

X. The Flux of the Body in Plato's *Timaeus*

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In his examination of the nature of sense-perception in the *Theaetetus*,¹ Plato introduces a principle which, as he says, had been held by many earlier thinkers whom he ironically describes as *kompsoteroi*, that "the All is motion and nothing else besides this." His elaboration of this principle as regards sense-perception leads to the conclusion that all sensible things are in motion, either slow or swift,² and that nothing, therefore, exists in itself but that all things arise, in their intercourse with each other, from their motions.³ The result of the entire analysis of the principle, finally, is to establish the conclusion that we must believe οὐδὲν εἶναι ἐν αὐτὸ καθ' αὐτό, ἀλλὰ τινα αἰεὶ γίγνεσθαι, τὸ δ' εἶναι πανταχόθεν ἐξαίρετον (157A8-B1). Hence, all sensible things must be conceived and described only in terms of "becoming," "being made," "perishing," and "changing," not as "standing still." The principle here elaborated, along with the corollary theory of sense-perception, it is now generally agreed by scholars,⁴ while doubtless deriving ultimately from the Heraclitean idea of flux, represents Plato's own construction and doctrine. That it is basic and integral to his whole philosophy and to his view of the physical world seems assured particularly by the fact that it is intrinsic to much of the thought of the *Timaeus* and also explicitly stated in that dialogue in the summary contrast of Being and Becoming.⁵ However, while the flux of the phenomenal world seems

¹ 156A-157C.² 156C-D2: the slow motion being, as the following discussion reveals, qualitative alteration (*alloiōsis*), the swift motion being change in place (*phora*). This distinction is defined more precisely in 181C-E, in the course of Plato's proof, using the present principle, that sense-perception does not constitute knowledge, and the further point is made that all things are always in both kinds of motion. On the nature of *phora* and *alloiōsis*, cf. also *Parm.* 138B-C and 156B.³ 156E8-157A3; and cf. the earlier expression of the idea in 152D-E.⁴ Cf. F. M. Cornford, *Plato's Theory of Knowledge* (London 1935) 48-51; Harold Cherniss, *Aristotle's Criticism of Plato and the Academy* (Baltimore 1944) 216-20; Sir David Ross, *Plato's Theory of Ideas* (Oxford 1955) 156-57, and cf. the review of G. Nakhnikian, "Plato's Theory of Sensation," *Review of Metaphysics* 9 (1955) 129-48 and 306-27.⁵ *Tim.* 51E6-52A7. Cf. also 27D6-28A6, and the discussion of F. M. Cornford, *Plato's Cosmology* (London 1937) 23-27.

established for his ontology and epistemology, the question naturally arises as to whether Plato also attempted to utilize this principle in the *Timaeus* in his description of the human organism and, if so, in what manner. Though Plato does not directly formulate in that dialogue a *logos* concerning the flux of the body, there are considerable indications that this is, in fact, his basic assumption concerning the nature of the body, and that it is consciously employed in the explanation of many physiological phenomena.

It is in the myth of the incarnation of souls in newly-created bodies (42E5–44D3) that Plato first foreshadows in the *Timaeus* certain aspects of his conception of man's physical organism. While his major purpose in introducing this myth may be to convey the effects upon the soul of the motions to which the infant body is subject, the nature of the body itself is vividly revealed in poetic language and metaphorical conceptions. The flux of the body is, indeed, briefly remarked in the preceding address of the Demiurge to the young gods. As he there proclaims, when souls *σώμασιν ἐμφυτευθεῖεν ἐξ ἀνάγκης, καὶ τὸ μὲν προσίοι, τὸ δ' ἀπίοι τοῦ σώματος αὐτῶν*, sensation, desire, and emotions would necessarily become innate in the body.⁶ After the address of the Demiurge, the young gods, obeying his instructions, borrow portions of fire, earth, water and air from the cosmos *ὡς ἀποδοθησόμενα πάλιν*, construct the human body in such fashion that it is a unity of all the four elements, and then bind the revolutions of the immortal soul into the *ἐπίρρυτον σῶμα καὶ ἀπόρρυτον*. The revolutions of the soul, having been bound into a *ποταμὸν . . . πολλὴν οὐτ' ἐκράτουν οὐτ' ἐκρατοῦντο, βία δ' ἐφέροντο καὶ ἔφερον ὥστε τὸ . . . ὅλον κινεῖσθαι ζῶον*, in a disorderly and irrational manner, since it had all the six motions.⁷ The source of the motions which compose the "river" of the body is twofold. The first is the motion of the stream which furnishes the nourishment of the body, poetically described as *πολλοῦ . . . ὄντος τοῦ κατακλύζοντος καὶ ἀπορρέοντος κύματος* (43B5–6). The other stream is the "tumult" of sensation, the result of the motions caused in the body when the creature happened to strike against "foreign fire outside it, or a solid lump of earth and moist glidings of water, or was caught up by a storm of winds borne by air." The motions caused by these things, *πλείστην καὶ μεγίστην παρεχόμεναι κίνησιν, μετὰ τοῦ ῥέοντος ἐνδελεχῶς ὀχετοῦ κινούσαι καὶ σφοδρῶς σειοῦσαι* the revolutions of the

