

Fragments and Commentary

By Pythagoras

Edited and Translated by Arthur Fairbanks

Passages in Plato referring to the Pythagoreans

Phaedo 62 B. The saying that is uttered in secret rites, to the effect that we men are in a sort of prison, and that one ought not to loose himself from it nor yet to run away, seems to me something great and not easy to see through; but this at least I think is well said, that it is the gods who care for us, and we men are one of the possessions of the gods.

Kratyl. 400 B. For some say that it (the body) is the tomb of the soul-I think it was the followers of Orpheus in particular who introduced this word-which has this enclosure like a prison in order that it may be kept safe.

Gorg. 493 A. I once heard one of the wise men say that now we are dead and the body is our tomb, and that that part of the soul where desires are, it so happens, is open to persuasion, and moves upward or downward. And, indeed, a clever man-perhaps some inhabitant of Sicily or Italy-speaking allegorically, and taking the word from 'credible' and 'persuadable' called this a jar; and he called those without intelligence uninitiated, and that part of the soul of uninitiated persons where the desires are, he called its intemperateness, and said it was not water tight, as a jar might be pierced with holes-using the simile because of its insatiate desires.

Gorg. 507 A. And the wise men say that one community embraces heaven and earth and gods and men and friendship and order and temperance and righteousness, and for that reason they call this whole a universe, my friend, for it is not without order nor yet is there excess. It seems to me that you do not pay attention to these things, though you are wise in regard to them. But it has escaped your notice that geometrical equality prevails widely among both gods and men.

Passages in Aristotle referring to the Pythagoreans

Phys. iii. 4; 203 a 1. For all who think they have worthily applied themselves to such philosophy, have discoursed concerning the infinite, and they all have asserted some first principle of things-some, like the Pythagoreans and Plato, a first principle existing by itself, not connected with anything else, but being itself the infinite in its essence. Only the Pythagoreans found it among things perceived by sense (for they say that number is not an abstraction), and they held that it was the infinite outside the heavens.

iii. 4; 204 a 33. (The Pythagoreans) both hold that the infinite is being, and divide it. iv. 6; 213 b 22. And the Pythagoreans say that there is a void, and that it enters into the heaven itself from the infinite air, as though it (the heaven) were breathing; and this void defines the natures of things,

inasmuch as it is a certain separation and definition of things that lie and this is true first in the case of numbers, for the void defines the nature of these.

De coel. i. ; 268 a 10. For as the Pythagoreans say, the all and all things are defined by threes; for end and middle and beginning constitute the number of the all, and also the number of the triad.

ii. 2; 284 b 6. And since there are some who say that there is a right and left of the heavens, as, for instance, those that are called Pythagoreans (for such is their doctrine), we must investigate whether it is as they say.

ii. 2; 285 a 10. Wherefore one of the Pythagoreans might be surprised in that they say that there are only these two first principles, the right and the left, and they pass over four of them as not having the least validity; for there is no less difference up and down, and front and back than there is right and left in all creatures.

ii. 2; 285 b 23. And some are dwelling in the upper hemisphere and to the right, while we dwell below and to the left, which is the opposite to what the Pythagoreans say; for they put us above and to the right, while the others are below and at the left.

ii.9 ; 290 b 15. Some think it necessary that noise should arise when so great bodies are in motion, since sound does arise from bodies among us which are not so large and do not move so swiftly; and from the sun and moon and from the stars in so great number, and of so great size, moving so swiftly, there must necessarily arise a sound inconceivably great. Assuming these things and that the swiftness has the principle of harmony by reason of the intervals, they say that the sound of the stars moving on in a circle becomes musical. And since it seems unreasonable that we also do not hear this sound, they say that the reason for this is that the noise exists in the very nature of things, so as not to be distinguishable from the opposite silence; for the distinction of sound and silence lies in their contrast with each other, so that as blacksmiths think there is no difference between them because they are accustomed to the sound, so the same thing happens to men.

ii. 9; 291 a 7. What occasions the difficulty and makes the Pythagoreans say that there is a harmony of the bodies as they move, is a proof. For whatever things move themselves make a sound and noise; but whatever things are fastened in what moves or exist in it as the parts in a ship, cannot make a noise, nor yet does the ship if it moves in a river.

