.

(T5) Aristotle, *Parts of Animals* II.1, 646a13-24

(1) Three sorts of structure can be distinguished. First of all we may posit the structure out of what some call the elements, *viz.*, earth, air, water, fire. But perhaps it is better to say 'out of powers' instead of the elements, and not all of the powers, but the ones that have been mentioned previously elsewhere [*GC* 2.2]. For the moist, the dry, the hot, and the cold are the matter of composite bodies, while the other differentiae follow upon these, such as heaviness/lightness, firmness/looseness, roughness/smoothness, and other similar properties of the bodies. (2) The second sort of structure, the one made out of the first, is the nature of the uniform components of the animals, *e.g.* bone, flesh, etc. (3) The third and

<sup>27</sup> See Schiefsky, *On ancient medicine* (n.15, above) 65-66.

<sup>28</sup> See *Prop.Plac.* 56.12-60.6 and 62.18-19 Nutton, and Nutton in Galen, *On my own opinions* (n.2, above) 47-49. See further Riccardo Chiaradonna's contribution in this volume.

<sup>29</sup> See Galen, *Part.Hom.Diff.* 87-94 Strohmaier.

last in number is the structure of the non-uniform parts, such as face, hand, and the like.<sup>30</sup>

Galen also accepts this hierarchy. And here again, as previously in Hippocrates' text, we may notice an ambiguity that can account for two different readings. This ambiguity can be used to illustrate the difference between Galen's position and that of the Pneumatists, which comes to the fore in the interpretation of the Hippocratic text. In (T5.1), having set out to present a tripartite hierarchy, Aristotle says that the first level would be that of earth, fire, air, water, which *some people* call 'elements'. This does not seem to be his own view; rather it is his way of indicating the lowest structural level he has in mind. In order to do so, he uses the concept of element that has most currency with all philosophers. But he adopts for himself what he sees as more precise terminology: instead of bodylike entities, it is better to speak of δυνάμεις, which are the elemental qualities.<sup>31</sup> Galen, as we shall see, takes this point in his generic defence of qualitativism against the atomists, but in his argument against the Pneumatists he defends the position which Aristotle himself questions here in (T5.1), namely that the elements are simple bodies, whereas Aristotle's δυνάμεις are treated as 'simple qualities'.

## 2. Galen's argument against atomism

The *de Elementis ex Hippocrate* begins with the argument against corpuscularist theories of elements. Galen presents the corpuscularist view as the kind of monism targeted in Hippocrates' claim in the proem to *de Natura Hominis*: 'I say that if man were one thing he would never feel pain, for there would be nothing that would cause him pain if he were one'.<sup>32</sup>

In his argument purporting to develop Hippocrates' thought, Galen combines under the single title several different corpuscularist positions: Democritus, Epicurus, Asclepiades and possibly also Diodoreans (*Hipp.Elem.* I.416.9 K = 60.1-3 De Lacy). This is made possible by his claim that according to all these thinkers the elements do not differ in form and power (*Hipp.Elem.* I.416.6 K = 58.19-20 De Lacy). The readers of Epicurus might object that there are some very important differences amongst the atoms, such as differences in shape and size, which become highly relevant, e.g. in the explanation of sensation. But it soon becomes clear that Galen has in mind not just any differences

<sup>30</sup> (T5) (1) Τριῶν δ' οὐσῶν τῶν συνθέσεων πρώτην μὲν ἂν τις θεῖη τὴν ἐκ τῶν καλουμένων ὑπὸ τινῶν στοιχείων, οἷον γῆς ἀέρος ὕδατος πυρός. Ἔτι δὲ βέλτιον ἴσως ἐκ τῶν δυνάμεων λέγειν, καὶ τούτων οὐκ ἐξ ἀπασῶν, ἀλλ' ὡσπερ ἐν ἑτέροις εἴρηται καὶ πρότερον. Ὑγρὸν γὰρ καὶ ξηρὸν καὶ θερμὸν καὶ ψυχρὸν ἕλη τῶν συνθέτων σωμάτων ἐστίν· αἱ δ' ἄλλαι διαφοραὶ ταύταις ἀκολουθοῦσιν, οἷον βάρος καὶ κουφότης καὶ πυκνότης καὶ μανότης καὶ τραχύτης καὶ λειότης καὶ τᾶλλα τὰ τοιαῦτα πάθη τῶν σωμάτων. (2) Δευτέρα δὲ σύστασις ἐκ τῶν πρώτων ἢ τῶν ὁμοιομερῶν φύσις ἐν τοῖς ζώοις ἐστίν, οἷον ὀστοῦ καὶ σαρκὸς καὶ τῶν ἄλλων τῶν τοιούτων. (3) Τρίτη δὲ καὶ τελευταία κατ' ἀριθμὸν ἢ τῶν ἀνομοιομερῶν, οἷον προσώπου καὶ χειρὸς καὶ τῶν τοιούτων μορίων.

<sup>31</sup> This approach has a parallel in the discussion in *GC* 2.1-3, where Aristotle also does not use the term στοιχεῖον to refer to earth, fire, air, water, but reserves it for the four elemental qualities, the hot, the cold, the dry, and the moist (*GC* 2.3, 330a30).

<sup>32</sup> Galen, *Hipp.Elem.* I.415.15-16 K = 58.14-15 De Lacy, quoting Hippocrates, *Nat.Hom.* VI.34.17-18 Littré = 168.4-5 Jouanna.

amongst the elements, but a very specific ability for being acted upon, particularly, for being subject to the process of qualitative change, or alteration.<sup>33</sup>

Galen illustrates the corpuscularist view of qualities with a quotation from Democritus:

(T6) Galen, *Hipp.Elem.* I.417 K = 60.8-15 De Lacy

‘For colour is by convention, sweet by convention, bitter by convention; in truth there are atoms and void’, says Democritus, who holds that all perceptible qualities arise from the coming together of the atoms, being relative to us who perceive them, and that by nature nothing is white or black or yellow or red or bitter or sweet. The expression ‘by convention’ means exactly this: ‘by custom’, as it were, and ‘relative to us’, not in accordance with the actual nature of things; he speaks of the latter, in turn, as ‘in truth’, taking the term from the form *eteon*, which means ‘true’.<sup>34</sup>

Trans. De Lacy

Galen makes it sound as though this Democritean statement expresses a view of perceived qualities common to all corpuscularists, thus making all of them into eliminativists of a sort. We know that this is certainly not true of Epicurus, one of Galen’s named targets in this argument. Epicurus in the *Letter to Herodotus* 68-69 argues that properties should not be excluded from the class of existents: the whole body receives its permanent nature from them, and they do have their own forms of focusing and discerning.<sup>35</sup> It remains an open question to what extent Epicurus recognized the downward causation of macroscopic properties, and more specifically of mental states, with respect to the microscopic bottom level.<sup>36</sup> This does not seem to be the main issue for Galen in his discussion in *Hipp.Elem.*<sup>37</sup> More important for his argument is the fact – which Galen, perhaps deliberately, omits to mention in this passage – that Epicurus and his school do have a non-eliminativist theory of macroscopic sensible properties.

<sup>33</sup> Alteration is one of the three main kinds of κίνησις discussed by Aristotle, the two others being quantitative change (increase and diminution) and locomotion. But the technical term itself and the concept of ἀλλοίωσις as a special kind of change are already present, consistently, in Plato’s late dialogues (cf. *Parmenides* 138C3, *Theaetetus* 182D2-5). Galen treats alteration and locomotion (φορά) as two simple kinds of change, growth and coming to be being complex (*Nat.Fac.* II.3.3-17 K).

<sup>34</sup> (T6) «Νόμῳ γὰρ χροίῃ νόμῳ γλυκὸν νόμῳ πικρὸν, ἔτεῃ δ’ ἄτομα καὶ κενόν» ὁ Δημόκριτός φησιν ἐκ τῆς συνόδου τῶν ἀτόμων γίνεσθαι νομίζων ἀπάσας τὰς αἰσθητὰς ποιότητας ὡς πρὸς ἡμᾶς τοὺς αἰσθανομένους αὐτῶν, φύσει δ’ οὐδὲν εἶναι λευκὸν ἢ μέλαν ἢ ξανθὸν ἢ ἐρυθρὸν ἢ γλυκὸν ἢ πικρὸν. τὸ γὰρ δὴ νόμῳ ταῦτὸ βούλεται τῷ οἶον νομιστὶ καὶ πρὸς ἡμᾶς, οὐ κατ’ αὐτὴν τῶν πραγμάτων τὴν φύσιν. ὅπερ δ’ αὖ πάλιν ἔτεῃ καλεῖ παρὰ τὸ ἔτεον, ὅπερ ἀληθὲς δηλοῖ, ποιήσας τοῦνομα.

<sup>35</sup> *Ep. Hdt.*, D.L. 10.69.8-11: καὶ ἐπιβολὰς μὲν ἔχοντα ἰδίας πάντα ταῦτά ἐστι καὶ διαλήψεις, συμπαρακολουθοῦντος δὲ τοῦ ἀθρόου καὶ οὐθαμῆ ἀποσχιζομένου, ἀλλὰ κατὰ τὴν ἀθρόαν ἔννοιαν τοῦ σώματος κατηγορίαν εἰληφότος.

<sup>36</sup> For discussions, see D. N. Sedley, ‘Epicurean Anti-Reductionism’, *Matter and metaphysics*, ed. J. Barnes, M. Mignucci (Naples 1988) 295-328, and J. Annas, *Hellenistic philosophy of mind* (Berkeley 1992) 125-33.

<sup>37</sup> In fact, the bottom-up explanation of mental states from the properties of elemental mixtures is important for his own medical philosophy. The best known text for that argument is *QAM*, and Galen confirms that view also in *HNH* XIV.97.4-14 K = 51.9-18 Mewaldt.



In (3) and (4), Galen summarizes the generic atomist explanation of sense perception. (5) and (6) give his analysis of this generic explanation which focuses on its main weakness, on the basis of which Galen argues that this theory of elements will not be able to provide an adequate account of sense perception: the first elements on this view are unable to undergo alteration. Galen formulates two conditions of perceiving, for the case of feeling pain, but which will be valid for any kind of sense perception and the faculties based on the power of perception: alterability and basic sentience.

(T9) Galen, *Hipp.Elem.* I.419.10-12 K = 62.15-16 De Lacy

Surely something that is to feel pain must necessarily meet these two requirements: it must be capable of alteration and capable of perceiving. If it never undergoes any alteration, it will retain at all times the state in which it was at the beginning; but what feels pain does not retain it; and if it changes its state, as stones and wood do when being heated and chilled out and split, but no feeling is by nature present in it, it will not perceive the occurrence of the condition that is affecting it, just as stones do not.<sup>41</sup> Trans De Lacy, modified

This analysis can be summarized in the following table, which shows the combinations of attributes of alteration and perceiving that can and cannot provide for sentience in elemental composites:

	The attribute of αλλοίωσις in the elements	The attribute of αἴσθησις in the elements	Sentience in a composite
1	-	-	impossible
2	-	+	impossible
3	+	-	possible
4	+	+	Possible

There is a reason to prefer 'alteration' and 'perceiving' as translations of Galen's αλλοιωτόν and αἰσθητικόν to De Lacy's 'change' and 'sensation' in order to make clearer

εἶναι τὰ πρῶτά τινες μὲν αὐτῶν ὑπὸ σκληρότητος ἄθραυστα, καθάπερ οἱ περὶ τὸν Ἐπίκουρον, ἔνιοι δ' ὑπὸ σμικρότητος ἀδιαίρετα, καθάπερ οἱ περὶ τὸν Λεύκιππον, (6) ἀλλ' οὐδ' ἀλλοιοῦσθαι κατὰ τι δυνάμενα ταύτας δὴ τὰς ἀλλοιώσεις, ἃς ἅπαντες ἄνθρωποι πεπιστεύκασιν εἶναι διδαχθέντες ὑπὸ τῶν αἰσθησέων, οἷον οὔτε θερμαίνεσθαι τί φασιν ἐκείνων οὔτε ψύχεσθαι, κατὰ δὲ τὸν αὐτὸν τρόπον οὔτε ξηραίνεσθαι οὔθ' ὑγραίνεσθαι, πολὺ δὲ δὴ μᾶλλον ἔτι μήτε λευκαίνεσθαι μήτε μελαινεσθαι μήτ' ἄλλην τιν' ὄλως ἐπιδέχεσθαι ποιότητα κατὰ μηδεμίαν μεταβολήν.

<sup>41</sup> (T9) τὸ γὰρ ἀλγήσον χρηὶ δῆπου δύο ταῦτ' ἔχειν ἐξ ἀνάγκης, ἀλλοιωτόν τε καὶ αἰσθητικὸν ὑπάρχειν· εἴτε γὰρ μηδέποτε μηδεμίαν ἀλλοίωσιν ἐπιδέχοιτο, φυλάξει διὰ παντὸς ἦν εἶχεν ἐξ ἀρχῆς κατάστασιν· οὐ φυλάττει δέ γε τὸ ἀλγούν· εἴτε μεταβάλλοι, καθάπερ οἱ λίθοι τε καὶ τὰ ξύλα θερμαινόμενά τε καὶ ψυχόμενα καὶ διαιρούμενα, μὴ παρείη δ' αὐτῶ τις αἴσθησις σύμφυτος, οὐκ αἰσθησεται τῆς ἀμφ' αὐτὸ γενομένης διαθέσεως, ὥσπερ οὐδ' οἱ λίθοι. Cf. I.419.10-12 K = 62.15-16 De Lacy.

the intended contrast with corpuscularists who might have claimed that they satisfy both the latter conditions since ‘change’ according to them is the motion of atoms or disjointed masses, and ‘sensation’ can refer to a generic power which arises when certain conditions are satisfied by a particular bodily structure. As Lucretius says in the passage cited above, not everything possesses sensation, but only the right kinds of atomic structures. Galen wants to make a point about alteration as a particular kind of change, the change of quality in the technical sense it has in the Aristotelian theory of change, and perceiving as a particular kind of mental state characterizing basic sentience which he considers to be a central element in any sensation as a manifestation of generic power. So the terminology is important for him at this point.

Alterability and perceiving are logical conditions of sentience in general, they are not the physical attributes of the elements. But in order for them to obtain, the physical attributes of the elements in their turn have to satisfy some further logical conditions. In his argument in *Hipp.Elem.* 2, Galen wants to show that the Epicurean theory does not provide the concept of an element that is adequate for the task.<sup>42</sup> The example he gives is as follows:

(T10) Galen, *Hipp.Elem.* I.420.15-421.4 K = 64.5-10 De Lacy

If a person should prick the skin with the finest needle, the animal should of course feel pain, and the needle will be in contact with one or two or more atoms. First suppose it touches one atom. But each of the atoms was said to be unwoundable and without sensation. Then it will not be affected at all by the needle; nor, if it were affected, would it feel the affection.<sup>43</sup> Trans. De Lacy

The logical form of this argument corresponds to that of the sorites.<sup>44</sup> It can be represented in a standard form as follows:

$$\begin{array}{l} \sim F(a_0) \\ \sim F(a_0) \supset \sim F(a_1) \\ \dots \\ \sim F(a_{n-1}) \supset \sim F(a_n) \\ \hline \sim F(a_n) \end{array}$$

The predicate  $F(x)$  refers to  $x$ 's property of feeling pain upon being scratched by a fine needle. It satisfies the conditions of a soritical predicate as outlined by Barnes in his study

<sup>42</sup> εἴπερ οὖν ἐξ ἀτόμων τινῶν ἦμεν ἢ τινος ἄλλης τοιαύτης φύσεως μονοειδοῦς, οὐκ ἂν ἡλγοῦμεν ἀλγοῦμεν δέ γε· δῆλον οὖν, ὡς οὐκ ἔσμεν ἐξ ἀπλῆς τινος καὶ μονοειδοῦς οὐσίας (Galen, *Hipp.Elem.* I.420.4-7 K = 62.21-25 De Lacy).