⁶ 42A3–7. At the end of the address of the Demiurge, the motion of the body is further implied in a metaphor describing the body as the great "turmoil" (*ochlos*) later engendered from fire and water and air and earth, irrational and turbulent (42c5–d1).

⁷ 42E7–43B5: so the creature moved forward and backward, right and left, up and down, wandering in all the six directions, Plato adds, anticipating the discussion of Necessity and the Errant Cause, in 48A ff.

soul, check the revolutions of the Same, flowing opposite to it, and shake the revolutions of the Different, so that the creature is at first irrational.⁸ With the passage of time, the revolutions of the soul gradually become calmer and more stable, when τὸ τῆς αὐξῆς καὶ τροφῆς ἑλαττον ἐπὶ ῥέεσμα, so that the creature becomes rational.⁹ Such, in résumé, is Plato's poetic expression and imaginative vision of the soul and the newly-created organism, and their effects upon each other. The whole emphasis of the description is strongly upon *kinêsis*, both of the soul and of the body. The dominant image penetrating the entire conception is that of the body as a stream, a complex of motions, ever flowing and changing. The metaphor of the river,¹⁰ articulated with conscious artistry and sustained symbolism, embodies Plato's apprehension of the essential nature of the human body. It is true, nevertheless, that one vital and novel aspect of the motions of the organism is disregarded in this "mythical" description. This aspect will play a significant role when Plato turns to a more "scientific" approach to the understanding of the body's nature.

In later portions of the dialogue the motion involved in many physical phenomena receives very careful attention from Plato. But it is particularly in the physiological section that the motions inextricably bound up with the very nature of the body are indicated with greater clarity, in the course of his explanation of the mechanism of nutrition. After he has discussed the formation of the stream of nutriment which flows through the veins, Plato continues:¹¹ "this (i.e., the stream of nutriment) we call blood, on which the flesh and the whole body feed, so that every member draws water¹² therefrom to replenish the base of the depleted part (*tou kenoumenou*). The manner of this replenishment (*plerôsis*) and wasting

⁸ 43B6-D4. Cf. also 44A5-7: the revolutions of the soul may be completely mastered, when sensations from outside are carried along and strike the soul, and draw along with it the whole vessel of the soul.

⁹ 44B1 ff. The imagery of the "stream" recurs prominently in later contexts. It underlies the entire description (77C6-79A4) of the formation in the body of channels, like the channels of a garden ὡς περ ἐκ νάματος ἐπίοντος ἄρδουτο (77C8-9); cf. also 80D6-7 and 81B4-5. It is transferred to other phenomena, as in the "stream of vision" in 45C3. In 75E5 ff., the mouth is described as an *eisodos* for the stream of nourishment and an *exodos* for the λόγων νάμα ἔξω ρέον ... κάλλιστον καὶ ἄριστον πάντων ναμάτων. In 84C3-7, the most serious of diseases occurs when the marrow becomes diseased, πάσης ἀνάπαλιν τῆς τοῦ σώματος φύσεως ἐξ ἀνάγκης ῥυείσης.