ii. 13; 293 a 19. They say that the whole heaven is limited, the opposite to what those of Italy, called the Pythagoreans, say; for these say that fire is at the centre and that the earth is one of the stars, and that moving in a circle about the centre it produces night and day. And they assume yet another earth opposite this which they call the counter-earth, not seeking reasons and causes for phenomena, but stretching phenomena to meet certain assumptions and opinions of theirs and attempting to arrange them in a system. . . . And farther the Pythagoreans say that the most authoritative part of the All stands guard, because it is specially fitting that it should, and this part is the centre; and this place that the fire occupies, they call the guard of Zeus, as it is called simply the centre, that is, the centre of space and the centre of matter and of nature.

iii.1; 300 a 15. The same holds true for those who construct the heaven out of numbers; for some construct nature out of numbers, as do certain of the Pythagoreans.

Metaphys. i. 5 ; 985 b 23-986 b 8. With these and before them (Anaxagoras, Empedokles, Atomists) those called Pythagoreans applying themselves to the sciences, first developed them ; and being brought up in them they thought that the first principles of these (i.e. numbers) were the first principles of all things. And since of these (sciences) numbers are by nature the first, in numbers rather than in fire and earth and water they thought they saw many likenesses to things that are and that are coming to be, as, for instance, justice is such a property of numbers, and soul and mind are such a property, and another is opportunity, and of other things one may say the same of each one.

And further, discerning in numbers the conditions and reasons of harmonies also; since, moreover, other things seemed to be like numbers in their entire nature, and numbers were the first of every nature, they assumed that the elements of numbers were the elements of all things, and that the whole heavens were harmony and number. And whatever characteristics in numbers and harmonics they could show were in agreement with the properties of the heavens and its parts and with its whole arrangement, these they collected and adapted; and if there chanced to be any gap anywhere, they eagerly sought that the whole system might be connected with these (stray phenomena). To give an example of my meaning: inasmuch as ten seemed to be the perfect number and to embrace the whole nature of numbers, they asserted that the number of bodies moving through the heavens were ten, and when only nine were visible, for the reason just stated they postulated the counter-earth as the tenth. We have given a more definite account of these thinkers in other parts of our writings. But we have referred to them here with this purpose in view, that we might ascertain from them what they asserted as the first principles and in what manner they came upon the causes that have been enumerated. They certainly seem to consider number as the first principle and as it were the matter in things and in their conditions and states; and the odd and the even are elements of number, and of these the one is infinite and the other finite, and unity is the product of both of them, for it is both odd and even, and number arises from unity, and the whole heaven, as has been said, is numbers.

A different party in this same school say that the first principles are ten, named according to the following table: -finite and infinite, even and odd, one and many, right and left, male and female, rest and motion, straight and crooked, light and darkness, good and bad, square and oblong. After this manner Alkmaeon of Kroton seems to have conceived them, and either he received this doctrine from them or they from him ; for Alkmaeon arrived at maturity when Pythagoras was an old man, and his teachings resembled theirs. For he says that most human affairs are twofold, not meaning opposites reached by definition, as did the former party, but opposites by chance - as, for example, white-black, sweet-bitter, good-bad, small-great. This philosopher let fall his opinions indefinitely about the rest, but the Pythagoreans declared the number of the opposites and what they were. From both one may learn this much, that opposites are the first principles of things; but from the latter he may learn the number of these, and what they are. But how it is possible to bring them into relation with the causes of which we have spoken if they have not clearly worked out; but they seem to range their elements under the category of matter, for they say that being is compounded and formed from them, and that they inhere in it.

987 a 9-27. Down to the Italian philosophers and with the exception of them the rest have spoken more reasonably about these principles, except that, as we said, they do indeed use two principles, and the one of these, whence is motion, some regard as one and others as twofold. The Pythagoreans, however, while they in similar manner assume two first principles, add this

which is peculiar to themselves: that they do not think that the finite and the infinite and the one are certain other things by nature, such as fire or earth or any other such thing, but the infinite itself and unity itself are the essence of the things of which they are predicated, and so they make number the essence of all things. So they taught after this manner about them, and began to discourse and to define what being is, but they made it altogether too simple a matter. For they made their definitions superficially, and to whatever first the definition might apply, this they thought to be the essence of the matter ; as if one should say that twofold and two were the same, because the twofold subsists in the two. But undoubtedly the two and the twofold are not the same; otherwise the one will be many - a consequence which even they would not draw. So much then may be learned from the earlier philosophers and from their successors.