<sup>43</sup> (T10) εἰ γὰρ τις τῇ λεπτοτάτῃ βελόνῃ τρώσειε τὸ δέρμα, πάντως μὲν ἀλγήσει τὸ ζῶον, ἀμεινὰ δ' ἥτοι μίας ἢ δυοῖν ἢ καὶ πλείονων ἀτόμων ἢ βελόνῃ. πρῶτον μὲν οὖν ὑποκείσθω ψάειν αὐτὴν μίας. ἀλλ' ἐκάστη τῶν ἀτόμων ἄτρωτός τ' ἦν καὶ ἀναίσθητος. οὐκ οὖν οὔτε πείσεται τι πρὸς τῆς βελόνης οὔτ' εἴπερ ἔπαθεν, ἤσθητ' ἂν τοῦ παθήματος.

<sup>44</sup> Galen compares the aggregate of atoms to ‘a heap of wheat and barley and chickpeas and beans’, ὡσπερ ἐν σώρῳ πυρῶν καὶ κριθῶν καὶ ἐρεβίνθων τε καὶ κυάμων (*Hipp.Elem.* I.431.2-3 K = 74.2-3 De Lacy).

of ancient sorites.<sup>45</sup> Thus, it is certainly false of a body made up of one atom. On Galen's construal, there is no difference in the way the predicate applies to two adjacent members of the ordered series, *i.e.* it is true that if the needle does not affect a body of one atom, then it cannot affect a body of any number of atoms. As Galen explains, with respect to an aggregate, the needle can either hit an atomic structure or miss it – in neither case can pain be produced, since no part of the aggregate will be affected. And finally, the conclusion, that no pain effect is produced on a living body when a needle is applied, is obviously false.

The problem signalled by this argument is usual for the reasoning *κατὰ μικρόν*: the impossibility, within a given set-up, of drawing a line between the part of the sequence  $\{a_0, a_1, a_2, \dots, a_{n-1}, a_n\}$  on which the predicate *F* is true and the other, where it is false. Galen employs soritical argument form in his other works. He does not take it for granted in all cases. Thus, for instance, in *Med.Exp.*, discussing its use by the rationalists in their criticism of the empiricist concept of experience, he points out that rationalists might use the same reasoning to deny the existence of such natural 'soritical' objects as mountains or clouds.<sup>46</sup> In this case he uses soritical reasoning to diagnose what he sees as the main problem of corpuscularist theories: they cannot explain the property of sentience, nor any of the other mental properties of which it is the source.<sup>47</sup> The reason is that their physics commits them to the view of a living body as a soritical object, made up by an aggregate of corpuscles: atoms, disjointed masses, or some other kind of particles. The important point is that these corpuscles are joined together by juxtaposition. Therefore the use of soritical reasoning must seem particularly legitimate.

The conclusion Galen draws in connection with this argument is that 'nothing different in kind can accrue to the things *juxtaposed*'.<sup>48</sup> Sensation is completely different

<sup>45</sup> J. Barnes, 'Medicine, experience and logic', in *Science and speculation: studies in Hellenistic theory and practice*, ed. J. Barnes, J. Brunschwig, M. Burnyeat, and M. Schofield (Cambridge and Paris 1982) 24-68 (31).

<sup>46</sup> See *On medical experience* 17 (Galen, *Three treatises on the nature of science*, trans. R. Walzer and M. Frede (Indianapolis 1985) 75-78); M. Tuominen, 'Heaps, experience, and method: on the sorites argument in ancient medicine', *History of Philosophy Quarterly* 24.2 (2007) 109-23.

<sup>47</sup> ὡςπερ οὖν ἐκ τῶν ἀλγούντων σωμάτων, οὕτω καὶ τῶν ἡδομένων ἔχεις ἀποδεικνύειν ταῦτ' ἐκ τούτων, οὕτω καὶ τῶν αἰσθανομένων, ὡςπερ αὐτὸν καὶ νῦν ἐξεπίτηδες ἐποίησα πολλαχόθι τοῦ λόγου. καὶ μὴν εἰ μήθ' ἡδονὴ μήτε πόνος, ἀλλὰ μηδ' αἴσθησις ὅλως ἐστὶ τοῖς ἀπαθέσι στοιχείοις, οὐδὲ μνήμη δῆπουθεν οὐδ' ἀνάμνησις οὐδὲ φαντασία· ῥίζα γάρ τις αὐτῶν ἐστὶ καὶ οἷον πηγὴ πάντων ἢ αἴσθησις· εἰ δὲ μηδὲν τούτων, οὐδ' ἄλλο τῶν ψυχικῶν ἔργων οὐδὲν, ὥστ' οὐδὲ ψυχὴ (Galen, *Hipp.Elem.* I.433.9-434.1 K = 76.12-15 De Lacy).

<sup>48</sup> δέδεικται γὰρ ὡς οὐδὲν ἑτερογενὲς δύναιται προσελθεῖν τοῖς συντιθεμένοις (I.431.8-10 K = 74.7-8 De Lacy). De Lacy translates τοῖς συντιθεμένοις as 'things conjoined'. In this context the term is perhaps best understood as referring to a specific type of aggregate made up by separate units, as opposed to a mixture or blending, where the elements form a homogeneous mass. I think Hankinson misses this point in his interpretation when he says: 'What is ruled out, Galen argues, is what one might call the supervenience of generically different properties: any supervenient properties must be similar in general type to properties actually disposed by the elements they supervene upon. Thus, since sentience is a type of alteration, the elements in the aggregate upon which sentience supervenes must be capable of alteration, although not necessarily of sentience itself, ...' (Hankinson, 'Philosophy of nature' (n.1, above) 213). I do not find in the text the argument stated in the second sentence. As for the analysis given in first sentence, it does not sound right: Galen says



in kind from both the properties of the atoms and the physical properties of the four elements as long as these latter remain unchanged and such as each of them is by its own nature. Therefore if we assume any of these to be the substrate of sensation, the soritical reasoning will apply: the minimal body of such a kind cannot have sensation, therefore neither can a body equal to two minimal bodies, nor to three and so on.

To avoid this paradox, one would need to make the elements exempt from this kind of analysis. It is not enough to replace the atoms with the changeable four elements of Aristotelian theory: if those elements are taken as they are and merely juxtaposed, no kind of disturbance will produce a sensation. They will be still ‘like heaps’ – this is already not Galen, but Aristotle, but Galen agrees.<sup>49</sup> In order to avoid this kind of fallacy, the main predicate itself, *i.e.* ‘feeling pain upon an exposure to a particular type of physical effect’, has to stop behaving soritically. This means that the elements should be either perceiving through and through or that the connection between the two elements should be such as to allow an unproblematic ‘leap’ from the unperceiving to the perceiving state. Both these conditions, according to Galen, presuppose the ability to undergo alteration.

The elements cannot be unperceiving and unalterable, they cannot be perceiving and unalterable (some kind of material monad), but they can be perceiving and alterable and unperceiving and alterable (see table at p. 165 above). Both the two latter options are logically possible as far as the requirements of perception are concerned, but perhaps not both are true.<sup>50</sup> In the bodies that are sentient, all the parts are both alterable and sentient. But those bodies that are not sentient can become sentient only if they are transformed and altered in many ways. Thus, although water on its own is unperceiving, and so is earth, and fire, and air, there might be such a combination of these four elements (perhaps in a living tissue pervaded with sensory nerves) that would already be perceiving.

It may be worth noting that speaking of alterability as a methodological requirement in the theory of elements, Galen seems to be appealing to two different roles of alteration and change. He alludes to the distinction when he argues that the property of being affected lacks in the element which is one:

(T11) Galen, *Hipp.Elem.* I.426.3-7 K = 68.18-21 De Lacy

- (1) That what is one is unaffected is quickly proved; for the one element has nothing into which it (a) will be *transformed* or by which it (b) will be *affected*.
- (2) (a) In being *transformed* it will be *changed into something else*, and (b) in

that generically different properties cannot accrue to aggregates, but can do so in more complex structures, such as mixture. Therefore sentience cannot arise in an aggregate, which is like a heap of grains, but can arise in a more unified structure, such as that of a living body.

<sup>49</sup>καὶ γὰρ παρὰ τὰ χρώματα καὶ τοὺς χυμοὺς καὶ τοὺς ἀτμοὺς καὶ πάνθ' ἀπλῶς εἰπεῖν τᾶλλα τὰ τοῖς σώμασιν ὑπάρχοντα τὸ τῆς αἰσθήσεως ἕτερόν ἐστι γένος, ὥστ' οὐτ' ἐξ ἀτόμων οὐτ' ἐκ πυρὸς καὶ ἀέρος καὶ γῆς καὶ ὕδατος ἐγχαρῆι γενέσθαι τὸ αἰσθητικὸν σῶμα μενόντων ἀμεταβλήτων καὶ τοιούτων, οἷά περ ἐστὶ κατὰ τὴν ἑαυτῶν φύσιν (Galen, *Hipp.Elem.* I.431.13-432.2 K = 74.4-7 De Lacy), *cf.* Aristotle, *Metaph.* Z 16 1040b5-9: Φανερόν δὲ ὅτι καὶ τῶν δοκουσῶν εἶναι οὐσιῶν αἰ πλείσται δυνάμεις εἰσὶ, τὰ τε μόρια τῶν ζώων (οὐθὲν γὰρ κεχωρισμένον αὐτῶν ἐστίν· ὅταν δὲ χωρισθῆ, καὶ τότε ὄντα ὡς ὕλη πάντα) καὶ γῆ καὶ πῦρ καὶ ἀήρ· οὐδὲν γὰρ αὐτῶν ἐν ἐστίν, ἀλλ' οἷον σωρός, πρὶν ἢ πεφθῆ καὶ γένηται τι ἐξ αὐτῶν ἐν.

<sup>50</sup> Galen, *Hipp.Elem.* I.424.16-426.11 K = 68.3-24 De Lacy; I.427.2-15 K = 70.2-12 De Lacy.

being *affected* it will be *affected by some other thing*. (3) How then will it still be kept one?<sup>51</sup>

Trans. De Lacy, my italics (IK)

In the first sense, mentioned early on and now again as a condition of sensation in general, it is the ability to be acted upon, undergo external disturbance of which the sentient component of sensation will actualize its sentience and become perceiving.<sup>52</sup> This sense corresponds to 'being affected' in (T11 (1b) and (2b)). Galen invokes this sense particularly when he argues against the option where the elements are sentient but not changeable.

(T12) Galen, *Hipp.Elem.* I.424.17-425.5 K = 68.4-8 De Lacy

It is inadmissible also that it be composed of elements that are unaffected and sentient; that (entity) too will never feel pain because it will not be affected. It will be potentially sentient, but will never actually feel anything before it is affected by something.<sup>53</sup>

Here the requirement that the elements must be subject to affection is given as a distinct part of the mechanism of sensation. The sentient body must be affected in order for the object of perception to be presented to it. It is from this assumption that Galen derives the condition that the elements of which this body is composed must be subject to affection. This condition will help to avoid the sorites-style paradox discussed above. But it does seem to presuppose that the way in which the sentient body is affected involves a change at the level of the elements. Some kind of elemental transformation is needed in order for the sensible object to be presented to a sentient body.

As we know, Aristotle's position on how the sense object acts upon the senses is stated in different terms, of the objects actualizing the sensory powers, and the question whether this actualization involves a physical process between the object and the sense organ is highly controversial.<sup>54</sup> Galen's theory of elements, the way it is presented in his polemic against corpuscularists, does seem to require that the elements which constitute the sentient body be affected in the process of perception. Otherwise, even the sentient body will fail to perceive, because the object of perception will not be presented to it. Of course, there is no suggestion that Galen's theory of *perception* is Aristotelian: it is not, and is not meant to be. But the theory of elements which he attributes to Hippocrates and commends as optimal, is Aristotelian, by his own admission.

The second meaning of 'being affected' invoked by Galen has to do with the ability of the elements to be transformed in a process of change ((T11.1(a) and 2(a)). This

<sup>51</sup> (T11) (1) ὅτι δὲ τὸ ἐν ἀπαθές, ἢ ἀπόδειξις σύντομος. οὔτε γὰρ εἰς δ (a) μεταστήσεται οὔθ' ὑφ' ὅτου (b) πείσεται τὸ ἐν στοιχείῳ ἔχει. (2) (a) μεθιστάμενόν τε γὰρ εἰς ἕτερόν τι μεταστήσεται καὶ (b) πάσχον ὑφ' ἑτέρου τινὸς πείσεται. (3) πῶς οὖν ἐν ἔτι φυλαχθήσεται;

<sup>52</sup> Galen, *Hipp.Elem.* I 419.10-12 K = 62.15-16 De Lacy, n.41 above.

<sup>53</sup> (T12) οὔκουν οὐδ' ἐξ ἀπαθῶν θ' ἅμα καὶ ἀναισθητῶν ἐγχωρεῖ στοιχείων εἶναι τὸ αἰσθητικόν. οὐ μὴν οὐδ' ἐξ ἀπαθῶν θ' ἅμα καὶ αἰσθανομένων. οὐδὲ γὰρ οὐδὲ τοῦτ' ἀλγήσει ποτὲ, διότι μηδὲ πείσεται. δυνάμει μὲν γὰρ αἰσθητικὸν ἔσται, ἐνεργείᾳ δ' αἰσθανόμενον οὐδέποτε, καθάπερ καὶ τὸ ἡμέτερον σῶμα καίτοι φανερώς ὑπάρχον αἰσθητικὸν ὅμως οὐκ αἰσθάνεται, πρὶν παθεῖν ὑπὸ τινος.

<sup>54</sup> For the most recent comprehensive summary, see Caston, 'The spirit and the letter' (n.3, above).

meaning becomes particularly important for Galen when it comes to explaining how it is possible for the elements of living bodies to be subject to change and yet not sentient. This is possible because the insentient cosmic elements can change in such a way as to form a new whole, such as to possess the property of sentience. This meaning of alterability is at work in Galen's explanation of how sentience can come about in a body made up of the elements which themselves are not sentient but have an ability to undergo change. In this case, the change in question is the one it takes to make the elements into the constituents of a living body.

(T13) Galen, *Hipp.Elem.* I.427.15-428 K = 70.12-18 De Lacy

(1) If you wish to scrutinize the actual parts (of a sentient body) and contemplate them with the aid of reason, (you will find that) all the parts of sentient bodies are both sentient and subject to affection, as he said a little earlier about flesh; (2) but if you contemplate the first elements, (you will recognize that) if one were to assume these bodies to be without sensation but able to act upon each other and be acted upon in many ways, it is possible for a sentient body to come to be in many partial alterations.<sup>55</sup>

Trans. De Lacy, lightly modified

The atomists might dispute Galen's analysis. They might insist, as Lucretius 891-96 quoted above (T7) shows, that it is not the quantity of atoms that accounts for the power of sensation in the living beings (this would be a misrepresentation of their theory) but a specific atomic structure, the way the atoms are arranged in a combination. And it is here that Galen would bring in his soritical refutation: since the only kind of combination available in the atomist system is juxtaposition, the onus is on its proponents to show at which point the atomic aggregate stops being insentient and starts being sentient.

His own theory of the elements does not face a similar problem because it is based on Aristotle's account of change, where qualitative change is described as having the mechanism of 'replacement', the quality ('form') replacing its privation in a persistent substrate. In this way, Galen thinks, it should be possible for a new quality to arise in the elemental constituents of a composite body, when these constituents undergo qualitative change of this sort, *i.e.* alteration. Galen speaks in (T13.2) about 'partial alterations' using the Greek expression κατὰ μέρος, which he also uses referring to soritical reasoning. But in this case there will be no soritical paradox, because the increments he talks about are qualitative, not quantitative. This means that the 'inductive step' of soritical reasoning, the inference of the form  $P(a_{n-1}) \supset P(a_n)$ , is not available. In fact, the analysis of 'replacement' change is:  $\sim P(x) \Rightarrow P(x)$ , where P is a property, x a persistent subject, and  $\Rightarrow$  is a non-technical symbol indicating the direction of change. The property P is not supposed to be contained in the composite object before it undergoes change. Therefore 'partial' alterations suggested by Galen do not run into a soritical problem.