¹⁰ It would, of course, be easy to believe that the imagery developed here by Plato was suggested to him by his knowledge of Heraclitus, especially in view of *Theaet.* 160D6-8 and *Crat.* 402A8-10.

¹¹ 80E6-81B5. Cornford's translation in *Plato's Cosmology* has been used for this and a second quotation from the *Timaeus*.

¹² The word ὀδρενόμενα is used here (81A1) with reference to the simile of channels in a garden, which underlies the whole description of the mechanism of respiration and circulation.

(*anachôrêsis*) is like that movement of all things in the universe which carries each thing toward its own kind. For the elements besetting us outside are always dissolving and distributing our substance, sending each kind of body on its way to join its fellows; while on the other hand the substances in the blood,¹³ when they are broken up small within us and find themselves comprehended by the individual living creature, framed like a heaven (*ouranos*) to include them, are constrained to reproduce the movement of the universe. Thus each substance within us that is reduced to fragments replenishes at once the part that has just been depleted (*to kenôthen*) by moving towards its own kind. Now, whenever there is more going out than flowing in, all things diminish; when there is less, they grow." In this compressed and very significant passage, the body is portrayed as subject to two constant processes, complementary to and continuous with each other, which are basic to the physical nature of the organism. It should be stressed that the motions concerned are motions of the primary bodies of the elements which compose the body.

The first of these processes is the constant *kenôsis* and *anachôrêsis* occurring in the body — the result of the fact that τὰ . . . περιεστῶτα ἐκτὸς ἡμᾶς τήκει τε αἰὲ καὶ διανέμει πρὸς ἕκαστον εἶδος τὸ ὁμόφυλον ἀποπέμποντα (81A4–6). Here a question arises as to what is meant by "the things which surround us outside." Earlier in the dialogue, in explaining the purpose for the creation of plants after the body of the mortal creature has been formed, it is said that¹⁴ τὴν . . . ζωὴν ἐν πυρὶ καὶ πνεύματι ξυνέβαινεν ἐξ ἀνάγκης ἔχειν αὐτῷ, καὶ διὰ ταῦτα ὑπὸ τούτων τηκόμενον κενούμενόν τ' ἔφθινεν. In another passage Plato explains that the Demiurge had used up all of the four elements in constructing the cosmos, since he perceived that συστάτῳ σώματι θερμὰ καὶ ψυχρὰ καὶ πάνθ' ὅσα δυνάμεις ἰσχυρὰς ἔχει περιεστώμενα ἔξωθεν καὶ προσπίπτοντα ἀκαίρως λύει . . .¹⁵ In other places, heat and cold and various other climatic factors are mentioned or implied as surrounding the body and acting upon it.¹⁶ Plato thus describes the agents which act upon the body from

¹³ A. E. Taylor, *A Commentary on Plato's Timaeus* (Oxford 1928) 584, rightly stresses that τὰ . . . ἔναιμα means the particles of fire, air, water, and earth, into which the ingested foods have been divided by the internal fire.

¹⁴ 77A1–3. On this passage, cf. the comments of J. B. Skemp, "Plants in Plato's *Timaeus*," *CQ* 41 (1947) 53–54.

¹⁵ 33A3–5, in the description of the formation of the cosmos.

¹⁶ Cf. 74C4–5: τὸν προσφερόμενον ἔξωθεν καὶ περιεστώμενον πάγον; 85D5: τοῦ περιεστώτος . . . ψυχούς; 88D2–3: (σώματος) ὑπὸ τῶν ἔξωθεν ξηραινομένου καὶ ὑγραινομένου, and for other examples, cf. 62A6–7, 67D7, 74B7–8, 75E6–7, and 76B7.

outside in variable and sometimes rather general terms. But, although he at times thinks and speaks vaguely in terms of the natural forces of the environment as they affect man,¹⁷ it seems certain that the phrase *ta periestôla eklos* means really the primary bodies of the elements, their triangles, masses, and varieties.¹⁸ His understanding of the cause of *kenôsis*, that is to say, is on the level of physics.