i. 6; 987 b 10. And Plato only changed the name, for the Pythagoreans say that things exist by imitation of numbers, but Plato, by sharing the nature of numbers.

i. 6; 987 b 22. But that the one is the real essence of things, and not something else with unity as an attribute, he affirms, agreeing with the Pythagoreans; and in harmony with them he affirms that numbers are the principles of being for other things. But it is peculiar to him that instead of a single infinite he posits a double infinite, an infinite of greatness and of littleness; and it is also peculiar to him that he separates numbers from things that are seen, while they say that numbers are the things themselves, and do not interpose mathematical objects between them. This separation of the one and numbers from things, in contrast with the position of the Pythagoreans, and the introduction of ideas, are the consequence of his investigation by concepts.

i. 8; 989 b 32-990 a 32. Those, however, who carry on their investigation with reference to all things, and divide things into what are perceived and what are not perceived by sense, evidently examine both classes, so one must delay a little longer over what they say. They speak correctly and incorrectly in reference to the questions now before us. Now those who are called Pythagoreans use principles and elements yet stranger than those of the physicists, in that they do not take them from the sphere of sense, for mathematical objects are without motion, except in the case of astronomy. Still, they discourse about everything in nature and study it they construct the heaven, they observe what happens in its parts and their states and motions; they apply to these their first principles and causes, as though they agreed entirely with the other physicists that being is only what is perceptible and what that which is called heaven includes. But their causes and first principles, they say, are such as to lead up to the higher parts of reality, and are in harmony with this rather than with the doctrines of nature. In what manner motion will take place when finite and infinite, odd and even, are the only underlying realities, they do not say; nor how it is possible for genesis and destruction to take place without motion and change, or for the heavenly bodies to revolve. Farther, if one grant to them that greatness arises from these principles, or if this could be proved, nevertheless, how will it be that some bodies are light and some heavy ? For their postulates and statements apply no more to mathematical objects than to things of sense; accordingly they have said nothing at all about fire or earth or any such objects, because I think they have no distinctive doctrine about things of sense. Farther, how is it necessary to assume that number and states of number are the causes of what is in the heavens and what is taking place there from the beginning and now, and that there is no other number than that out of which the world is composed? For when opinion and opportune time are at a certain point in the heavens, and a little farther up or down are injustice and judgment or a mixture of them, and they bring forward as proof that each one of these is number, and the result

then is that at this place there is already a multitude of compounded quantities because those states of number have each their place-is this number in heaven the same which it is necessary to assume that each of these things is, or is it something different? Plato says it is different ; still, he thinks that both these things and the causes of them are numbers; but the one class are ideal causes, and the others are sense causes.

ii. 1 ; 996 a 4. And the most difficult and perplexing question of all is whether unity and being are not, as Plato and the Pythagoreans say, something different from things but their very essence, or whether the underlying substance is something different, friendship, as Empedokles says, or as another says, fire, or water, or air.

ii. 4 ; 1001 a 9. Plato and the Pythagoreans assert that neither being nor yet unity is something different from things, but that it is the very nature of them, as though essence itself consisted in unity and existence.

1036 b 17. So it turns out that many things of which the forms appear different have one form, as the Pythagoreans discovered; and one can say that there is one form for everything, and the others are not forms; and thus all things will be one.

ix. 2 ; 1053 b 11. Whether the one itself is a sort of essence, as first the Pythagoreans and later Plato, affirmed.

xi. 7; 1072 b 31. And they are wrong who assume, as do the Pythagoreans and Speusippos, that the most beautiful and the best is not in the first principle, because the first principles of plants and animals are indeed causes; for that which is beautiful and perfect is in what comes from these first principles.

xii. 4; 1078 b 21. The Pythagoreans (before Demokritos) only defined a few things, the concepts of which they reduced to numbers, as for instance opportunity or justice or marriage. . .

xii. 6; 1080 b 16. The Pythagoreans say that there is but one number, the mathematical, but things of sense are not separated from this, for they are composed of it; indeed, they construct the whole heaven out of numbers, but not out of unit numbers, for they assume that the unities have quantity; but how the first unity was so constituted as to have quantity, they seem at a loss to say. b 31. All, as many as regard the one as the element and first principle of things, except the Pythagoreans, assert that numbers are based on the unit; but the Pythagoreans assert, as has been remarked, that numbers have quantity.