<sup>55</sup> (T13) εἰ μὲν γὰρ αὐτὰ τὰ μόρια δοκιμάζειν ἐθέλοις καὶ σκοπεῖσθαι τῷ λόγῳ, πάντ' ἐστὶν αἰσθητικά τε καὶ παθητικά τῶν αἰσθητικῶν σωμάτων, ὡς ὀλίγον ἔμπροσθεν ἐπὶ τῆς σαρκὸς ἐλέγομεν· εἰ δὲ τὰ πρῶτα στοιχεῖα σκοποῖης, ἐνδέχεται τούτων ἀναισθητῶν μὲν ὑποκειμένων, εἰς ἄλληλα δὲ τὸ δρᾶν καὶ πάσχειν ἐχόντων πολυειδῶς ἐν πολλαῖς ταῖς κατὰ μέρος ἀλλοιώσεσι γενέσθαι ποτὲ τὸ αἰσθητικὸν σῶμα.

Galen illustrates his point with the example of housebuilding: a new house built by putting together bricks, stones, and timber, will have only the properties which these constituent parts have. Likewise, in a structure built up by juxtaposition of the constituent parts all its properties are the same in kind as the properties of parts. In order for a structure to acquire a property different in kind (ἐτερογενές) from the properties of parts, the method by which parts are combined in a structure has to be different, such that the parts themselves would lose some of their properties and acquire new ones.

(T14) Galen, *Hipp.Elem.* I.430.6-14 K = 72.16-22 De Lacy

(1) Shapes produce shapes and smaller magnitudes produce larger ones, but shapes do not produce magnitudes or magnitudes shapes, and for that reason it cannot be allowed that something different in kind is generated from elements that do not change their qualities; (2) but it can be allowed from elements that do change them. (3) For it is possible that in the course of many intermediary changes what was formerly black may in turn become white and what was formerly white may in turn become black and (4) what is now insentient may in turn become sentient.<sup>56</sup>

Trans. De Lacy, lightly modified

The argument in (T14.1) is apparently against the atomistic theory of elements, since size, weight, shape, and position are the only real properties of atoms according to this theory. (T14.2) is Galen's general statement of his own proposal: we know that 'changing qualities' has a very specific meaning, in accordance with Aristotelian theory of change (otherwise the disjointed masses of Asclepiades and Plato's regular solids would qualify as elements). Quality is also taken by Galen not generically in the sense of 'property', but referring primarily to the four elemental qualities and all their derivatives, again in agreement with Aristotle's treatment of elemental qualities in *GC* 2.2 and *Mete.* 4. (T14.3) indicates that the process of change in which new qualities, such as sentience, are derived, is complex, and may include many transformations of the elements before coming to fruition. (T14.4) reminds us again of the logical structure of change which is essential for a correct theory of elements: change is a replacement of a privation of a quality by the quality itself.

Galen's point here is that sentience supervenes on the alterable elements because sentience is something different in kind from the properties that the elements have.<sup>57</sup> Here, of course, he is thinking of his own (and the Aristotelian) qualitative model of the elements, where each element is a conjunction of two elemental qualities (hot/dry, hot/moist, cold/moist, and cold/dry). Sentience is different in kind from any of these

<sup>56</sup> (T14) (1) καὶ γὰρ τὰ σχήματα σχημάτων ἐστὶν ἀπεργαστικά καὶ τὰ μικρότερα μεγέθη τῶν μειζόνων, οὐ μὴν ἦτοι σχήματα μεγεθῶν ἢ μεγέθη σχημάτων, ὥστ' ἐκ μὲν τῶν μὴ μεταβαλλόντων τὰς ποιότητας στοιχείων οὐκ ἐγγωρεῖ γενέσθαι τι τῶν ἐτερογενῶν, (2) ἐκ δὲ τῶν μεταβαλλόντων ἐγγωρεῖ· (3) δύναται γὰρ ἐν πολλαῖς ταῖς μεταξὺ μεταβολαῖς τὸ τέως μέλαν αὐθις γενέσθαι λευκὸν καὶ τὸ τέως λευκὸν αὐθις μέλαν (4) καὶ τὸ νῦν ἀναίσθητον αὐθις αἰσθητικόν.

<sup>57</sup> Pace Hankinson, 'Philosophy of nature' (n 1, above; cf. n.48, above) 213. Victor Caston gives a correct analysis of the case of sensation relatively to Galen's house example, although he does not mention the special role of alteration; see V. Caston, 'Epiphenomenalisms ancient and modern', *Philosophical Review* 106.3 (1997) 306-63 (352-53).

properties, but the claim is that a certain number of unspecified ‘intermediary changes’ can produce sentience in the mixture of these elements.

It may be important to note that Galen is not aiming at providing a full explanation of sensation here, but only establishing the necessary conditions which need to obtain at the elemental level in order for sensation to be possible. ‘Possible’ is a key word in his analysis of the four logical options. The possibility for the elements to have the property of being affected but not sentience depends on whether such elements can satisfy the two necessary conditions of perception just mentioned: being subject to affection as part of the process of perception and being subject to change in the course of which they will obtain sentience.

According to Galen, both these roles are fulfilled by the same type of change, namely alteration, but its function is not the same. In the first case, alteration is supposed to be the triggering cause of sensation, while in the second case, alteration provides the physical mechanism of mixture, which transforms the elements into the proximate matter, making them, in this mixed state, the building blocks of the perceiving structure. Although Galen does believe that these two processes must be the same as far as their physical status is concerned, it is the second process that interests him as a part of his objection to the atomists and it is this kind of alterability that is particularly important as a requirement for the elements: they must be able to undergo a physiological change so as to be incorporated within a sentient structure.<sup>58</sup>

As we have seen in his analysis of the four options, Galen admits that both the elements that are perceiving and alterable and the elements that are just alterable have a possibility of being sentient. This does not mean that both these options are true of the elements of the sentient bodies. His promise to establish the true option must be fulfilled in his criticism of the Pneumatist account of elements.

### 3. Galen’s arguments against the Pneumatists

#### 3.1 The Pneumatist argument: Stoic philosophical background and Galen’s strategy

The overall position of the Pneumatic school is much closer to Galen’s own philosophy of nature than that of the corpuscularists. Pneumatism is associated with Stoicism, as Galen himself tells us, and more specifically, with the version of the Stoic doctrine developed by Chrysippus, who described his active principle as *pneuma*, ‘breath’.<sup>59</sup> Discussing the

<sup>58</sup> The distinction is not spelled out by Galen himself, despite its importance, but he seems to be aware of the slightly convoluted presentation of his argument, when he finishes the argument by saying *sapientī sat*: ‘this has been adequately demonstrated, to those at least who have had any training at all in following the demonstration’ (*Hipp. Elem.* I.432.11-12 K = 74.24-25 De Lacy).

<sup>59</sup> Galen, *Diff. Puls.* VIII.631.1-4 K: πολλὸν δὲ τοῦτ’ ἔστι παρὰ τῷ προπάππῳ τῆς αἰρέσεως αὐτῶν Χρυσίππῳ. νομοθετεῖ μὲν γὰρ ὀνόματα πλεῖον ἢ Σόλων Ἀθηναίους ἰστᾶν τοῖς ἄξιοι νομίσματα. VIII.642.4-7 K: ἀρέσκονται γὰρ οὗτοι πάντες οἱ Πνευματικοὶ καλούμενοι τοῖς ἀπὸ τῆς στοᾶς δόγμασιν. ὥστ’ ἐπεὶ Χρυσίππος αὐτοὺς εἴθισεν ἀμφισβητεῖν περὶ τῶν κατὰ τὴν φιλοσοφίαν ὀνομάτων, οὐδ’ αὐτοὶ περὶ τῶν κατὰ τὴν ἰατρικὴν ταῦτα ποιεῖν ὀκνοῦσι. On Galen’s engagement with Stoicism, see T. Tieleman, *Galen and Chrysippus on the soul: argument and refutation in the De placitis II-III* (Leiden 1996), *id.*, *Chrysippus on affections* (Leiden 2003), and most recently Ch. Gill, *Naturalistic psychology in Galen and Stoicism* (Oxford 2010).

Pneumatist view in *Hipp.Elem.*, Galen mentions by name only one representative of this school, its founder Athenaeus of Attalia.<sup>60</sup> Athenaeus is the author of a comprehensive treatise on medical art, *Peri boêthêmatôn*, which Galen apparently knows and which he highly praises just before developing his criticism of Athenaeus's theory of elements.<sup>61</sup> Despite the fact that Galen has first-hand knowledge of Athenaeus's work, in his argument we do not seem to find any verbatim quotations from Athenaeus. Athenaeus's views are presented as replies in a dialectical debate, constructed by Galen on the basis of what he knows about the Pneumatist position. According to Galen's report, Athenaeus and his followers believe that the elements of a living body are not fire, air, water, earth, but the hot, the cold, the dry, and the moist, insofar as they are constitutive of living bodies only. A near-contemporary source tells us that Athenaeus also accepted the Stoic principle of *pneuma*:

(T15) [Galen] [*Int.*] 9, XIV.698.5-12 K = *SVF* 2.416

According to Athenaeus, the elements of man are not the four first bodies, fire, air, water, and earth, but their qualities, the hot, the cold, the dry and the moist, two of which he considers to be productive causes, *viz.* the hot and the cold, and two material, *viz.* the dry and the moist, and he additionally introduces as the fifth breath, which according to the Stoics, pervades everything, by which all things are contained and governed.<sup>62</sup>

Both Galen and Athenaeus are humouralists. Both seem to think of the four humours – blood, phlegm, yellow, and black bile – as the organic equivalents of the four elements. Galen occasionally follows the Pneumatist usage calling the humours 'proximate elements'.<sup>63</sup> Both take each of the humours to be a combination of two 'organic' elemental qualities: yellow bile of heat and dryness (like Aristotle's fire), blood of heat and moist (like air), phlegm of moist and coldness, and black bile of dryness and coldness.<sup>64</sup> Galen tells us that Athenaeus in his writings criticized Asclepiades.<sup>65</sup>

<sup>60</sup> The biographical evidence for Athenaeus is meagre. Galen in *de Causis Contentivis* 1.2 calls him a 'student of Posidonius'. If this were Posidonius of Apamea (*ca.* 130 - after 51 BC) and Athenaeus' studentship were to be taken literally, this would give a very early date for the foundation of the Pneumatist school which is not supported by other evidence. References in ancient sources do not start until the mid-first century AD, which would put Athenaeus's *floruit* in the early first century. For a detailed survey with references, see V. Nutton, *Ancient medicine* (London 2005) 202-04.

<sup>61</sup> Title in Oribasius, *Collectiones Medicae* 9.12 t1-2 (*Collectionum medicarum reliquiae*, libri IX-XVI, ed. H. Raeder, CMG 6.1.2 (Leipzig and Berlin 1929) 12.25-26), *cf.* Galen, *Hipp.Elem.* I.457.13-15 K = 102.7-9 De Lacy.

<sup>62</sup> (T15) κατὰ δὲ τὸν Ἀθηναῖον στοιχεῖα ἀνθρώπου οὐ τὰ τέσσαρα πρῶτα σώματα, πῦρ καὶ ἀήρ καὶ ὕδωρ καὶ γῆ, ἀλλ' αἱ ποιότητες αὐτῶν, τὸ θερμὸν καὶ τὸ ψυχρὸν καὶ τὸ ξηρὸν καὶ τὸ ὑγρὸν, ὧν δύο μὲν τὰ ποιητικὰ αἶτια ὑποτίθεται, τὸ θερμὸν καὶ τὸ ψυχρὸν, δύο δὲ τὰ ὑλικά, τὸ ξηρὸν καὶ τὸ ὑγρὸν, καὶ πέμπτον παρεισάγει κατὰ τοὺς Στωϊκοὺς τὸ διήκον διὰ πάντων πνεῦμα, ὅφ' οὗ τὰ πάντα συνέχεσθαι καὶ διοικεῖσθαι.

<sup>63</sup> Galen: 'For blood, phlegm, yellow and black bile are the elements of the coming into being of all sanguineous animals, not of man only'. See *Hipp.Elem.* I.492.1-493.1 K = 138.15-140.2 De Lacy.

<sup>64</sup> For Galen, see *Nat.Fac.* 2.9. Galen's theory of humours as parts of a living body is more complex: he is keen to remind his audience that the parts of the living body which we call blood, bile, *etc.*, are

But there are also some differences between the two theories of elements, Galenic and Pneumatist. Perhaps the most important one has to do with the way in which the Pneumatists treat the relation between the cosmic elements (earth, air, fire, water) and the elemental constituents of a living body, 'proximate' (τὰ προσεχρή) or 'peculiar' (ἴδια), *i.e.* humours with their constituent elemental qualities (hot/cold, dry/moist). In order to understand the Pneumatist notion of 'proximate' elements it will be useful to go back to the Stoic (Chrysippean) theory of pneumatic tension. According to this theory, *pneuma*, the active principle of the cosmos, acting upon matter, pervades the whole of the universe and produces all its parts and natural kinds, from the four elements through the inanimate nature to plants, animals, and humans.<sup>66</sup> The successive tiers of nature's ladder are formed by different degrees of pneumatic tension.<sup>67</sup> This tension holds together the entities of a given natural kind and shapes and guides their activities. The lowest tier, that of inanimate bodies, such as minerals, corresponds to the state of *pneuma* described as *hexis*, just 'state' or 'habit'; the realm of plants is guided by *phusis*, 'nature', in a narrow sense; animals have *psukhê*, 'soul' as their ruling principle, and soul in physicalist terms is nothing else but a degree of pneumatic tension, above that of *phusis*, but below that of *logos*, the rational principle.<sup>68</sup> *Logos* is the ruling principle of all rational creatures: humans, gods, and the cosmos as a whole (*logos* is one of the ways to refer to the active principle).<sup>69</sup> *Logos* is corporeal and corresponds to the highest degree of pneumatic tension. The characteristic feature of the soul as a ruling principle is that it possesses the power of perception.

(T16) D.L. 7.156-57 Dorandi

(1) They hold the view that nature is the designing fire going by an ordered route into generation, which is firelike and artlike breath; (2) and the soul [on their view] is perceiving <nature>. (3) This latter is breath connatural to us. (4) Therefore it is a body and persists after death. (5) It is destructible, but the soul of all things, whose parts are in animals, is indestructible. (6) Zeno of Citium, Antipater in *On soul*, as well as Posidonius hold that soul is hot breath: for it is by this that we are breathing and by this we move. (7) According to Cleanthes, all souls persist until the conflagration, according to Chrysippus, only those of the sages.<sup>70</sup>

all the results of elemental mixture. Thus blood can display different degrees of heat and density, and the same is the case with the remaining three humours.

<sup>65</sup> *Hipp.Elem.* I.486.3-7 K = 132.18-22 De Lacy.

<sup>66</sup> See *SVF* 2.458 (149.46-150.30 = Philo, *Quod Deus sit immutabilis*, chs 35, 41).

<sup>67</sup> See *SVF* 2.451 = Nemesius, *de Natura Hominis*, ed. M. Morani (Leipzig 1987) 18.5-9 and 15-17.

<sup>68</sup> See *SVF* 2.459 (Critolaus apud [Philo] *Aet.Mund.* 248.2) and 458, see n.50, above. For discussions, see D. E. Hahm, *The origins of Stoic cosmology* (Columbus 1977), B. Inwood, 'Chrysippus on extension and the void', *Revue Internationale de Philosophie* 178 (1991) 245-66, D. E. Hahm, 'Self-motion in Stoic philosophy', in *Self-motion: from Aristotle to Newton*, eds M. L. Gill and J. G. Lennox (Princeton 1994) 175-225.

<sup>69</sup> *SVF* 2.841 (Chrysippus apud Galen, *PHP* 5.3).