This is the more certain in view of Plato's conception of the perpetual motion of the elements of the cosmos and the continual cycle of transformation which he envisages them undergoing. For it is this conception which underlies the explanations of the processes to which the body is subject in the passage quoted above (105-6). There, Plato describes the motions involved in the *kenôsis* and *plêrôsis* of the body only in terms of the movement (*phora*) of all things in the cosmos "toward their own kind," without further explication. The description is perhaps deceptively over-simple and obscure, since it relies heavily upon the analogy of the microcosm to macrocosm which pervades the conception of the body in the *Timaeus*. Further, it assumes the theory of motion within the cosmos, as Plato has developed it earlier in the dialogue.

In this explanation of motion, the essential factors of causation are the circular revolution of the cosmos, which encompasses unequal and heterogeneous particles in a universe without void, and the preservation of heterogeneity. After insisting emphatically that heterogeneity is a necessary condition for motion,¹⁹ Plato continues with an explanation²⁰ of the unceasing movement (*phora*) of the elements and of their "motion through each other,"²¹ in the cycle of transformation: "The circuit of the Whole, when once it has comprehended the (four) kinds, being round and

¹⁷ All of which would ultimately be explicable in terms of the elements. Cf. e.g. 59D-E, where hail, ice, snow, and frost are explained as forms of water, separated off from fire and air.

¹⁸ On the masses and varieties of the primary bodies, cf. 57B7-c2, 57c7-d3, and 58c5 ff.

¹⁹ Cf. 57D7-58A2. Plato is discussing here how motion and rest come about. Homogeneity makes motion impossible, τὸ γὰρ κινήσμενον ἄνευ τοῦ κινήσοντος ἢ τὸ κινήσον ἄνευ τοῦ κινήσμενου χαλεπὸν, μᾶλλον δὲ ἄδύνατον, εἶναι κίνησις δὲ οὐκ ἔστιν τούτων ἀπόντων. Thus, he adds, we place rest in homogeneity, and motion in heterogeneity. The cause of the heterogeneity is the inequality of the particles, and the origin of inequality has already been explained.

²⁰ 58A2-c4. With this whole account should be compared the "mythical" explanation of motion in the Nurse of Becoming, 52E1-53A7, where the constant motion, change of region, and heterogeneity of the "characters" in the Receptacle are stressed, though in different terms because of the metaphor.

²¹ The cycle of transformation of the elements is described in detail in 56D1-57C6, which explains the physical processes by means of which the elements are transmuted into each other.

naturally tending to come together upon itself, constricts them all and allows (or tends to allow) no room to be left empty. Hence fire has, more than all the rest, penetrated in among all the others; and in a second degree, air, as being second in the fineness of its particles; and so on with the rest. For the kinds that are composed of the largest particles leave the largest gaps in their texture, while the smallest bodies leave the least. So the coming together involved in the condensing process thrusts the small bodies together into the interstices between the large ones. Accordingly, when the small are set alongside the large, and the lesser disintegrate the larger, while the large cause the lesser to combine, all are changing the directions of their movement, this way and that towards their own regions; for each, in changing its size, changes also the situation of its region.²² In this way, then, and by these means there is a perpetual safeguard for the occurrence of that heterogeneity which provides that the perpetual motions of these bodies is and shall be without cessation."²³ Plato's theory of motion, thus, accounts for the perpetual motion of the elements within the cosmos and their change of region, and, consequently, for their impact upon the body, the cause of the *kenôsis* of the body. It likewise accounts, by analogy, for the movement of the elements of the body in *anachôrêsis* and *plêrôsis*, and their distribution "to their own kind." All these motions are conceived on a physical level and in mechanical terms, and are embraced within Plato's general theory of motion throughout the cosmos. Man's body, in its constant motions and processes, is viewed essentially as one facet of the cosmic process.

A full and specific analysis of the physical processes involved in *kenôsis* and *apochôrêsis* is lacking, but principles implied or worked out in connection with other topics offer considerable illumination. Since

²² Cf. also 57B4-c6, for an explanation of the physical processes causing the elements, in the cycle of transformation, to change their regions upwards or downwards "toward their kindred" (*pros to syngenes*), since the great mass of each element has its own proper situation in the cosmos. Together the two passages furnish an explanation, in terms of combination (*synkrisis*) and separation (*diakrisis*) and consequent change of shape and size, along with the "thrust" of the *seismos*, of the movement of elements "toward their own kind." Plato's theory of motion affords, in fact, a physical causation of the ancient doctrine of the attraction of "like to like." Cf. Harold Cherniss (above, note 4) 449, note 393.