xii. 8; 1083 b 9. The Pythagorean standpoint has on the one hand fewer difficulties than those that have been discussed, but it has new difficulties of its own. The fact that they do not regard number as separate, removes many of the contradictions ; but it is impossible that bodies should consist of numbers, and that this number should be mathematical. Nor is it true that indivisible elements have quantity; but, granted that they have this quality of indivisibility, the units have no quantity; for how can quantity be composed of indivisible elements? but arithmetical number consists of units. But these say that things are number; at least, they adapt their speculations to such bodies as consist of elements which are numbers.

xiii. 3; 1090 a 20. On the other hand the Pythagoreans, because they see many qualities of numbers in bodies perceived by sense, regard objects as numbers, not as separate numbers, but as

derived from numbers. And why? Because the qualities of numbers exist in harmony both in the heaven and in many other things. But for those who hold that number is mathematical only, it is impossible on the basis of their hypothesis to say any such thing; and it has already been remarked that there can be no science of these numbers. But we say, as above, that there is a science of numbers. Evidently the mathematical does not exist apart by itself, for in that case its qualities could not exist in bodies. In such a matter the Pythagoreans are restrained by nothing; when, however, they construct out of numbers physical bodies out of numbers that have neither weight nor lightness, bodies that have weight and lightness - they seem to be speaking about another heaven and other bodies than those perceived by sense.

Eth. i. 4; 1096 b 5. And the Pythagoreans seem to speak more persuasively about it, putting the unity in the co-ordination of good things.

ii. 5; 1106 b 29. The evil partakes of the nature of the infinite, the good of the finite, as the Pythagoreans conjectured.

v. 8; 1132 b 21. Reciprocity seems to some to be absolutely just, as the Pythagoreans say; for these defined the just as that which is reciprocal to another.

Mor. i. 1; 1182 a 11. First Pythagoras attempted to speak concerning virtue, but he did not speak correctly for bringing virtues into correspondence with numbers, he did not make any distinct.

Pythagoras and the Pythagoreans: Passages in the Doxographists

Aet. Plac. i. 3; ` . 280. And again from another starting-point, Pythagoras, son of Muesarchos, a Samian, who was the first to call this matter by the name of philosophy, assumed as first principles the numbers and the symmetries existing in them, which he calls harmonies, and the elements compounded of both, that are called geometrical. And again he includes the monad and the undefined dyad among the first principles; and for him one of the first principles tends toward the creative and form-giving cause, which is intelligence, that is god, and the other tends toward the passive and material cause, which is the visible universe. And he says that the starting-point of number is the decad; for all Greeks and all barbarians count as far as ten, and when they get as far as this they return to the monad. And again, he says, the power of the ten is in the four and the tetrad. And the reason is this: if any one returning from the monad adds the numbers in a series as far as the four, he will fill out the number ten (i.e. $1 + 2 + 3 + 4 = 10$); but if he goes beyond the number of the tetrad, he will exceed the ten. Just as if one should add one and two and should add to these three and four, he will fill out the number ten; so that according to the monad number is in the ten, but potentially in the four. Wherefore the Pythagoreans were wont to speak as though the greatest oath were the tetrad: 'By him that transmitted to our soul the tetraktys, which has the spring and root of ever-flowing nature.' And our soul, he says, is composed of the tetrad; for it is intelligence, understanding, opinion, sense, from which things come every art and science, and we ourselves become reasoning beings. The monad, however, is intelligence, for intelligence sees according to the monad. As for example, men are made up of many parts, and part by part they are devoid of sense and comprehension and experience, yet we perceive that man as one alone, whom no being resembles, possesses these qualities; and we perceive that a horse is one, but part by part it is without experience. For these are all forms and classes according to monads. Wherefore, assigning this limit with reference to each one of these, they speak of a reasoning being and a neighing being. On this account the monad is intelligence

by which we perceive these things. And the undefined dyad is science; fittingly, for all proof and all persuasion is part of science, and farther every syllogism brings together what is questioned out of some things that are agreed upon, and easily proves something else; and science is the comprehension of these things, wherefore it would be the dyad. And opinion as the result of comprehending them is the triad; fittingly, for opinion has to do with many things; and the triad is quantity, as 'The thrice-blessed Danaoi.' On this account then he includes the triad. . . . And their sect is called Italic because Pythagoras taught in Italy, for he removed from Samos, his fatherland, because of dissatisfaction with the tyranny of Polykrates.