<sup>70</sup> (T16) (1) Δοκεῖ δ' αὐτοῖς τὴν μὲν φύσιν εἶναι πῦρ τεχνικόν, δδῶ βαδίζον εἰς γένεσιν, ὅπερ ἐστὶ πνεῦμα πυροειδές καὶ τεχνοειδές (2) τὴν δὲ ψυχὴν αἰσθητικὴν. (3) ταύτην δ' εἶναι τὸ συμφυές ἡμῖν πνεῦμα (4) διὸ καὶ σώμα εἶναι καὶ μετὰ τὸν θάνατον ἐπιμένειν (5) φθαρτὴν δ' ὑπάρχειν, τὴν δὲ τῶν

This text illustrates the connection between nature (as the principle of vegetative life) and soul as understood by the Stoics. Nature is defined in (1), famously, as a designing fire (πῦρ τεχνικόν) which, when it goes down the route of generation, is fire-like and art-like breath, *pneuma*. We should take note of the expression 'artlike' (τεχνοειδής) *pneuma*. In this context the adjective, along with 'firelike' (πυροειδής) is supposed to emphasize the dependence of the generative *pneuma* on the designing and fiery aspects of the original active principle as well as the derivative nature of the pneumatic process of generation. But it may be relevant that one of the several positions of Pneumatists attacked by Galen is that the proximate elements are the elements 'of the art'. Along with the more obvious reading, according to which these elements are 'of the art' in the sense of being the elements of analysis conducted by the art of medicine, we must, I think, consider the one according to which they are the natural elements constituted in the process of cosmic generation originated by divine craftsmanship. The art of medicine in this case would only follow the divine design in the art-like manner appropriate to it. Galen should be happy with the idea that the elements in a living body partake of the cosmic design, but hardly prepared to admit that they should therefore be different elements, whose structure only imitates that of the cosmic elements.

It is important to note that in our text, soul is taken to be the perceiving, or sentient, nature (T16.2). Galen himself does adapt the Stoic theory of pneumatic tension for his analysis of the powers of living beings, agreeing with the Stoics and Aristotle against Plato that plants do not possess perception, and agreeing with the Stoics and Plato against Aristotle that where there is soul there is perception. The result of these two assumptions is that plants possess φύσις rather than ψυχή and are excluded from the class of ensouled beings – the net Stoic position.<sup>71</sup>

Galen does not normally quarrel with the Stoics about the elements. On the contrary, in all the most important debates against the atomists, they are presented as allies and differences are suppressed. Nonetheless, his disagreement with the Pneumatists in the *Hipp.Elem.* has to do with the Stoic principles they are trying to follow.

ἄλλων ἀφθαρτον, ἧς μέρη εἶναι τὰς ἐν τοῖς ζώοις. (6) Ζήνων δ' ὁ Κιτιεὺς καὶ Ἀντίπατρος ἐν τοῖς Περὶ ψυχῆς καὶ Ποσειδώνιος πνεῦμα ἐνθερμον εἶναι τὴν ψυχὴν· τούτῳ γὰρ ἡμᾶς εἶναι ἔμπνοους καὶ ὑπὸ τούτου κινεῖσθαι. (7) Κλεάνθης μὲν οὖν πάσας ἐπιδιαμένειν {τὰς} μέχρι ἐκπύρωσεως, Χρύσιππος δὲ τὰς τῶν σοφῶν μόνων. In (2), after αἰσθητικὴν <φύσιν> is added by von Arnim since it seems to be indicated grammatically. It is not clear that it should be in the text rather than just being implied (in fact, in the most recent edition Dorandi does not print it), but the connexion between nature and soul does seem to be clearly intended (Gigante suggested ἕξιν which gives better sense doctrinally, but lacks textual grounds.).

<sup>71</sup> See *Nat.Fac.* 1.1, II.1.5-2.6 K, *Adv.Jul.* XVIIIa.266.9-13 K, *Caus.Symp.* VII.129.4-10 K. Galen relaxes this restriction on a number of occasions, drawing parallels between the Stoic plant nature and Aristotle's vegetative soul and even Plato's desiring soul, where it suits his argument, but in the passages cited in this note, particularly in the first one, he emphasizes that Stoic technical usage is the correct one, as far as the precision and clarity is concerned. For more on plant souls see James Wilberding's paper in this volume.



As (T16.3) shows, according to the Stoics, soul, the perceiving or sentient nature, is connatural breath: the portion of designing fire that went along the route of animal generation.<sup>72</sup>

It is important to recall the physical mechanism by which breath, in the Stoic account, is transformed into the soul, acquiring its proper tension, which comes complete with the property of sentience. According to the Stoics, in the animal ontogenesis soul is produced in the process they call ‘hardening’ (στόμωσις), analogous to the hardening of steel in the smithy. The hot breath that sustained the embryo (and which is treated in some sources as combined with the innate heat) is exposed to the cold air, which enters the lungs of a newborn animal. The connatural *pneuma* is cooled and hardened, and according to some accounts, loses its original concomitant heat.<sup>73</sup> The heat sustaining the complete animal (as opposed to the embryo) is adventitious upon the motion of *pneuma* and thus turns out to be in a way the secondary and not the primary factor in the explanation of animal activities. The primary factor is connatural breath, which alone provides a physical link between the organism and its environment. Here is how the mechanism is described by Antyllus, a Pneumatist, who is Galen’s contemporary:

(T17) Antyllus, *On healthy vocal exercise*, apud Oribasium, *Collectiones Medicae*, 6.10.19.5-20.1 (6.1.1, 163.11-15 Raeder)

For breath, by its restless motion in friction, arouses and kindles the heat in us, producing because of its uninterrupted activity such an amount of burning in the body that if we do not constantly cool ourselves by the cooling of the respiration, then we will unknowingly experience the same as those who fall into the great conflagration.<sup>74</sup>

On this view, the quality of heat in a living body is a function of a still more basic, corporeal living principle, namely, connatural breath. This vital heat has its own, distinct, method of production and causal history, being an outcome of continuous motion of *pneuma*. In this it differs from both the designing fire as the active principle and the elemental fire produced by the designing fire in the process of cosmogony.<sup>75</sup> In the grand design of the Stoic cosmos it is, of course, quite important that the physical principle of heat be operative on all the cosmic levels. Yet, this design does not presuppose a simple transfer of physical characteristics from the first principles to all the denizens of the

<sup>72</sup> This point is well attested in the Stoic sources. The argument establishing that soul is breath is reported (and criticized) by Alexander of Aphrodisias in *Mant.* 3 (117.32-118.4).

<sup>73</sup> Cf. Plutarch’s criticism in *Stoic.Rep.* 1053c4-d1, *Comm.Not.* 1084d7-e4.

<sup>74</sup> (T17) τὸ γὰρ πνεῦμα τὴν ἐν ἡμῖν θερμασίαν τῷ πολυκινήτῳ τῆς φορᾶς κατὰ τὴν παράτριψιν ἐγείρει καὶ ζωπυρεῖ, τοσαύτην ἀποτελοῦν διὰ τὸ τῆς ἐνεργείας ἀδιάλειπτον ἐν τῷ σώματι πύρωσιν, ὥστε, εἰ μὴ παρ’ ἕκαστον ἀναψύχομεν ἑαυτούς τῇ διὰ τῆς ἀναπνοῆς καταψύξει, λαθεῖν ἂν ὅμοια παθόντας τοῖς εἰς πολλὴν ἐμπεσοῦσιν <ἔγκαυσιν> (Oribasius, *Collectionum medicarum reliquiae*, libri I-VIII, ed. H. Raeder, CMG 6.1.1 (Leipzig and Berlin 1928), 163.11-15).

<sup>75</sup> On Stoic cosmogony, see Hahm, *Stoic cosmology* (n.68, above), 57-90; on the genesis of fire and elemental transformations, two recent studies: J.M. Cooper, ‘Chrysippus on physical elements’, in *God and cosmos in Stoicism*, ed. R. Salles (Oxford 2009) 93-117, and R. Salles, ‘Chrysippus on conflagration and destructibility of the cosmos’, *ibid.*, 118-34.

cosmos: the design as physical principle ensures also that all the workings within the cosmos get their own specific λόγοι and specific mechanism of production.

The Pneumatists thus have philosophical reasons, taken from Stoic physics, to argue that vital heat present in the human body is not identical with the cosmic heat. Vital heat is a 'proximate' or 'peculiar' element because it is derivative from the internal vital principle of a living body.<sup>76</sup> This makes all the proximate qualities dependent on the pneumatic motion, and accounts for the difference between these qualities and their cosmic counterparts (earth, air, fire, water), although presumably there is some sort of relation between these cosmic qualities (which are identical with cosmic elements in the Stoic system) and the proximate qualities. One of the arguments used by Pneumatists in defence of their view is that cosmic elements are not found in the living organism in their pure form, so proximate qualities are the proper elements of a living body as far as the medical art is concerned.

Galen has several reasons for disagreeing with this position. In his system, the four primary elemental qualities (hot/cold, dry/moist) are basic with respect to the kinetic properties of the elements and elemental mixtures, since kinetic properties are construed as the functions of the powers of attraction and repulsion inherent in the most basic mixtures.<sup>77</sup> Galen argues that proximate, *i.e.* organic, elemental qualities have the same nature as their inorganic cosmic counterparts: the principles of natural design and mixture are sufficient to account for a variety of properties manifest in the organic and inorganic elemental compounds throughout the cosmos. The qualities of heat, cold, moisture, and solidity, are incorporeal, but combined with the prime matter they produce the elements, *i.e.* the simple bodies each of which possesses the extreme degree of one of the elemental qualities. The elements do not exist in their pure state anywhere in the cosmos, large or small, but it would be wrong to deny their existence altogether on this basis. The elements are legitimate theoretical entities, which are not postulated arbitrarily, but are expected to provide an explanation for the effects we observe in the sensible compounds. The previous argument has already ruled out the possibility that corpuscles and atoms could play the role of such theoretical entities. We are going to see how Galen establishes the key points of this position in his debate against Pneumatists.

In the beginning of his argument, Galen summarizes Athenaeus's position as follows:

<sup>76</sup> The distinction between two positions in medical philosophy is reflected also in this report by Rufus of Ephesus: 'Zeno says that heat and breath are the same, while physicians distinguish between breath as that which is breathed in, and the hot as the result of friction produced by breath, while others say it is a certain principle of life'. Θερμασίαν δὲ καὶ πνεῦμα Ζήνων μὲν τὸ αὐτὸ εἶναι φησιν οἱ δὲ ἰατροὶ διαιροῦσι, πνεῦμα μὲν τὸ ἀναπνεόμενον· θερμὸν δὲ τὴν ἔκτριψιν τοῦ πνεύματος· οἱ δὲ ἀρχὴν τινα ζωῆς. *De corporis humani appellationibus* 228.1 = *Oeuvres de Rufus d'Éphèse*, eds C. Daremberg and É. Ruelle (Paris 1879) 166.9-11. It is not clear whether the last mentioned group of physicians, those who consider heat as a certain principle of life, share the Pneumatist view of it as a product of pneumatic motion. In the theory of Athenaeus which Galen discusses both these views seem compatible: proximate qualities are not the same as the cosmic qualities (because produced by pneuma), but they are the elements, *i.e.* the principles of life.

<sup>77</sup> Kupreeva, 'Aristotelian dynamics' (n.25, above) 81-84.

(T18) Galen, *Hipp.Elem.* 6.1, I.457.8-13 K = 102.1-7 De Lacy

(1) Athenaeus of Attalia made hot, cold, dry, and wet the elements of man, (2) and at the same time he claimed that the elements are clearly visible and do not require proof, (3) sometimes calling them qualities and powers, on occasion granting that they are bodies, (4) then afraid to agree that they are water, air, fire, and earth.<sup>78</sup>

Trans. De Lacy

In this summary, Galen draws attention to two points, which he goes on to criticize and explain in some detail. The first one, as stated here (T18.2), is methodological and epistemological: the ‘proximate’ elements of living bodies (the ones that are the elements specifically of living bodies, and are produced by pneuma, qualities of heat, coldness, dryness and moisture) are ‘evident and do not require demonstration’. The second point (T18.3) is logical. Galen claims that Pneumatists are inconsistent and possibly confused about the ontological status of the elements, calling them at times qualities and at other times bodies. He will argue, most likely drawing on Aristotle’s *Categories*, that bodies and qualities subsume, respectively, two non-overlapping classes of predicates, and that in this classification the elements are bodies. These points reflect two lines of reasoning in Galen’s argumentative strategy whose aim is to show that Athenaeus’s position conflicts with evidence and that it is based on faulty logic and conceptual confusion. In fact, both points identified by Galen as targets of his attack may have more philosophical background than he is initially prepared to acknowledge.

### 3.2 Methodological point: a dialectical study of principles needed

Galen begins by questioning the concept of evidence used by Athenaeus with respect to the elements of living body. The text of *Hipp.Elem.* does not give us very many details as to the exact meaning of this description in Athenaeus’s doctrine, and it is not clear how much of what we have in this report was actually spelled out by Athenaeus himself rather than supplied by Galen. Galen suggests two explanations: (1) the Pneumatists might say that the cosmic elements (earth, fire, water, air) are not found by perception in a human (or any living, *i.e.* ensouled) body or (2) they do not want to speak about the cosmic elements because these latter ‘are outside the medical art; they are content to make hot, cold, dry and wet, which they can clearly point to even in animals, the elements both of bodies and the whole of medicine’.<sup>79</sup>

Galen tackles the first defence before he even mentions Athenaeus, pointing out that no physical element is found in a ‘pure’ form in the cosmos itself and that the processes of

<sup>78</sup> (T18) (1) Ἀθήναιος ὁ Ἀτταλεύς, ἅμα μὲν στοιχεῖα τιθέμενος ἀνθρώπου τὸ θερμὸν καὶ τὸ ψυχρὸν καὶ τὸ ξηρὸν καὶ τὸ ὑγρὸν, (2) ἅμα δ’ ἐναργῆ φάσκων εἶναι τὰ στοιχεῖα καὶ ἀποδείξεως μὴ δεῖσθαι (3) καὶ ποτὲ μὲν ὀνομάζων αὐτὰ ποιότητος καὶ δυνάμεις, ἐνίοτε δὲ σώματα συγχωρῶν ὑπάρχειν, (4) εἶτα δεδιῶς ἀέρα καὶ πῦρ καὶ ὕδωρ καὶ γῆν ὁμολογήσαι.

<sup>79</sup> Galen, *Hipp.Elem.* I.459.10-15 K = 104.6-11 De Lacy. ἀλλ’ ἴσως φήσουσιν οἱ ἀπ’ Ἀθηναίου μηδ’ αὐτοὶ περὶ γε τούτων ἀποφαίνεσθαι μηδέν, ἐπέκεινα γὰρ εἶναι τῆς ἰατρικῆς τέχνης, ἀρκεῖν δ’ αὐτοῖς τὸ θερμὸν καὶ τὸ ψυχρὸν καὶ τὸ ξηρὸν καὶ τὸ ὑγρὸν, ἃ κὰν τοῖς ζώοις ἐναργῶς δεῖξαι δύνανται, στοιχεῖα καὶ τῶν σωμάτων ὑποθέσθαι καὶ τῆς ὅλης ἰατρικῆς.

coming to be and nutrition of the living things should be a sufficient proof that they are naturally built up by the cosmic elements.<sup>80</sup>

His response to the second line of the Pneumatist defence, according to which the animate hot, animate cold, animate dry, and animate moist are the elements of medicine, is simply to ridicule this claim. How can something be an element of both the animal and the art of medicine? In fact, Galen should certainly know what the force of this claim might be: the rejection of cosmic elements on the grounds of their irrelevance to medical art is a part of the Empiricist programme in medical philosophy. The Pneumatist position differs from that of the Empiricists, for the acceptance of the four elemental qualities (however understood) as the principles of medical art is a dogmatic, or Rationalist, move. But the restriction the Pneumatists impose on these principles, *i.e.* the requirement that they should be exclusively 'proximate', organic qualities, brings them closer to the Empiricist position. The thought behind both views is that medicine, as a relatively autonomous art, does not need to worry about the speculations of natural philosophers about the cosmos at large. As noted above, Galen himself is not totally unsympathetic with the idea that there are limits to the scope of medical expertise.<sup>81</sup> But he does not agree with the way the limits are drawn by his opponents. In particular, he will not accept the view according to which the principles of medicine, including the theory of the elements, will be established on the basis of medical experience alone. In what can be regarded as a methodological prelude to his discussion of Pneumatism, he underlines the broad theoretical foundation of his position:

(T19) Galen, *Hipp.Elem.* I.449.5-10 K = 92.26-94.2 De Lacy

(1) Natural science is concerned with bodies that come to be and pass away and generally with bodies that are in the process of change; but if being is only one, these are eliminated. (2) In the same way medicine too, first, depends on coming to be and perishing as a handmaiden, and if these are not given, is also eliminated.<sup>82</sup>

Trans. De Lacy, lightly modified

In (T19.2), calling medicine a handmaiden (ὕπηρετις) of the processes of change, Galen indicates his objection to rationalism of the Pneumatist type. The Pneumatists accept the description of the cosmic elements provided by natural science, in its Stoic version, but make no use of them in their medical theory and practice. In establishing the elements relevant to the art of medicine, they give methodological priority to evidence (ἐναργεία) (T18.2), understood primarily as the evidence of sense perception.<sup>83</sup> It is in this way that

<sup>80</sup> *Hipp.Elem.* I.451.11-457.5 K = 96.2-100.24 De Lacy. The discussion of this point is resumed after the 'logical' interlude at *Hipp.Elem.* I.465.10-13 K = 110.15-17 De Lacy. See *Appendix*.