²³ Cf. the discussion of this passage and its place in Plato's whole theory of motion by Harold Cherniss (above, note 4) 448-50, who points out that the world-soul is the ultimate source of all motions in the cosmos, since it causes the circular revolution of the cosmos; in turn, the revolution of the cosmos, confining the unequal and heterogeneous particles in a universe without void and moving them with its circular motions, must cause the complex of secondary, transmitted motions (i.e. Plato's auxiliary causes) which preserve heterogeneity, as the condition for the ceaseless motion of the elements. By analogy, these principles must apply to the body also.

the body with its tissues and structures is composed of the four elements in various proportions,²⁴ it is by its very nature liable to the disintegrative action of the motions of the elements, when it suffers contact with them. In the most general reference to the effects of this action, the body is described as being heated or chilled within by the elements which enter it, while it is dried out or moistened by those outside it, and suffers the consequent affections arising from both these *motions*.²⁵ But Plato's understanding of the *kenôsis* of the body by the elements is really on the physical plane and goes far deeper than this general description indicates. In fact, preparatory to his discussion of the function of respiration, a general principle is stated²⁶ which helps to clarify the actions of the elements upon the body: all structures composed of smaller particles are impervious to larger particles, while structures composed of larger particles are not impervious to smaller particles; fire, having the smallest particles of all the elements, is for this reason able to pass through water, earth, and air, and all things composed of these elements, and there is nothing impenetrable to it. This principle is basic to the process of *kenôsis*, and consonant with the earlier discussion of the active properties of the four elements, where, in respect to their mobility, smallness of particle, and sharpness of triangle, the first place is assigned to the particle of fire, the second to air, and the third to water.²⁷ These qualities of the primary bodies are of much importance in conceiving various processes and phenomena of the organism as explained by Plato. And, in particular, it is in terms of these properties of the primary bodies, and their impact upon the body, that the process of *kenôsis* must be understood.

Some further elucidation of the manner in which two of the elements act upon the body of man occurs incidentally in the explanation of the sensations to which they give rise. As to the question²⁸ why fire is called "hot," Plato suggests that the problem may be investigated by observing

²⁴ Cf. the detailed account in 73B1-76E6, and the discussion of Friedrich Solmsen, "Tissues of the Soul," *Philosophical Review* 59 (1950) 445 ff.

²⁵ Cf. 88D1-4: the passage introduces the account of gymnastics, which reflects the same conception of the motions of the body and its elements as developed earlier in the dialogue.

²⁶ 78A2-6: the principle is adduced to explain why it is that the *koilia*, although it can contain the foods and drink, cannot contain fire and air.

²⁷ Cf. 56A1-B3. The element earth is omitted in the calculations here, presumably because of its extreme immobility (55E1-7). In 56D1-57B7, the action of the elements upon one another is described in terms of the properties which have just been assigned to them; it is this action which produces alteration of the elements and motion.

²⁸ 61D5-62A5. Although the passage emphasizes sensation, as a result of the action of a "mass" of fire upon the body, presumably the action of fire-particles would be similar, even though sensation did not occur.

the separating (*diakrisin*) and cutting action of fire upon our own bodies. We perceive the sensation as a sharp one. And we must take into account the thinness of its sides, the sharpness of its angles, the smallness of its particles, and the swiftness of its motions, remembering the genesis of the form of fire. Because of these properties, fire, being violent and intense, always cuts that which it chances upon. Fire especially of all the elements, therefore, separating (*diakrinousa*) and "chopping"²⁹ the body into small particles, has furnished both the name and sensation of heat. In this analysis, the action of fire is described on the physical level, the particles of fire, because of their smallness, swiftness, and the sharpness of their triangles, being conceived as penetrating the body, cutting and dividing the tissues into the particles or elements of which the body is composed.³⁰ And doubtless the action of air, second to fire in mobility etc., may, by inference, be thought of as analogous to that of fire, but lesser in degree.