Act. i. 7 ; *Dox.* 302. Pythagoras held that one of the first principles, the monad, is god and the good, which is the origin of the One, and is itself intelligence; but the undefined dyad is a divinity and the bad, surrounding which is the mass of matter. i. 8 ; 307. Divine spirits are psychical beings; and heroes are souls separated from bodies, good heroes are good souls, bad heroes are bad souls. i. 9 ; 307. The followers of Thales and Pythagoras and the Stoics held that matter is variable and changeable and transformable and in a state of flux, the whole through the whole. i. 10; 309. Pythagoras asserted that the so-called forms and ideas exist in numbers and their harmonies, and in what are called geometrical objects, apart from bodies. i. 11 ; 310. Pythagoras and Aristotle asserted that the first causes are immaterial, but that other causes involve a union or contact with material substance [so that the world is material]. i. 14; 312. The followers of Pythagoras held that the universe is a sphere according to the form of the four elements; but the highest fire alone is conical. i. 15; 314. The Pythagoreans call colour the manifestation of matter. i. 16; 314. Bodies are subject to change of condition, and are divisible to infinity. i. 18; 316. (After quotation from Arist. *Phys.* iv. 4; 212 a 20) And in his first book on the philosophy of Pythagoras he writes that the heaven is one, and that time and wind and the void which always defines the places of each thing, are introduced from the infinite. And among other things he says that place is the immovable limit of what surrounds the world, or that in which bodies abide and are moved; and that it is full when it surrounds body on every side, and empty when it has absolutely nothing in itself. Accordingly it is necessary for place to exist, and body; and it is never empty except only from the standpoint of thought, for the nature of it in perpetuity is destructive of the interrelation of things and of the combination of bodies; and motions arise according to place of bodies that surround and oppose each other; and no infiniteness is lacking, either of quantity or of extent. i. 20; 318. Pythagoras said that time is the sphere of what surrounds the world. i. 21 ; 318. Pythagoras, Plato: Motion is a certain otherness or difference in matter. [This is the common limit of all motion.] i. 24; 320. Pythagoras and all that assume that matter is subject to change assert that genesis and destruction in an absolute sense take place for from change of the elements and modification and separation of them there take place juxtaposition and mixture, and intermingling and melting together. *Aet. Plac.* ii. 1; 327. Pythagoras first named the circumference of all things the universe by reason of the order in it. ii. 4; 330. Pythagoras, Plato, and the Stoics held that the universe is brought into being by god. And it is perishable so far as its nature is concerned, for it is perceived by sense, and therefore material; it will not however be destroyed in accordance with the foreknowledge and plan of god. ii. 6; 334. Pythagoras: The universe is made from five solid figures, which are called also mathematical; of these he says that earth has arisen from the cube, fire from the pyramid, air from the octahedron, and water from the icosahedron, and the sphere of the all from the dodecahedron. ii. 9; 338. The followers of Pythagoras hold that there is a void outside the universe into which the universe breathes forth, and from which it breathes in. ii. 10; 339. Pythagoras, Plato, Aristotle: The right hand side of the universe is the eastern part from which