<sup>81</sup> p. 161 and n.28 above.

<sup>82</sup> (T19) (1) ἡ γὰρ φυσιολογία περὶ τῶν ἐν γενέσει καὶ φθορᾷ καὶ ὅλως ἐν μεταβολῇ σωμάτων ἐστίν. εἰ δ' ἐν ἐστὶ μόνον τὸ ὄν, ἀνήρηται ταῦτα. (2) κατὰ δὲ τὸν αὐτὸν τρόπον καὶ ἡ ἰατρικὴ πρῶτον μὲν κἂκ τοῦ γενέσεως καὶ φθορᾶς οἷον ὑπηρετις ὑπάρχειν, εἰ μὴ δοθεῖ ταῦτ' εἶναι, συναναίρειται καὶ αὕτη.

<sup>83</sup> Because of the methodological importance of this concept of ἐναργεία in the Pneumatist theory of elements, it is very tempting to look for the links between this concept and the Stoic doctrine of κατάληψις, but in the absence of any evidence, this remains a speculation, albeit an attractive one.

they come to establish the elemental qualities hot, cold, dry, and moist that exclusively characterize the living bodies as the proper elements of these bodies.

This approach disagrees with Galen's understanding of the first principles of the art of medicine. Galen elaborates on his claim about the dependence of medicine on the processes of natural change, explaining that the art of medicine should adopt the appropriate first principles to account for change. Those practitioners of the art who fail to do so are at risk of going beyond the scope of medicine.<sup>84</sup> The immediate target of Galen's criticism here is 'elemental monism', but the methodological point he is making is more general and does not depend on the exact nature of differences between his physical theory and those of his various opponents. Galen draws a parallel between his criticism of his opponents and Aristotle's criticism of the Eleatic philosophers in *Physics* I.2: in both cases, according to him, the denial of the first principles of the art or a theoretical discipline does not belong to the discipline itself and therefore has to be confronted on a different turf, outside this discipline, *i.e.* either by public criticism (as in (T20.1) or in a separate discipline which has as its task the discussion of the first principles (T20.2)).

(T20) Galen, *Hipp.Elem.* I.451.4-9 K = 94.23-28 De Lacy

(1) Those who deny the clear facts should be either publicly censured by all men for turning our life upside down, or (2) some art should be set up which would argue about the principles, apart from all special arts, (3) that would in this way direct each particular art to the principles which have been granted it [in argument].<sup>85</sup>

Trans. De Lacy, modified, see note

86

The special discipline mentioned in (T20.2) is not given any name, but its nature as described leaves little doubt that it will be a philosophical discipline devoted to the arguments concerning the first principles. Galen is thinking primarily of the first principles important for the doctor, so this special discipline must be not dialectic in general, but the branch of it that has to do with natural philosophy. This discipline is distinct from medicine, but medicine needs it in order to be on the right track, conceptually.<sup>86</sup>

It is from this more general dialectical point of view that Galen criticizes the Pneumatist concept of evidence, pointing out that although the qualities themselves are

<sup>84</sup> *Hipp.Elem.* I.450.9-13 K = 94.14-17 De Lacy.

<sup>85</sup> (T20) (1) τοῖς γὰρ ἀναίρουσι τὰ ἐναργῶς φαινόμενα ἢ κοινῇ πάντας ἀνθρώπους μέμφεσθαι προσήκειν, ὡς ἀνατρέπουσι τὸν βίον, (2) ἢ τινα τέχνην ὑπὲρ τῶν ἀρχῶν ἀγωνιζομένην προσστήσασθαι παρὰ τὰς κατὰ μέρος ἀπάσας, (3) αὐτὴν δ' ἐκάστην τῶν κατὰ μέρος τεχνῶν ἐπὶ ταῖς ἀρχαῖς συγχωρηθείσας οὕτω προϊέναι.

<sup>86</sup> My translation of (T20.3) αὐτὴν δ' ἐκάστην τῶν κατὰ μέρος τεχνῶν ἐπὶ ταῖς ἀρχαῖς συγχωρηθείσας οὕτω προϊέναι, on which my interpretation depends, differs from that of De Lacy. De Lacy apparently takes προϊέναι to be the infinitive of πρόειμι, and he understands αὐτὴν δ' ἐκάστην τῶν κατὰ μέρος τεχνῶν as an appositive construction referring to each of the several other arts, but I think it is much more natural to take αὐτὴν as the subject of the construction *acc. cum infinitivo* with προϊέναι (αὐτὴν referring back to the separate art mentioned in (T20.2)) and ἐκάστην as the direct object of προϊέναι, the latter understood as the infinitive of the transitive verb προίημι.

clearly perceptible, the same cannot be claimed with respect to their elemental status. The concept of 'element', the grounding principle of a doctor's activity, cannot be discovered by mere empirical means, but is inevitably theoretically laden.<sup>87</sup> As such, it has to be established by an appropriate dialectical discipline. Elaborating on this methodological point, Galen develops his logical objection to Pneumatists, which amounts to the criticism of their ontology, adopted from the Stoics.

### 3.3. Logical argument and the ontology of qualities and bodies

Logical objection is first presented in a vivid memoir of a debate Galen, as a student, had with one of his teachers, a Pneumatist and follower of Athenaeus. Galen asked about the ontological status of Pneumatist proximate elements: are they pure qualities or qualities of bodies and if bodies, composite or simple ones?

(T21) Galen, *Hipp.Elem.* I.461.4-462.14 K = 106.3-108.1 De Lacy

(1) 'Just as we say "white"', I said, 'of the colour itself – for we say of colours that one is white, another is black, another red, another golden yellow, another pale yellow – and in addition [we predicate terms of] the bodies that have taken on the colours – for we call the swan and the milk white, but the raven and the Ethiopian black – in the same way,' I said, (2) 'I hear people at one time predicating "hot" of the body itself, as they might say that fire is hot, but at another time only of the quality in the body. (3) Therefore,' I said, 'when you say "hot" I don't know what you wish to signify, whether it is the quality alone or the body that has received it.' (4) He had a ready answer to this; he agreed that by hot he did not mean the quality alone but also the whole body. (5) When I then asked, 'Then are you telling me that the body that is hot to the extreme degree is an element? Or even if [a body] is moderately hot, will that [body] also be an element?', and when I asked the same question about cold and dry and wet, (6) he said, 'Why is this important to you?', by now he was upset and he did not answer readily as he did before. (7) 'Because', I said, 'it differs a great deal whether one posits some unlimited number of elements or a limited number. It will be unlimited for the person who makes the moderately cold or hot or dry or wet an element, but not unlimited for the one who makes the extreme the element. For there will be one [extreme] for each kind, so that the total number of elements will be limited to four'.<sup>88</sup>

Trans. De Lacy

<sup>87</sup> Cf. Galen, *Hipp.Elem.* I.458.4-9 K = 102.14-18 De Lacy: πότερον γὰρ ἡ στοιχεῖα, ταύτη τὴν ἐνάργειαν αὐτοῖς μαρτυρεῖ ἢ κατὰ τὰς οὐσίας, αἷς συμβέβηκεν αὐτοῖς εἶναι στοιχεῖοις; εἰ μὲν γὰρ κατὰ τὰς οὐσίας, τί οὐχὶ καὶ τὰ ὑγιεινὰ καὶ τὰ νοσερὰ πᾶσιν ἀνθρώποις φαίνεσθαι φησι καὶ μήτε διδασκαλίας τινὸς μήτ' ἀποδείξεως προσδεῖσθαι διὰ τὴν ἐνάργειαν; ('Does he testify that they have this clarity *qua* elements, or is it the clarity of the substances whose elements they happen to be? If it is the substances, why doesn't he say that things beneficial and injurious to health are evident to all men and require neither instruction nor proof because of their clarity?') (Trans. De Lacy)).

<sup>88</sup> (T21) (1) ὡς γὰρ λευκὸν, ἔφην, αὐτὸ τε τὸ χρῶμα λέγεται· φαμὲν γὰρ τῶν χρωμάτων τὸ μὲν λευκὸν εἶναι, τὸ δὲ μέλαν, τὸ δ' ἐρυθρόν, τὸ δὲ ξανθόν, τὸ δ' ὄχρον· ἔτι τε πρὸς τούτοις τὰ δεδεγμένα τὰς χροῶν σώματα· λευκὸν γὰρ τὸν κύκνον καὶ τὸ γάλα, μέλινα δὲ τὸν κόρακα καὶ τὸν Αἰθίοπα καλοῦμεν· (2) οὕτως, ἔφην, ἀκούω καὶ θερμὸν λεγόντων ἐνίοτε μὲν αὐτὸ τὸ σῶμα,

In (T21.1), Galen draws a distinction between two kinds of predication of a colour term. In the first case, the term, *e.g.* ‘white’, ‘black’, ‘red’, *etc.*, is predicated of the colour itself. In the second case, the term is predicated of a body which has that colour, *e.g.* ‘white’ of a white swan, ‘black’ of a black raven, *etc.*

In (T21.2), Galen generalizes the distinction: the term ‘hot’ can be predicated either of a quality (‘heat’) or a body that has the quality. We can see that this is a somewhat different version of the same distinction. In the case of colour, the concrete colour term (‘white’, red’, *etc.*) was predicated of its proper genus (‘colour’). Here, Galen offers only a broad generic description of the subject of essential predication of the term ‘hot’, as the quality of ‘heat’. In (T21.2), Galen, differently from (T21.1), does not list any other predicates that could be applied to quality except ‘the hot’. If we were to take the description of the subject term as ‘quality’ at face value, such a list could include all possible qualities. But Galen’s aim now is to distinguish the elemental heat from the adventitious, so the fact that he started with the example of ‘colour’ as a proper genus in (T21.1) should be taken as an attempt to illustrate the nature of the distinction between the two ways of using the predicate ‘hot’. The fact that it is not easy to find a proper genus for this predicate, analogous to the genus ‘colour’ for ‘white’, makes his task difficult. Following this logic of generalization, Galen, in (T21.3), describes the distinction between the two kinds of predication as that between predicating a quality term (‘hot’) of the quality (the quality ‘hot’) or of the body that has that quality.

When in (T21.4) Galen’s Pneumatist teacher ‘readily’ admits using the term ‘hot’ as referring to both the quality and the body, we cannot be sure whether this is an admission of uncertainty made in response to Galen’s clever dialectical set-up or whether it comes naturally as a considered view based on the Stoic thesis according to which all qualities are corporeal. Galen is happy with this reply by the Pneumatist, as it permits him to launch his own disambiguation strategy, which involves describing the elemental heat as the extreme degree of ordinary (adventitious) heat. In order to proceed with this argument, it is important for him to secure the assumption that heat is predicated in some, as yet unspecified way, of both the quality and the body.

In (T21.5), Galen asks his teacher whether what he calls the ‘element’ has the extreme or moderate degree of heat, and then raises the same question about the three other elemental predicates – cold, dry, and moist. In (T21.6), the Pneumatist is no longer forthcoming with a ready reply, presumably, because according to his theory, the elements are not described simply as extremes of the corresponding qualities: as we saw above, they are animate qualities, discovered by medical experience. Galen presents this as an

καθάπερ εἰ τύχοι τὸ πῦρ, ἐνίοτε δὲ τὴν ἐν αὐτῷ ποιότητα μόνην. (3) οὐ τοίνυν, ἔφην, γινώσκω, ἐπειδὴν εἴτης θερμόν, ὅ τί ποτε δηλοῦν ἐθέλεις, εἴτε τὴν ποιότητα μόνην εἴτε τὸ δεδεδυμένον αὐτὴν σῶμα. (4) ὁ δὲ πρὸς μὲν τοῦτο καὶ μάλ’ ἐτοίμως ἀπεκρίνατο μὴ τὴν ποιότητα μόνην, ἀλλὰ καὶ σύμπαν τὸ σῶμα θερμόν ὀνομάζειν ὁμολογῶν. (5) ἐφεξῆς δὲ μου πάλιν ἐρομένου· πότερον οὖν ἐκεῖνο τὸ σῶμα λέγεις μοι στοιχεῖον, ὅ τί περ ἂν ἄκρως ἢ θερμόν, ἢ κἄν μετρίως ἢ τοιοῦτον, ἔσται καὶ τοῦτο στοιχεῖον; ὡσαύτως δὲ καὶ περὶ ψυχροῦ καὶ ξηροῦ καὶ ὑγροῦ τὴν αὐτὴν ἐρώτησιν ποιησαμένου μου (6) «τί δὲ τοῦτο, ἔφην, σοὶ διαφέρει;» ταραττόμενος ἤδη καὶ μὴ καθὼς πρόσθεν ἐτοίμως ἀποκρινόμενος. (7) ὅτι πολλὸν διαλλάττει, ἔφην, ἢ ἀπειρόν τι πλῆθος ὑποθέσθαι στοιχείων ἢ πεπερασμένων. ἀπειρόν μὲν γὰρ ἔσται τὸ μετρίως θερμόν ἢ ψυχρόν ἢ ξηρόν ἢ ὑγρὸν ὑποθεμένοις στοιχείων, οὐκ ἀπειρόν δὲ τὸ ἄκρως. ἐν γὰρ καθ’ ἕκαστον ἔσται γένος, ὥστ’ εἶναι τὰ πάντα στοιχεῖα τέτταρα πεπερασμένα.

ultimate perplexity of his opponent and offers to clarify the problem. The clarification in (T21.7) appeals to the necessity of avoiding the implausible consequence of allowing an indefinite number of elements. Such a consequence will result should one agree with the Pneumatists that the elements, *i.e.* the Pneumatist elemental qualities, do not need to be established in a theoretically precise way and are discovered by perceptual experience in an indefinite range of different cases.<sup>89</sup> At this point the interlocutor grants Galen the required definition of the element as having the extreme degree of the elemental quality.

This argument gives us a good idea of the kind of logical analysis Galen applies in his theory of elements. His distinction between the two kinds of predication bears some resemblance to Aristotle's distinction between 'being said of a subject' and 'being in a subject' in *Categories* II. Aristotle gives no formal definition of being said of a subject, and explains that by 'being in a subject' he means 'that which, belonging to something not as a part, is incapable of existing separately from the thing it is in'.<sup>90</sup> He clarifies his distinction with a set of examples, which can be summarized in the following table:

Said of a subject	Being in a subject	
+	+	Knowledge is in the soul as in a subject and is said of the knowledge of grammar as of a subject
+	-	'Man' is said of a particular man as of a subject, but is not in any subject
-	+	the particular ( <i>e.g.</i> my) knowledge of grammar is in the soul as in a subject, but is not said of any subject
-	-	'This man Socrates', 'this horse' are neither said of any subject nor in any subject. These are primary substances.

In the scholarly literature Aristotle's distinction is sometimes too soon described as that between essential and accidental predication.<sup>91</sup> But the distinction is meant to be methodologically prior to the introduction of the concept of substance or essence, which is in fact properly derived precisely by applying this distinction. It would be better to speak of a distinction between synonymous predication and inherence.<sup>92</sup>

<sup>89</sup> Galen seems to be using Plato's distinction between the unlimited and the limit as drawn in the *Philebus* 24b3-e2. Whereas Plato leaves the possibility of more than one kind of limit, Galen seems to be presupposing that there is only one way to impose a limit on an elemental quality, namely, to take it at its extreme.

<sup>90</sup> *Cat.* 2, 1b24-25: ἐν ὑποκειμένῳ δὲ λέγω ὃ ἐν τινι μὴ ὡς μέρος ὑπάρχον ἀδύνατον χωρὶς εἶναι τοῦ ἐν ᾧ ἔστί.