The action of another element, water or "the liquid," is described in the explanation of the opposite sensation of cold.³¹ In this case, the larger particles of liquids surrounding the body enter into it and thrust out (*exôthounta*) the smaller particles (i.e. of fire and air).³² But since they are not able to enter into the places of the smaller particles which have been expelled, the larger particles thrust together (*xunôthounta*) the moisture in the body. Thus, instead of the particles of the body continuing heterogeneous and in motion, the larger particles of liquids, because of the thrusting together (*xunôsin*) and the resulting homogeneity, render the body motionless and solidify it. But, Plato adds, whatever is contracted contrary to nature fights and thrusts itself in the opposite direction. Hence arises the trembling and shaking in the body, and the sensation of cold. This explanation of the sensation of cold gives only a partial account of the action of water upon the body. It differs from the account given for the action of fire in detail and emphasis, but there is no necessary disagreement in principle. Here, the emphasis is

²⁹ The word *κερματίζουσα* used here (62A3) is an etymological pun. Cf. its use of the internal fire, in 81A6.

³⁰ The action of fire upon the food and drink in the belly is described in much the same manner. Cf. 79A1-2: *τήκει δὴ, καὶ κατὰ σμικρὰ διαιροῦν*, and 80D3-6. In 56D-57C, the action of fire upon the other elements is explained in very similar terms. In 81B5-D4, the action of the triangles, of the internal fire and of the foods entering the body, is stressed.

³¹ 62A5-B6. In 58D4 ff., water is divided into two forms, "the liquid" and "the fusible."

³² Cornford's explanation (above, note 5) 260, note 2, seems correct, particularly in view of 59A6, where cooling is explained as the withdrawal of the particles of fire.

upon the mechanical "thrusting"³³ of the particles of water and upon heterogeneity in the body, as a condition and cause of motion.³⁴ To a degree the two accounts complement each other. In both cases, the motions involved are those which Plato elsewhere defines as secondary or auxiliary causes, the causes of things which move other things, and are moved by other things, of necessity.³⁵

The motions of the elements in the process of *plêrôsis* Plato describes very vividly by analogy to the motions within the cosmos: the elements move, or are carried, toward their own kindred. Although he does not elsewhere elaborate further, the process may perhaps be understood more fully using the principles of his theory of motion. As the internal fire, thanks to the function of respiration,³⁶ constantly forms the blood and drives it into the veins, the particles of fire, air, water, and earth which compose the blood are compelled, since there can be no void, to fill up the base of the part that is always being emptied by the impact of the elements outside. The principle according to which the particles are distributed is that of "like to like," by which, however, Plato cannot mean simply an attraction of like to like, since he rejects "attraction" as a real factor of causation and has given an explanation of the movement of like to like within the cosmos.³⁷ The affinity of like to like must, rather, be understood in terms of Plato's theory of the condition of motion and rest throughout the cosmos, namely, the presence or absence of homogeneity or heterogeneity.³⁸ The principle that homogeneity causes rest

³³ Cf. 57B4-7, where the idea of "thrusting" occurs in the explanation of the transformation of the elements, and, for other uses of the principle of thrusting, cf. 79B and 80C.

³⁴ This passage (62A5-B6) demonstrates that Plato thinks of heterogeneity as indispensable for the motion of the elements in the body also. Cf. the similar use of the concepts of homogeneity and heterogeneity in the distinction of the two kinds of water in 58D5-59A8.

³⁵ Cf. 46C7-E2, where the distinction between primary and secondary causation is made; among the secondary causes are mentioned dissolving and solidifying, cooling and heating, and all processes similar to these. In the fuller enumeration of secondary causes in *Laws* 897A4-B3, *diakrisis* and *synkrisis* are included.

³⁶ On the function of respiration as the cause of digestion and circulation, cf. 78E3-79A4, and 80D, and Cornford's excellent description (above, note 5) 306 ff., of the mechanism involved.