comes the beginning of motion, and the left hand side is the west. They say the universe has neither height nor depth, in which statement height means distance from below upwards, and depth from above downwards. For none of the distances thus described exist for the universe, inasmuch as it is disposed around the middle of itself, from which it extends toward the all, and with reference to which it is the same on every side. ii. 12 ; 340. Thales, Pythagoras, and their followers: The sphere of the whole heaven is divided into five circles, which they call zones; the first of these is called the arctic zone and is ever visible; the second the summer solstice, the third the equinoctial, the fourth the winter solstice, and fifth the antarctic zone, which is invisible. And the ecliptic called the zodiac in the three middle ones is projected to touch the three middle ones. And the meridian crosses all these from the north to the opposite quarter at right angles. It is said that Pythagoras was the first to recognise the slant of the zodiacal circle which Oenopides of Chios appropriated as his own discovery. ii. 13; 343. Herakleides and the Pythagoreans asserted that each world [GREEK] of the stars is air and aether surrounding earth in the infinite aether. And these doctrines are brought out in the Orphic writings, for they construct each world of the stars. ii. 22; 352. The Pythagoreans: The sun is spherical. ii. 23; 353. Plato, Pythagoras, Aristotle: The solstices lie along the slant of the zodiacal circle, through which the sun goes along the zodiac, and with the accompaniment of the tropic circles; and all these things also the globe shows. 11.24; 354. An eclipse takes place when the moon comes past. ii. 25; 357. Pythagoras: The moon is a mirrorlike body. ii. 29; 360. Some of the Pythagoreans (according to the Aristotelian account and the statement of Philip the Opuntian) said that an eclipse of the moon takes place, sometimes by the interposition of the earth, sometimes by the interposition of the counter- earth. But it seems to some more recent thinkers that it takes place by a spreading of the flame little by little as it is gradually kindled, until it gives the complete full moon, and again, in like manner it grows less until the conjunction, when it is completely extinguished. ii. 30; 361. Some of the Pythagoreans, among them Philolaos, said that the earthy appearance of the moon is due to its being inhabited by animals and by plants, like those on our earth, only greater and more beautiful; for the animals on it are fifteen times as powerful, not having any sort of excrement, and their day is fifteen times as long as ours. But others said that the outward appearance in the moon is a reflection on the other side of the inflamed circle of the sea that is on our earth. ii. 32 ; 3(34. Some regard the greater year . . . as the sixty year period, among whom are Ocuopides and Pythagoras.

Act. *Plac.* iii. 1; *Dox.* 364. Some of the Pythagoreans. said that the milky way is the burning of a star that fell from its own foundation, setting on fire the region through which it passed in a circle, as Phaethon was burned. And others say that the course of the sun arose in this manner at the first. And certain ones say that the appearance of the sun is like a mirror reflecting its rays toward the heaven, and therefore it happens at times to reflect its rays on the rainbow in the clouds.

Aet. iii. 2; 366. Some of the followers of Pythagoras say that the comet is one of the stars that are not always shining, but emit their light periodically through a certain definite time; but others say that it is the reflection of our vision into the sun, like reflected images. iii. 14; 378. Pythagoras: The earth, after the analogy of the sphere of the all, is divided into five zones, arctic, antarctic, summer, winter, and equinoctial of these the middle one he defines to be the middle of the earth, called for this very reason the torrid zone; but the inhabited one [the one between the arctic and the torrid zone] being well-tempered.

Aet. iv. 2; *Dox.* 386. Pythagoras holds that number moves itself, and he takes number as an equivalent for intelligence. iv. 4; 389. Pythagoras, Plato: According to a superficial account the soul is of two parts, the one possessing, the other lacking, reason; but according to close and exact examination, of three parts; for the unreasoning part they divide into the emotions and the desires. (Theodor. v. 20); *Dox.* 390. The successors of Pythagoras saying that body is a mixture of five elements (for they ranked the aether as a fifth along with the four) held that the powers of the soul are of the same number as these. And these they name intelligence and wisdom and understanding and opinion and sense-perception. iv. 5 ; 391. Pythagoras: The principle of life is about the heart, but the principle of reason and intelligence is about the head. iv. 5; 392. Pythagoras et al. : The intelligence enters from without. iv. 7; 392. Pythagoras, Plato : The soul is imperishable. iv. 9; 396. Pythagoras et al. : The sense-perceptions are deceptive. iv. 9 ; 397. Pythagoras, Plato: Each of the sensations is pure, proceeding from each single element. With reference to vision, it was of the nature of aether hearing, of the nature of wind; smell, of the nature of fire ; taste, of the nature of moisture; touch, of the nature of earth. iv. 14; 405. The followers of Pythagoras and of the mathematicians on reflections of vision For vision moves directly as it were against the bronze [of a mirror], and meeting with a firm smooth surface it is turned and bent back on itself, meeting some such experience as when the arm is extended and then bent back to the shoulder. iv. 20; 409. Pythagoras, Plato, Aristotle: Sound is immaterial. For it is not air, but it is the form about the air and the appearance after some sort of percussion which becomes sound; and every appearance is immaterial; for it moves with bodies, but is itself absolutely immaterial; as in the case of a bent rod the surface-appearance suffers no change, but the matter is what is bent.