<sup>91</sup> See *e.g.* P. Studtmann, 'Aristotle's *Categories*', in *Stanford Encyclopedia of Philosophy*, ed. E. Zalta (2007), <http://plato.stanford.edu/entries/aristotle-categories>: 'By focusing on Aristotle's illustrations, most scholars conclude that beings that are said-of others are universals, while those that are not said-of others are particulars. Beings that are present-in others are accidental, while those that are not present-in others are non-accidental. Now, non-accidental beings that are universals are most naturally described as essential, while non-accidental beings that are particulars are best described simply as non-accidental'.

<sup>92</sup> The latter term in fact has become customary since G. E. L. Owen, 'Inherence', *Phronesis* 10 (1965), 97-105. 'Synonymous predication' is the expression developed on the basis of Aristotle,



Aristotle's synonymous predication ('being said of a subject') has a parallel in Galen's predication of a quality term of a quality, while Aristotle's inherence ('being in a subject') provides a semantic basis for Galen's predication of a quality term of a body that has quality. The parallel between Galen and Aristotle is not complete: Aristotle distinguishes between the features that characterize beings, τὰ ὄντα, whereas Galen speaks about the difference between two kinds of predication. But this latter difference is based on the ontological difference, and it is highly likely that Galen's distinction is informed by his reading of the *Categories*, a treatise he knew very well.<sup>93</sup>

We may notice that describing the two kinds of predication, Galen does not use the terms 'subject' (ὕποκειμενον) or 'substance' (οὐσία), which would be closer to Aristotle's wording in the *Categories*, but speaks of quality (ποιότης) and body (σῶμα). This usage may be due to the fact that Galen is arguing against the Pneumatists who seem to follow the Stoic view that qualities are corporeal.<sup>94</sup> It may also be based on a certain interpretation of Aristotle, as we shall see shortly.

In the argument following upon this autobiographical sketch, Galen again presses his Pneumatist opponents for a clear definition of the ontological status of the elements, this time aiming to derive an *ad hominem* refutation of their position, which reduces the search for elements to the level of proximate elements. Galen cites Athenaeus' definition of the proximate elements:

(T22) Galen, *Hipp.Elem.* I.465 K = 110.13-15 De Lacy

<Athenaeus speaks>: 'I am taking the proximate elements of animals, not the elements common to all bodies'; and by proximate they mean 'peculiar to' and 'of nothing else at all'.<sup>95</sup>

Trans. De Lacy

These are the elements that are evident and do not require demonstration. Galen points out that the elements that are apparent (τὰ φαινόμενα στοιχεῖα) are not the same as the true elements (τὰ ὄντως στοιχεῖα), and accuses Athenaeus of confusion in this regard.<sup>96</sup> Galen

*Categories* 5, 3a33, where Aristotle uses it to describe the type of predication characterizing that of substance and differentia (see F.A. Lewis, *Substance and predication in Aristotle*, Cambridge, 1991, 22). It is to be preferred to 'essential' predication because of its broader scope which makes it applicable to categories other than substance and at the level of genera, which is broader than that of essence.

<sup>93</sup> Galen tells us that he wrote a commentary in four books (*Lib.Prop.* 17.1, XIX.47.5-6 K = 171.12 Boudon-Millot), and indicates that his was a commentary of advanced level, suitable for those students who have already familiarized themselves with the more basic commentaries, for instance, by Adrastus and Aspasius (*Lib.Prop.* 14.15, XIX 42.12-43.1 K = 166.22-167.6 Boudon-Millot).

<sup>94</sup> The distinction between bodies and qualities is much discussed in connection with the Stoic thesis, according to which qualities are bodies. Those who argue for the incorporeality of qualities, from different perspectives, include Platonists (see Alcinous, *Didasc.* 11, 166.15-38 Hermann-Whittaker), Aristotelians (see Alexander of Aphrodisias, *Mant.* 3 and 6), and Epicureans (see Epicurus, *Letter to Herodotus*, D.L. 10.68-71). The Galenic corpus contains the treatise of uncertain authorship 'Qualities are incorporeal' ὅτι αἱ ποιότητες ἀσώματοι (*Qual.Incorp.* XIX 463-484 K).

<sup>95</sup> (T22) τὰ γὰρ προσεχῆ λαμβάνω τῶν ζώων, οὐχὶ τὰ κοινὰ πάντων σωμάτων στοιχεῖα. καλοῦσι δὲ προσεχῆ τὰ οἷον ἴδια καὶ μηδενὸς ἄλλου τῶν ἀπάντων.

<sup>96</sup> *Hipp.Elem.* 6.28, I.465.10-13 K = 110.15-17 De Lacy.

grants that there are proximate and evident elements (using 'evident' and 'apparent' interchangeably) as an assumption he himself is prepared to share. Moreover, he tells us that Athenaeus will not disagree with him in defining as proximate elements the homoeomerous (uniform) parts of the animal body, *i.e.* such parts as bone, flesh, etc.<sup>97</sup> Disagreement will instead arise when Galen claims that it is *only* these homoeomerous parts that can qualify as the elements in line with Athenaeus's epistemological requirement, because they are the only type of structure that is 'evident' or 'apparent', discoverable by sense perception. Galen argues that this is all the Pneumatists are entitled to call the 'apparent' or 'evident' elements and reports that in fact it is not these structures that Athenaeus considers to be elements. Instead, for Pneumatists, it must be the four elemental qualities that are 'proximate', *i.e.* distinct from cosmic elements.

(T23) Galen, *Hipp.Elem.* I.466.4-467.1 K = 110.21-112.2 De Lacy

(1) But did Athenaeus make these [homoeomerous bodies] the elements? (2) He is the very one who writes that each of the homoeomerous parts has come to be from the first elements, and that the other parts of the animal are then formed from the homoeomerous parts. (3) Therefore when he is asked what are the elements of flesh, for example, or fat, obviously his answer will be the hot and the cold and the dry and the wet. (4) And similarly, of course, he says that wet and dry and cold and hot are the elements of bone and cartilage and hair. (5) It is now time for you to ask what sort of wet and dry and cold and hot he meant. For it is by dominance that flesh is wet, cartilage <is dry, and flesh is hot, cartilage> cold; and in the same way bone is dry and cold, fat is cold and wet, and each of the other homoeomerous parts is of this or that description by prevalence of the simple [qualities].<sup>98</sup>

Trans. De Lacy, lightly modified

The elemental status of the four qualities seems to be derived by Galen from the claim he finds in Athenaeus's writing, to the effect that homoeomerous, *i.e.* uniform, parts of a living body come to be from them (T23.2-4). Galen next asks whether Athenaeus is referring to the 'hot, cold, wet, and dry' insofar as they are called so 'by prevalence' (κατ' ἐπικράτησιν). (T23.5).

<sup>97</sup> For the place of uniform parts in Aristotle's hierarchy of organic structures, see (T5.2). Galen wrote a treatise *Distinctions between uniform parts* (*Fī ikhtilāf al-'aḏā' al-mutashābiha al-ajzā'i*), extant only in Arabic, in which he counts about forty-five different kinds of uniform parts in a living body. See Gotthard Strohmaier's overview of Galen's doctrine of homoeomers in *Part.Hom.Diff.* 87-94 Strohmaier.

<sup>98</sup> (T23) (1) ἄρ' οὖν ὁ Ἀθήναιος ἔθετό που ταῦτα στοιχεῖα; (2) καὶ μὴν αὐτός ἐστιν ὁ γράφων ἕκαστον μὲν τῶν ὁμοιομερῶν ἐκ τῶν πρώτων γεγονέναι στοιχείων, ἐκ δὲ τῶν ὁμοιομερῶν ἥδη τὰλλα συγκείσθαι τοῦ ζώου μόρια. (3) τῆς γοῦν σαρκὸς εἰ οὕτως ἔτυχεν ἢ τῆς πιμελῆς ἐρωτηθεὶς τὰ στοιχεῖα, δῆλον, ὅτι τὸ θερμὸν καὶ τὸ ψυχρὸν καὶ τὸ ξηρὸν καὶ τὸ ὑγρὸν ἀποκριθήσεται. (4) καὶ μὲν δὴ καὶ ὄστου καὶ χόνδρου καὶ τριχὸς ὡσαύτως ὑγρὸν καὶ ξηρὸν καὶ ψυχρὸν καὶ θερμὸν εἶναι φήσει τὰ στοιχεῖα. (5) καιρὸς οὖν ἦδη πυνθάνεσθαι σε, ὅποιον ὑγρὸν ἢ ξηρὸν ἢ ψυχρὸν ἢ θερμὸν ἀπεφῆνατο. κατὰ μὲν γὰρ τὴν ἐπικράτησιν ὑγρὸν μὲν ἢ σὰρξ, ὁ χόνδρος δὲ ... ψυχρὸν. ὡσαύτως δὲ τὸ μὲν ὄστουν ξηρὸν καὶ ψυχρὸν, ἢ πιμελῆ δ' ὑγρὸν καὶ θερμὸν ἕκαστόν τε τῶν ἄλλων ὁμοιομερῶν ἢ τοῖον ἢ τοῖον ἐστιν ἐπικρατεῖα τῶν ἀπλῶν. I supplement the text in translation following De Lacy.

Galen is here introducing another distinction between the two types of predication: the predication 'by prevalence' is contrasted with unqualified or simple predication. In the case of composite bodies constituted by a mixture of four elemental qualities, any one of these qualities, for instance, 'hot', is predicated of a composite body, when the hot prevails in this bodily mixture, sufficiently to make an appearance as a sensible quality. The thing in which the hot or the cold prevails contains both qualities, and thus cannot itself be one of the elemental qualities. 'Simple' predication corresponds to the case where the quality in question is not mixed with any other quality: this is the case of the cosmic elements, such as fire. Fire is hot not by prevalence, but in an unqualified way. The main reason why Galen introduces this distinction is that when he distinguished synonymous from non-synonymous predication in order to separate bodies from qualities, the simple and composite bodies turned out to be in the same class with respect to the predication of elemental qualities. This would be an undesirable result for him, since he needs to define the elements as simple bodies. Thus he makes a new distinction, which sets apart the two different kinds of non-synonymous predication for elemental qualities, distinguishing simple non-synonymous predication (which corresponds to the elements) from non-synonymous predication by prevalence (which corresponds to composites, *i.e.* the elemental mixtures).

Galen argues that predication 'by prevalence' has as its subject the homoeomerous substances within a living body, since they may be called hot or cold or dry or wet because a particular pair of qualities prevails in them. But, he tells us, this is not what Athenaeus means. Athenaeus says, apparently, that it is the *elemental constituents* of homoeomerous bodies, rather than the homoeomers themselves, that are the true elements.<sup>99</sup> Galen's verdict is that in making this claim and appealing to the 'true elements' Athenaeus is going beyond the level of the perceptible and commits himself, *malgré lui*, to non-evident elements. The Pneumatist methodological principle which led them to postulate the proximate elements as true elements cannot be sustained, because it results in a conclusion which they themselves are not prepared to endorse. Galen's recommendation is that they should drop the condition of perceptual evidence. He has already criticized this condition on general methodological grounds, and now argues that the analysis of the structure of predication also shows that his opponents must revise their position and turn to the elements in a proper theoretical sense, *i.e.* to the elements, of which the elemental qualities are predicated without qualification, and not by prevalence. Such are the cosmic elements.

(T24) Galen, *Hipp.Elem.* 6.34-35, I.468.5-469.1 K = 112.21-114.4 De Lacy

(1) If you name what is by prevalence wet and dry and hot and cold, then clearly at that stage you have the perceived elements, nerve, membrane, cartilage, ligament, flesh, and each of the others that we mentioned. (2) But if you are looking for an element that is simple in nature, it must be unmixed, unblended, and at the extreme in quality. (3) Therefore you have come again to fire and air and water and earth; for only in these will you find the qualities unmixed and unblended, the extreme of heat and dryness in fire, of cold and dryness in earth, and in each of the rest in accordance with their proper natures.<sup>100</sup> Trans. De Lacy

<sup>99</sup> *Hipp.Elem.* 6.32, I.467.4-6 K = 112.8-10 De Lacy: ἀλλ' οὐ ταυτά φησιν ὁ Ἀθηναῖος, ἀλλὰ τὰ τούτων συνθετικά ὄντως εἶναι στοιχεῖα.

<sup>100</sup> (T24) (1) εἰ μὲν γὰρ τὸ κατ' ἐπικράτησιν ὕγρον καὶ ξηρὸν καὶ ψυχρὸν καὶ θερμὸν ὀνομάζεις,

In (T24.1), Galen lists as examples of perceived elements bodily tissues, which belong to homoeomers on his classification. The claim in (T24.2) relies on the same argument as the one Galen used in his debate with the Pneumatist teacher: the real elements, as opposed to the perceptible ones, are unmixed, unblended, and contain the extreme of the elemental quality. But this time the argument can be used to indicate a special, logical status for the elements *qua* simple bodies, which Galen has just outlined through a sequence of two distinctions in the mode of predication. In (T24.3), Galen concludes that such are the four cosmic elements, earth, air, fire, and water.

A philosophically trained Pneumatist might object here that Stoic qualities are bodies, and so already Galen's first distinction (between synonymous and non-synonymous predication of qualities) loses its force. We can speak of elements as being *both* bodies *and* qualities. As we have seen, Galen will not accept this suggestion. Moreover, the Pneumatists could object that apart from the two kinds of heat mentioned by Galen, the adventitious and the elemental, there is a more fundamental kind of heat, that of the divine *pneuma*, which is constitutive of both the elemental fire and other kinds of heat, but not identical with any of them. When this fundamental quality is present in the living body, it produces the proximate elements directly, without going through the stage of inanimate cosmic elements outside the body. Therefore, proximate elements are not reducible to the cosmic elements. It is a sign of this irreducibility that none of the cosmic elements are found in animal bodies in their pure form.

Galen is probably aware of this objection. We could not expect him to present it as a coherent story, but he gives his replies to what can only be the parts of this story. In response to the suggestion that qualities themselves are elements, he points out that this view is even more abstract than the theory of cosmic elements rejected by Pneumatists on the grounds of being too remote from evidence. But his main criticism is that Pneumatists do not understand the difference between an element and a first principle.<sup>101</sup>

In his argument Galen does not address in any detail the generation of proximate elements in the Pneumatist version. Instead, he presents his own account, based on his analysis of the qualitative structure of the elements which elaborates on his analysis of the structure of predication. Galen introduces the concept of a *first principle*, which plays a key role in the generation of the element, but is itself distinct from the element.

(T25) Galen, *Hipp.Elem.* 6.37-40, I.469.12-471.1 K = 114.13-116.5 De Lacy

(1) That extreme heat is simpler than fire and that fire is produced when this heat has entered matter, this has been agreed by all philosophers whom Athenaeus is eager to follow. (2) And indeed that the first principles of the coming to be of fire are the matter which underlies all the elements and is without qualities, and the extreme heat enters into it, this too has been similarly agreed to, and also (3) that the

ἔχεις ἑναργῶς ἤδη τὰ στοιχεῖα γινωσκόμενα νεῦρον καὶ ὑμένα καὶ χόνδρον καὶ σύνδεσμον καὶ σάρκα καὶ τῶν ἄλλων ἕκαστον ὧν εἶπομεν. (2) εἰ δὲ τὸ πρὸς τὴν φύσιν ἀπλοῦν ζητεῖς, ἄμικτόν τε καὶ ἄκρατον εἶναι χρὴ τοῦτο καὶ ἄκρον τῇ ποιότητι. πάλιν οὖν ἦκει ἐπὶ πῦρ καὶ ἀέρα καὶ ὕδωρ καὶ γῆν· (3) ἐν τούτοις γὰρ μόνοις εὐρήσεις ἀμίκτους τε καὶ ἀκράτους τὰς ποιότητας, ἄκραν μὲν ἐν πυρὶ θερμότητά τε καὶ ξηρότητα, ἄκραν δ' ἐν ὕδατι ψυχρότητα καὶ ὑγρότητα καὶ τῶν ἄλλων ἐν ἑκατέρῳ κατὰ τὴν οἰκείαν φύσιν.