³⁷ Cf. the citation in note 22 above, and 80B8-c8, where attraction as a real force in the causation of motion is rejected by Plato, and a mechanical explanation in terms of the void, *synkrisis* and *diakrisis*, and circular thrust, is advanced in its place, for various phenomena.

³⁸ Cf. the conditions of motion and rest (note 19 above), and the following statement in 57A3-5: τὸ γὰρ ὁμοιον καὶ ταῦτὸν αὐτῷ γένος ἕκαστον οὔτε τινα μεταβολὴν ἐμποιῆσαι δυνατόν οὔτε τι παθεῖν ὑπὸ τοῦ κατὰ ταῦτὰ ὁμοίως τε ἔχοντος.

(*stasis*) while heterogeneity is necessary for motion, along with the lack of void and the movement of the blood in the veins, would furnish a sufficient explanation for the physical determination of the several elements to their kindred.

Plato does, then, quite literally and consistently think of the body as perpetually in a process of flux. The physical body is, in essence, process, a complex of unceasing motions, of motion of the particles or elements in place (*phora*) and the qualitative alteration arising from that motion (*alloiôsis*). This conception is, indeed, vital to his explanations of the physiological phenomena of the body.³⁹ For it is in terms of the relative balance and equilibrium of the motion of flux that he understands the nutrition of the body, its increase or growth, and decrease and natural death, as well as maintenance of the body's stability after growth has ceased.⁴⁰ In this last stage there is ideally a perfect equilibrium of the motions taking place in the body, so that the regular constitution of the elements composing the body in its natural state is preserved. The paramount importance for maintaining this equilibrium is stressed in the explanation of the causes of the first class of diseases. There, the principle underlying the maintenance of equilibrium of the motions of the particles of the body is stated with great care:⁴¹ *μόνως γὰρ δῆ, φαμέν, ταῦτόν ταῦτῳ κατὰ ταῦτόν καὶ ὡσαύτως καὶ ἀνὰ λόγον προσγιγνόμενον καὶ ἀπογιγνόμενον ἑάσει ταῦτόν ὃν αὐτῷ σῶν καὶ ὑγιὲς μένειν· ὃ δ' ἂν πλημμελήσῃ τι τούτων ἐκτὸς ἀπὸν ἢ προσίον*, will cause alterations of every kind, diseases, and endless decay. Maintenance of equilibrium therefore depends upon the part which is constantly being emptied always being supplied exactly what has been removed by the action of the elements.⁴² This principle, the violation of which produces disturbance

³⁹ Plato also carefully explains two functions of the body, sensation and respiration, from the point of view of the physical motions involved. For the former cf. 45B2 ff. and 64A2 ff., and for the latter, 79A5-E9.

⁴⁰ Cf. 81B4 ff. Having given his description of *kenôsis* and *plêrôsis*, Plato makes the point that increase and decrease depend upon their relative balance; he then continues with an explanation of growth, decay, and natural death which involves the interaction of the triangles of the body and the triangles of the ingested foods. Cf. the excellent remarks of Friedrich Solmsen, "Epicurus on the Growth and Decline of the Cosmos," *AJP* 74 (1953) 34-51, esp. 40-41 and 47-48.

⁴¹ 82B2-7. Since the class of diseases being discussed involves the action of the four elements of which the body is composed, the principle here stated is on the level of physics, and involves the motions of fire, air, water and earth within the body.

⁴² The idea of the equilibrium of the motions of the body is especially well illustrated in the discussion of gymnastics (88c7 ff.), which Plato describes with explicit reference to the motions of the Cosmos. Because the body is subjected to the motions arising from both the elements outside and those which enter within, man must imitate

in the body, gives the most precise formula, on the physical level, of the natural processes which constitute the flux of the organism.

the Nurse of Becoming and keep the body in motion. If he does so and, by constantly making in it some *seismous*, preserves throughout the whole the inner and outer motions according to nature and, by shaking it moderately, arranges in order according to kinship the particles and affections wandering about the body, he will preserve the natural constitution of the elements of the body and, thus, the health of the body. The best motion, Plato adds, is that caused by the body itself in itself, since this is most similar to the motions of the soul and the cosmos.