<sup>101</sup> *Hipp.Elem.* I.469.8-12 K = 114.10-13 De Lacy.

matter exists through all eternity, being ungenerated and undestroyed, and (4) that what comes and goes in it is the quality, and (5) that the element must be of the same genus<sup>102</sup> with that of which it is an element. (6) For element differs from first principle in this, that first principles are not necessarily of the same genus with the things whose first principles they are, but elements are always of the same genus. (7) A simple quality is an element of a composite quality, and a simple body of a body that is not simple. (8) And if we spoke of hot, cold, dry, and wet in three ways, as quality or as unmixed body or as mixed body, and if it is evident that neither the quality nor the mixed and blended body is an element, then what is left is that the body that is unblended and unmixed and simple in its qualities is the element. (9) So you have again come to fire and air and water and earth, which as primary bodies possess extreme heat, cold, dryness, and wetness.<sup>103</sup>

Trans. De Lacy, lightly modified

Galen argues here, against the Pneumatists, that the elements are bodies and not just qualities. He carefully words his claim in (T25.1) that ‘all philosophers’ followed by the Pneumatists agree that ‘extreme heat’ produces fire when it enters matter, so as not to include any further ontological qualifications of the ‘extreme heat’ that might be added by all the different philosophical schools Galen has in mind. These schools are Platonic, Peripatetic, and Stoic: Galen believes they broadly agree on all the main issues in natural philosophy, and often neglects the differences. In this case, an important difference for the Stoic school would be the corporeality of the ‘extreme heat’, whether it is taken as corresponding to the designing fire or any other kind.<sup>104</sup> Galen avoids any direct claim of incorporeality of the extreme heat, but it is to be understood because his argument in this passage is designed to prevent any confusion between the categories of body and quality.<sup>105</sup>

<sup>102</sup> *Hipp.Elem.* I.470.4 K = 114.20 De Lacy: ‘of the same genus’ translates ὁμογενές rendered by De Lacy in all three occurrences (here and at I.470.7 = 114.22 De Lacy and I.470.8 = 114.23 De Lacy) as ‘homogeneous’. The meaning of the term here should clearly be logical.

<sup>103</sup> (T25) (1) ὅτι τε γὰρ ἀπλούστερόν ἐστι πυρὸς ἢ ἄκρα θερμότης ὅτι τε ταύτης ἐγγενομένης τῇ ὕλῃ πῦρ ἀποτελεῖται, τοῖς φιλοσόφοις ὠμολόγηται πᾶσιν, οἷς ὁ Ἀθήναιος ἔπεσθαι σπουδάζει. (2) καὶ μὲν δὴ καὶ ὡς ἀρχὴ τῆς τοῦ πυρὸς γενέσεως ὕλη τ’ ἐστὶν ἢ ἅπασιν ὑποβεβλημένη τοῖς στοιχείοις ἢ ἄποιος ἢ τ’ ἐγγινομένη ταύτη θερμότης ἢ ἄκρα, (3) καὶ τοῦθ’ ὁμοίως ὠμολόγηται καὶ ὡς ἢ μὲν ὕλη διὰ παντὸς ἔστι τοῦ αἰῶνος ἀγέννητός τε καὶ ἀφθαρτος οὐσα, (4) τὸ δὲ γιγνόμενον τε καὶ ἀπογιγνόμενον αὐτῆς ἢ ποιότης ἐστὶ (5) καὶ ὡς ὁμογενές εἶναι χρὴ τὸ στοιχεῖον, οὐπερ ἂν ἦ στοιχεῖον. (6) ἐν τούτῳ γὰρ δὴ καὶ διήνεγκε στοιχεῖον ἀρχῆς, ἐν τῷ τὰς μὲν ἀρχὰς οὐκ ἐξ ἀνάγκης εἶναι τοῖς πράγμασιν ὁμογενεῖς, ὧν ὑπάρχουσιν ἀρχαί, τὰ δὲ στοιχεῖα πάντως ὁμογενῆ. (7) ποιότης μὲν γὰρ ἀπλῆ ποιότητος συνθέτου στοιχεῖον, ἀπλοῦν δὲ σῶμα σώματος οὐχ ἀπλοῦ. (8) καὶ μὴν εἰ τὸ θερμόν καὶ τὸ ψυχρόν καὶ τὸ ξηρὸν καὶ τὸ ὑγρὸν ἐλέγετο τριχῶς ἢ ὡς ποιότης ἢ ὡς ἄμικτον ἢ ὡς μεμιγμένον σῶμα, φαίνεται δ’ οὐθ’ ἢ ποιότης στοιχεῖον οὔτε τὸ κεκραμένον σῶμα καὶ μεμιγμένον, ὑπολείπεται τὸ ἄκρατόν τε καὶ ἄμικτον σῶμα καὶ ἀπλοῦν ταῖς ποιότησι στοιχείοις εἶναι. (9) πάλιν οὖν ἦκει ἐπὶ πῦρ καὶ ἀέρα καὶ ὕδωρ καὶ γῆν, ἐν οἷς πρώτοις ἄκρα θερμότης καὶ ψυχρότης καὶ ξηρότης καὶ ὑγρότης ἐστὶ.

<sup>104</sup> On the kinds of fire in Chrysippus, see *SVF* 2.413 (136.26-137.6), cf. the discussion in Cooper, ‘Chrysippus’ (n.75, above).

<sup>105</sup> See n.95 above.

Galen describes the qualityless matter which underlies all elements, and the extreme heat which enters it, as the first principles (T25.2). It is important for him to draw a distinction between the first principle and the element. The main thesis on which the distinction rests is that the element must be *of the same genus* as that thing of which it is the element: ὁμογενὲς εἶναι χρὴ τὸ στοιχεῖον, οὐπὲρ ἂν ἦ στοιχεῖον (T25.5). This thesis does need some deciphering, because it introduces a so far unfamiliar notion of *genus* and makes use of a different sense of 'element'. Both these novel steps once again take the reader beyond the more familiar physical theory of elements to the realm of logical analysis. The different meaning of 'element' becomes clear from Galen's illustration of the thesis in (T25.7). When he says that a composite quality has a simple quality as its element and a composite body a simple body, it is clear that he means the element as a unit of analysis in a broad sense and not just one of the four elements.<sup>106</sup> But his goal ultimately is to provide a theoretical justification for the concept of element which is used in the study of nature and in medical theory.

The same text, (T25.7), can give us an idea of what Galen means by his thesis that the element must be of the same genus with that of which it is the element. The Aristotelian parallel for this thesis is found in *Metaph.* XII.4, where Aristotle argues against the view that the principles of all things are the same. Aristotle builds on the semantic pluralism of his *Categories* and maintains that the categories cannot be the elements of each other, and any element they might have in common would have to belong to one of the categories.<sup>107</sup> Now, this *can be taken to imply* that the elements of substances are substances, the elements of relatives, relatives, and so on in each category.<sup>108</sup> But Aristotle does not actually claim this.<sup>109</sup> It is not his goal in this argument to establish any positive thesis of this kind. He is arguing, most likely, against the Platonists, who could be portrayed as treating the things described as *tina* as the elements of those described as *ta pros ti*.<sup>110</sup> The theory of elements he develops outside this polemic takes form, privation, and matter to be the same elements by analogy,<sup>111</sup> and he points out that there is a special, stronger sense of analogical sameness for the elements of the things that belong to the same genus (e.g. colour, sound, etc.). The examples he gives are those of concrete form, privation and matter that constitute the corresponding genera.<sup>112</sup>

It seems to be this latter meaning of *genus* invoked by Aristotle that is closest to the 'genus' referred to by Galen when he speaks of being of the same genus (ὁμογενὲς) in (T25.5). Galen does indeed speak in (T25.7) of quality being the element of quality, which

<sup>106</sup> In *PHP* 8.2.1-2, V.661.7-14 K, Galen explains the general meaning of στοιχεῖον and how it is applied to the four simple bodies.

<sup>107</sup> Aristotle, *Metaph.* XII.4, 1070a33-1070b4.

<sup>108</sup> Aristotle, *Metaph.* XII.4, 1070b4-11.

<sup>109</sup> In fact, he points out, as part of his argument, that the element of a being has to be different from that being, in the way in which B is different from BA (1070b5-8).

<sup>110</sup> This is a development of the analysis of the passage in M. Crubellier, 'Metaphysics L 4', in *Aristotle's Metaphysics Lambda*, ed. D. Charles and M. Frede (Oxford 2000) 137-60 (143).

<sup>111</sup> Aristotle, *Metaph.* XII.4, 1070b16-19.

<sup>112</sup> Aristotle, *Metaph.* XII.4, 1070b19-21.

might suggest that he is thinking of Aristotle's categories, although categories as such are never mentioned in this treatise. Galen's main goal is to prove that the elements of bodies are bodies and not qualities. In the latter case, his attention is drawn not so much to the category of substance as to just one especially important κατηγορούμενον of substance, namely body.<sup>113</sup> It is this generic κατηγορούμενον, a kind subsumed under the category, but not identical with the category under which it is subsumed, that is used by Galen to establish the relation of 'being of the same genus' in (T25.5). The first principle differs from the element in being free from this constraint of belonging to the same generic *katêgoroumenon* as the genus under investigation. The first principles of the body, in our case, the prime matter and the principle of heat, do not have to be bodies.

In the commentary Galen gives a more detailed explanation of the difference between element and principle.

(T26) Galen, *HNH* 1, XV.30.4-31.4 K = 17.28-18.15 Mewaldt

(1) But in addition to it [to the principle of matter, underlying the four elements, qualityless, ungenerated, and imperishable] there are four qualities: the extreme cold, dryness, heat, and moisture. (2) And this was still commingled by the ancients, who have not yet arrived at the concept of difference between the principle and the element, because the word 'element' can be used also about the principles. (3) But these are clearly two things different from one another: (a) one is the minimal part of the whole, and (b) the other is that in respect of which this very minimal part is conceptually differentiated. (4) For fire itself cannot be divided into two bodies and proven to be their blending, just as earth, or water, or air cannot [be so divided]. (5) However it is possible to conceive of (a) the substance of a changing thing as being one thing, and (b) the change it undergoes as another. (6) For the body that is changing is not the same as the change itself. (7) For that which changes is the subject, and its change comes about in the exchange of qualities: when the extreme heat enters it, fire is formed, just as air is formed when the subject receives the extreme moisture, and in the same way earth comes to be when that subject, which belongs to all things, being by its own nature without qualities, receives into itself dryness without heat, and water comes to be when [it receives in this way] coldness.<sup>114</sup>

<sup>113</sup> For both body and the element (air) used as examples of substance in the context of illustrating various types of premisses which involves a full list of Aristoteian *Categories*, see *Inst.Log.* 2.4.3-5 *Kalbfleisch*: ἡ <περὶ τῆς οὐσίας, καθάπερ> αἱ τοιαῖδε «ὁ ἀήρ σῶμά ἐστιν· ὁ ἀήρ οὐκ ἔστι σῶμα».

<sup>114</sup> (T26) (1) ... ἀλλὰ πρὸς αὐτῷ ποιότητες τέσσαρες, ψυχρότης ἄκρα καὶ ξηρότης καὶ θερμότης καὶ ὑγρότης. (2) συνεκέχυτο δ' ἔτι τοῦτο παρὰ τοῖς ἀρχαίοις οὐδ' εἰς ἕνοιαν ἀφιγμένοις τῆς διαφορᾶς ἀρχῆς τε καὶ στοιχείου διὰ τὸ δύνασθαι χρῆσθαι τῆ τοῦ στοιχείου προσηγορίᾳ κάπλι τῶν ἀρχῶν. (3) ἄλλα δὲ δύο πράγματά ἐστι φανερώς ἀλλήλων διαφέροντα, (α) τὸ μὲν ἕτερον ἐλάχιστον μῦριον τοῦ ὅλου, (β) τὸ δὲ ἕτερον εἰς δὲ διαλλάττεται κατ' ἐπίνοιαν αὐτὸ τοῦτο τὸ ἐλάχιστον. (4) αὐτὸ μὲν γὰρ τὸ πῦρ οὐχ οἷόν τε διελεῖν εἰς δύο σῶματα καὶ δεῖξαι κεκραμένον ἐξ ἐκείνων, ὥσπερ οὐδὲ τὴν γῆν ἢ τὸ ὕδωρ ἢ τὸν ἀέρα. (5) νοῆσαι μέντοι δυνατὸν ἑτέραν μὲν εἶναι τοῦ μεταβάλλοντος τὴν οὐσίαν, ἑτέραν δὲ τὴν μεταβολὴν αὐτοῦ. (6) οὐ γὰρ ταῦτόν ἐστι τὸ μεταβάλλον σῶμα τῆ κατ' αὐτὸ μεταβολῆ. (7) τὸ μὲν γὰρ μεταβάλλον ἐστὶ τὸ ὑποκείμενον, ἡ μεταβολὴ δὲ αὐτοῦ κατὰ τὴν τῶν ποιότητων ἀμοιβὴν γίνεται, θερμότητος μὲν ἄκρας ἐγγινομένης αὐτῷ πρὸς ἀποτελουμένου, καθάπερ γε καὶ ἀέρος, ὅταν ἄκραν ὑγρότητα δέξηται, κατὰ ταῦτά δὲ γῆς μὲν γινομένης, ἐπειδὴν

This passage makes it clear that both the primary quality and the qualityless substrate are considered by Galen as principles. The ancients are criticized for failing to see all the principles (this is the case of Melissus, who put his finger on the concept of matter but did not give due attention to the qualitative principles) or for confusing the concepts of principle and element (T26.1). The latter confusion is explained by developmental considerations: Galen says that the ancients have not yet arrived at the distinction, and common usage allows one to use both words interchangeably (T26.2). Galen does not tell us at which point exactly this distinction is made, and does not associate it explicitly with any particular doctrine.

The distinction he draws is between the element as a 'minimal part of a body' (T26.3a) and the principle as the aspect of such a minimal part that accepts differentiation (T26.3b). Both definitions need a brief comment. Galen has explained in the first lines of *Hipp.Elem.* that in speaking of the element as the 'minimal part of a body', he does not mean minimal in size, or in any other way that could be related to sense perception.<sup>115</sup> Rather, he means by this a minimal type of structure that satisfies certain conceptual requirements for being an element. From this discussion, it is clear that the structure must include a qualityless bodily substrate and an elemental ('minimal') qualitative characteristic. Neither the elemental characteristic, nor the qualityless substrate can have a separate existence. They are substructural analytical units which 'form' the element not in the sense of being its actual building blocks, but in the sense of defining its properties and behaviour. This is Galen's explanation of the concept of 'principle'. I believe we should understand the phrase εἰς δὲ διαλλάττεται κατ'ἐπίνοιαν in (T26.3b) as referring to the different aspects of the element identifiable as such by conceptual analysis.<sup>116</sup> This analysis is further supported in (T26.4) and (5). In (T26.5), a distinction is drawn between the substrate of change and change itself. Significantly, the substrate is called 'substance', οὐσία in (T26.5b) and τὸ ὑποκείμενον in (T26.7). This analysis does strongly resemble the

ἐκεῖνο τὸ ὑποκείμενον ἅπασι κατὰ τὴν ἑαυτοῦ φύσιν ἄποιον ὑπάρχον εἰς ἑαυτὸ δέξεται ξηρότητα χωρὶς θερμότητος, ὕδατος δ' ὅταν ψυχρότητα.

<sup>115</sup> *Hipp.Elem.* I.413 K = 56.3-7 De Lacy. We can compare with this the concept of minimal unit of division that is minimal not in magnitude, but in kind, introduced by Galen in *PHP* V.661.15-662.5 K = 8.2.3.1-4.3 De Lacy: ὡσπερ οὖν τῆς φωνῆς ἡμῶν, ἢ χρώμεθα διαλεγόμενοι πρὸς ἀλλήλους, τέτταρα καὶ εἴκοσι ἔστι στοιχεῖα, κατὰ τὸν αὐτὸν τρόπον ἀπάντων τῶν γεννητῶν καὶ φαρτῶν σωμάτων ἐλάχιστα μόρια γῆ καὶ ἀήρ ἔστιν ὕδωρ τε καὶ πῦρ, ἐλάχιστου δὲ λεγομένου τοῦ μηκέτι τομῆν ἐγχωροῦντος. ἡ μὲν γὰρ κατὰ τὸ μέγεθος τομῆ τοιοῦτον οὐδὲν ἐλάχιστον ἔχει, μόνη δὲ ἡ κατ' εἶδος ἴσταται ποτε καθάπερ ἐπὶ τῆς φωνῆς.

<sup>116</sup> My interpretation differs from that in Hankinson, 'Philosophy of nature' (n.1, above) 214, who has the phrase as 'that into which this least is conceptually changeable'. On Hankinson's translation, Galen says that the elements are conceptually changeable into principles, which could be tolerable in a less technical context, but not in the one which is intended as drawing a distinction. Moreover, if we assume that Galen wants to say that the elements are changed 'into' the hot, cold, dry, and moist, taking these to be principles, it will still be difficult to see the role of substrate, which is also the principle, according to this very argument. The text at XV.30.8 K = 18.4 Mewaldt is admittedly difficult, as witness the corrections and glosses in the manuscripts: in R, the second hand corrects διαλλάττεται into διέλη τις, and in L there is a marginal variant or gloss: εἰς δὲ διέλη τις κατ' ἐπίνοιαν.



Aristotelian analysis of change in *Physics* I.7-9, where the principles of change are subject (ὑποκείμενον), form, and privation. In our passage and in Galen's discussion in *Hipp. Elem.* we do not find similar references to form and privation, but this may be due to the fact that he only discusses one kind of change, namely alteration, where the 'form' in question has to be quality. Therefore the references to 'quality' should be understood as indirect references to the 'form' of Aristotle's general analysis. So, when Galen describes the extreme heat as the principle, he is referring to one of the principles of change, in accordance with Aristotle's theory, namely the principle of form which, in the particular class of changes called 'alterations', is represented by the category of quality.

Taking stock of Galen's argument against the Pneumatists, we can see him taking three main steps to establish his position:

- (1) a distinction between synonymous and non-synonymous predication, which parallels Aristotle's semantic distinction between synonymous predication and inherence in the *Categories* (T21);
- (2) a further distinction between simple predication and predication 'by prevalence' (T23)-(T24);
- (3) a distinction between the first principle and the element (T25)-(T26).

All these distinctions are needed in order to counter the Pneumatist reduction of bodily elements to corporeal qualities. On this analysis, the element of a body is a simple body, generated from the first principles, the quality or form of heat and the qualityless matter. The resulting element is a body, and its elemental quality is incorporeal. If Galen were to apply the Aristotelian categories in classifying the elements, he would treat them as substances.

The interest of this Galenic argument for the history of the Peripatetic theory of physical substance goes beyond its polemical value in establishing the quasi-Aristotelian elemental system against the Pneumatist quasi-Stoic one. The most important illuminating factor lies in Galen's use of Aristotle's logic and metaphysics in order to build an ontological background for the theory of elements in accordance with this logic and metaphysics. We have seen that this is a very conscious move on his part, a part of his programme in medical philosophy as the servant of nature (3.2 above).

There are two points in particular on which Galen's discussion sheds light as a source for Peripatetic thought of his age. The first has to do with the fact that he derives the four elements and establishes their status as bodies on the basis of the analysis of the structure of predication. In this respect, Galen's derivation differs considerably from both known derivations of the simple bodies found in the Aristotelian corpus, *GC* II.1-4 and *Cael.* III-IV. In both these discussions, Aristotle uses physical or cosmological considerations, such as the qualitative constitution of perceptible bodies or natural motions and natural places within the cosmos. Nowhere in the extant corpus does Aristotle attempt to define the simple bodies, earth, air, fire, and water, in terms of more universal analytical units in his first philosophy or in biology. In fact, there are indications that he may have serious reservations against such attempts. Thus he concedes that the use of the word 'element' to describe such simple bodies is popular rather than philosophically precise, when he speaks, many times, indeed,

about the 'so-called elements'.<sup>117</sup> He seems to be more prepared to speak of the elemental qualities (hot, cold, dry, and moist) as 'elements', *stoikheia*.<sup>118</sup> Aristotle is also reluctant to describe the elements as substances.<sup>119</sup> For Galen, on the contrary, it is quite essential to show that elements are qualified bodies: not simply bodies, and not simply qualities, but the most basic qualified alterable bodily structures and as such also substances. He cannot afford vagueness in this respect, partly because he has to counter the atomist/corpuscularist and the Stoic/Pneumatist options, but partly, it seems, because this position is required by the scope and focus of his study of a living organism. The paradigm shift in the ancient life sciences, from being focussed on the study of functions across the species to a more detailed scrutiny of material structure and mechanisms of the processes within a living organism as a whole, has been brought to scholarly attention in connection with the work of Galen and Alexander of Aphrodisias.<sup>120</sup> In this new paradigm, the explanation of organic functions can have a stronger dependence on the understanding of the underlying elemental transformations and mixtures. Therefore the ontological status of the main constituents of such low-level processes is given more weight, as we can see from Galen's polemical account. Galen's new derivation of the Aristotelian elements, as qualified bodies and substances, using an Aristotelian study of predication, provides a novel and noteworthy example of interpreting *Aristotelem ex Aristotele*.

The second point where Galen's theory of elements is of interest as a source for the study of the Aristotelian tradition has to do with the status of form in Aristotle's hylomorphic theory. Galen's approach to the analysis of the simple body seems close to the hylomorphic analysis. This also agrees well with his view of the ontological status of elements as bodies and substances. Alexander of Aphrodisias, Galen's younger contemporary, famously defended his own version of the hylomorphic theory of elements, according to which not just the elements themselves and their underlying substrate, but also the elemental qualities, were characterized as substances.<sup>121</sup>

We have seen that in Galen's account, quality invariably plays the role of form as one of the two principles of change, the other one being matter. In this role quality is also contrasted with matter, whose representative is described as body and sometimes also called substance and subject. What Galen does not do in our text is call the simple quality

<sup>117</sup> *Phys.* I.4, 187a26; 3.5, 204b33; *Metaph.* XI.10, 1066b36; *GC* II.1, 328b31; 329a26; *Mete.* I.3, 339b5; *PA* II.1, 646a13; *GA* II.3, 736b31.

<sup>118</sup> *GC* II.2, 329b13; II.3, 330a30, cf. (T5.1) above.

<sup>119</sup> See *Metaph.* VII.16, 1040b5-10.

<sup>120</sup> See P. L. Donini, 'L'anima e gli elementi nel *De anima* di Alessandro di Afrodisia' *Atti dell'Accademia delle Scienze di Torino*, 105 (1971) 61-107. On the 'disappearance' of Aristotelian model of biological inquiry in later antiquity, see J. Lennox, 'The disappearance of Aristotle's biology: A Hellenistic mystery', in J. Lennox, *Aristotle's philosophy of biology* (Cambridge 2001) 110-25.

<sup>121</sup> Alexander of Aphrodisias, *de An.* 5.4-9; cf. 6.2-3: οὐσία μέντοι ἑκάτερον αὐτῶν. ὡς γὰρ ἡ ὕλη, οὕτως δὲ καὶ τὸ φυσικὸν εἶδος οὐσία. See Caston, 'Epiphenomenalisms' (n.57, above), I. Kupreeva, 'Qualities and bodies: Alexander against the Stoics', *Oxford Studies in Ancient Philosophy* 25 (2003) 296-344, M. Rashed, *Essentialisme: Alexandre d'Aphrodise entre logique, physique et cosmologie* (Paris 2007).

constitutive of the simple body a form of the element. This may reflect a view according to which form is substance in a different sense from that in which both matter and composite are substances. This view has been attested for Boethus:

(T27) Boethus apud Simplicius in *Cat.* 78.10-20 Kalbfleisch

(1) Boethus says to this that the account of the primary substance suits, of all [meanings], both matter and composite substance. (2) For it belongs to each of them both not to be said of anything and not to be in any subject. (3) For neither of them is inherent in something else. (4) However, the composite, even though it is not inherent in something else, has in it the form which is which is inherent in something else, namely matter, (5) whereas matter has nothing in it that is inherent in something else. (6) So both have something in common and something that is different, since matter is the matter of something, *qua* matter and subject, but composite substance is not of something. (7) But in this way, says Boethus, matter and composite are subsumed under the category of substance, but form will remain outside the category of substance, but will fall under some other category: quality, quantity, or some other.<sup>122</sup>

This position has been termed ‘nominalism’ in a recent study by Marwan Rashed.<sup>123</sup> Galen’s account of the structure of the simple body agrees with this approach. Galen insists that qualities and bodies belong to different predication-based groupings, and in (T26.5) speaks of body as the substance of that which is changing. At the same time, he emphasizes the causal role of elemental qualities, making them into the principles of elemental change and elemental constitution. This, along with the distinction between simple predication and predication ‘by prevalence’, allows him to avoid confusing the elemental quality, which is constitutive of a simple body, with the quality which inheres in a composite substance and is dependent on it. Even though form/quality is not accorded the status of substance in the predication-based ontology, the elemental qualities retain their causal role as the principle of change and constitutive principles of the elements. It is not clear to what extent Galen draws on the existing sources in formulating this view. He is certainly familiar with current Peripatetic literature and debates. But even if this is Galen’s own reconstruction of the Aristotelian position, it offers us a good perspective on how the non-substantial account of form in the early Peripatetic commentaries on the *Categories* could be made to agree with the role of form in the theory of change and in hylomorphic theory. Moreover, Galen seems to see no contradiction between this approach and Aristotle’s definition of soul as form *and* substance. His view is apparently that the concept of substance is applied homonymously in

<sup>122</sup> (T27) (1) ἀπαντῶν δὲ πρὸς ταῦτα ὁ Βόηθος τὸν τῆς πρώτης οὐσίας λόγον καὶ τῆ ὕλη καὶ τῷ συνθέτῳ ἐφαρμόττειν φησίν. (2) ἐκατέρῳ γὰρ αὐτῶν ὑπάρχει τὸ μήτε καθ’ ὑποκειμένου τινὸς λέγεσθαι μήτε ἐν ὑποκειμένῳ τι εἶναι. (3) οὐδέτερον γὰρ αὐτῶν ἐν ἄλλῳ ἐστίν. (4) ἀλλὰ τὸ μὲν σύνθετον, κἂν μὴ ἐν ἄλλῳ ἐστίν, ἔχει τὸ εἶδος τὸ ἐν ἑαυτῷ ἐν ἄλλῳ ὄντι τῆ ὕλη, (5) ἡ δὲ ἡ ὕλη οὐδὲ ἔχει τι ἐν ἄλλῳ ἐστίν. (6) καὶ κοινὸν οὖν τι ἔχουσι καὶ διάφορον, καθόσον ἡ μὲν ὕλη τινὸς ἐστίν ὕλη, καθὸ ὕλη, ὥσπερ καὶ ὑποκείμενον, ἡ δὲ σύνθετος οὐσία οὐκ ἔστιν τινός. (7) ἀλλ’ οὕτως μὲν, φησὶν ὁ Βόηθος, ἡ ὕλη καὶ τὸ σύνθετον ὑπαχθῆσονται τῆ τῆς οὐσίας κατηγορία, τὸ δὲ εἶδος τῆς μὲν οὐσίας ἐκτὸς ἔσται, ὑπ’ ἄλλην δὲ πεσεῖται κατηγορίαν, ἥτοι τὴν ποιότητα ἢ ποσότητα ἢ ἄλλην τινά.

<sup>123</sup> Which should be consulted for further details: Rashed, *Essentialisme* (n.121, above).

the cases of matter, composite, and form.<sup>124</sup> And indeed Boethus in (T27.4-6) can provide support for such a view, even though he does not extend the principle of homonymy to form in that particular discussion.

*Appendix: Do the elements exist in a pure state?*

In the course of his argument against the Pneumatists, Galen seems to make use of the claim that the cosmic elements are always found in a mixed state and do not exist in a pure state. This is supposed to counter the claim of the Pneumatists according to which the elements of a living body are not the cosmic elements, because these latter are impossible to find within a living body.

The view according to which the elements do not exist in a pure form seems to be a popular subject of philosophical discussions in the second century. Proclus attributes it to Numenius:

(T28) Numenius, fr. 51 des Places = Proclus, *in Tim.* II, 9.4-5 Diehl  
 Numenius who believes that everything is mixed holds that nothing is simple.<sup>125</sup>

This view is criticized by Alexander of Aphrodisias in *Mant.* 7 in a form which suggests Platonic tradition as its source, since the text goes back to the text of *Ti.* 31b. Here, Plato, before introducing the four elements, says that nothing can be bodily without being both tangible and visible. Since visibility belongs to fire and tangibility to earth, this text is interpreted as saying that every body has to contain all elements.<sup>126</sup>

Galen's position seems difficult to pin down. This is how he argues against the Pneumatists:

(T29) Galen, *Hipp.Elem.* I.453.15-454.11 K = 98.6-15 De Lacy.  
 ... (1) So if you are looking for earth in animals, you can see (in them) the kind of earth that you see also in the cosmos; but earth that is unmixed, complete, and by itself you would not easily find even in the cosmos; similarly you would not find water that is pure and not mixed with all the rest, and the same is true of fire and air; all have been adulterated by other kinds of things and mixed with them, and they all received a larger or smaller share of each other. (2) But even in a mixture the form of the prevailing element will appear clearly to someone who has intellect. (3) Do not then look for anything unmixed in the bodies of animals either, but be content, when you see this part cold and dry and solid, to call earth to mind, and when you see that part rarefied and wet and fluid, to think of water.<sup>127</sup>

<sup>124</sup> It seems that a similar approach to the concept of principle is taken in Galen's interpretation of Aristotle's account of the soul as form and substance, see e.g. *QAM* IV.783.3-9 K.

<sup>125</sup> (T28) Νουμήγιος μὲν οὖν πάντα μεμίχθαι οἰόμενος οὐδὲν οἶεται εἶναι ἀπλοῦν.

<sup>126</sup> Alexander, *Mant.* 7, see discussion and some references in Alexander of Aphrodisias, *Supplement to On the soul*, trans. R. W. Sharples (London 2004) 80-85.

<sup>127</sup> (T29) (1) ὅστ', εἰ ζητεῖς ἐν τοῖς ζώοις γῆν, ἔχεις θεάσασθαι τοιαύτην, οἶαν κὰν τῷ | κόσμῳ, τὴν δ' ἀμικτόν τε καὶ παντελεῆ καὶ μόνην οὐκ ἂν οὐδ' ἐν ἐκείνῳ ῥαδίως ἐξεύροις, ὥσπερ οὐδ' ὕδωρ καθαρὸν καὶ ἀμιγῆς ἀπάντων τῶν ἄλλων οὐδὲ πῦρ οὐδ' ἀέρα· νενόθηται γὰρ ἅπαντα τοῖς

Numenius's interpretation of Plato's argument requires every perceptible body to consist of the mixture of all elements (fire and earth in order to be visible and tangible, air and water in order to retain the balance of the mixture). By contrast, Galen's argument does not seem to *require* all bodies to be mixtures, at least not on those grounds. Yet Galen claims in (T29.1) that there are no unmixed elements anywhere in the cosmos, meaning that as a matter of fact it is impossible to discover pure elements in the cosmos. Then he goes on to argue in (T29.2) that there are the elements nonetheless 'for anyone who has intellect'. The reference to 'intellect' seems to be crucial here, as Galen suggests that we should not expect to encounter the elements *qua* pure states, but that it is still possible, on the basis of perceiving particular properties, to infer a combination of elemental bodies sufficiently strong to produce such perceptible properties. His argument in (T29.2) and (3) seems to be directed against the Pneumatist appeal to sense perception in establishing evidence for the animate or inanimate elements.

έτερογενέσι καὶ ἀναμέμικται καὶ μετείληφεν ἢ μάλλον ἀλλήλων ἢ ἦττον. (2) ἀλλὰ τοι κὰν τῆ μίξει τοῖς γε νοῦν ἔχουσιν ἢ τοῦ κρατοῦντος ἰδέα φαίνεται. (3) μὴ τοίνυν μηδ' ἐν τοῖς τῶν ζώων σώμασιν ἄμικτόν τι ζήτει, ἀλλ' ἀρκείτω σοι τουτὶ μὲν ψυχρὸν καὶ ξηρὸν καὶ πυκνὸν ἰδόντι τὸ μόριον ἀναμνησθῆναι γῆς, τουτὶ δ' ἀραιὸν καὶ ὑγρὸν καὶ ῥυτὸν εἰς ἔννοιαν ὕδατος ἀφικέσθαι.