Aet. *Plac.* v.1; 415. Pythagoras did not admit the sacrificial part alone (of augury). v. 3 ; 417. Pythagoras : The seed is foam of the best part of the blood, a secretion from the nourishment, like blood and marrow. v.4; 417. Pythagoras, Plato, Aristotle: The power of seed is immaterial, like intelligence, the moving power but the matter that is poured forth is material. v.20; 432. Pythagoras, Plato: The souls of animals called unreasoning are reasonable, not however with active reasoning powers, because of an imperfect mixture of the bodies and because they do not have the power of speech, as in the case of apes and dogs; for these have intelligence but not the power of speech.

Ar. *Did. Ep.* Fr. 32; *Dox.* 467. Apollodoros in the second book Concerning the gods: It is the Pythagorean opinion that the morning and the evening star are the same.

Theophr. *Phys. Op.* Fr. 17; *Dox.* 492. Favorinus says that he (Pythagoras) was the first to call the heavens a universe and the earth round.

Cic. de *Deor. Nat.* i. 11 ; Philod. *piet.* Fr. c 4 b; *Dox.* 533. For Pythagoras, who held that soul is extended through all the nature of things and mingled with them, and that from this our souls are taken, did not see that god would be separated and torn apart by the separation of human souls; and when souls are wretched, as might happen to many, then part of god would be wretched; a thing which could not happen.

Hippol. *Phil.* 2 ; *Dox.* 555. There is a second philosophy not far distant from the same time, of which Pythagoras, whom some call a Samian, was the first representative. And this they call the Italian philosophy because Pythagoras fled the rule of Polykrates over the Samians and settled in a city of Italy where he spent his life. The successive leaders of this sect shared the same spirit.

And he in his studies of nature mingled astronomy and geometry and music . And thus he asserted that god is a monad, and examining the nature of number with especial care, he said that the universe produces melody and is put together with harmony, and he first proved the motion of the seven stars to be rhythm and melody. And in wonder at the structure of the universe, he decreed that at first his disciples should be silent, as it were mystae who were coming into the order of the all; then when he thought they had sufficient education in the principles of truth, and had sought wisdom sufficiently in regard to stars and in regard to nature, he pronounced them pure and then bade them speak. He separated his disciples into two groups, and called one esoteric, and the other exoteric. To the former he entrusted the more perfect sciences, to the latter the more moderate. And he dealt with magic, as they say, and himself discovered the art of physiognomy. Postulating both numbers and measures he was wont to say that the first principle of arithmetic embraced philosophy by combination, after the following manner:

Number is the first principle, a thing which is undefined, incomprehensible, having in itself all numbers which could reach infinity in amount. And the first principle of numbers is in substance the first monad, which is a male monad, begetting as a father all other numbers. Secondly the dyad is female number, and the same is called by the arithmeticians even. Thirdly the triad is male number; this the arithmeticians have been wont to call odd. Finally the tetrad is a female number, and the same is called even because it is female.

All numbers, then, taken by classes are fours (for number is undefined in reference to class), of which is composed the perfect number, the decad. For the series, one two three and four, becomes ten, if its own name is kept in its essence by each of the numbers. Pythagoras said that this sacred tetraktys is 'the spring having the roots of ever-flowing nature in itself, and from this numbers have their first principle. For the eleven and the twelve and the rest derive from the ten the first principle of their being. The four parts of the decad, this perfect number, are called number, monad, power, and cube. And the interweavings and minglings of these in the origin of growth are what naturally completes nascent number; for when a power is multiplied upon itself, it is the power of a power and when a power is multiplied on a cube, it is the power of a cube ; and when a cube is multiplied on a cube, the cube of a cube; thus all numbers, from which arises the genesis of what arises, are seven: -number, monad, power, cube, power of a power, power of a cube, cube of a cube.

He said that the soul is immortal, and that it changes from one body to another[Cf. Epiph. Haer. i. 7; Dox. 589.]; so he was wont to say that he himself had been born before the Trojan war as Aethalides, and at the time of the Trojan war as Euphorbos, and after that as Hermotimos of Samos, then as Pyrrhos of Delos, fifth as Pythagoras. And Diodoros of Eretria and Aristoxenos the musician say that Pythagoras had come into Zaratas of Chaldaeia and he set forth that in his view there were from the beginning two causes of things, father and mother and the father is light and the mother darkness; and the parts of light are warm, dry, light, swift; and of darkness are cold, moist, heavy, slow ; and of these the universe is composed, of male and female. And he says that the universe exists in accordance with musical harmony, so the sun also makes an harmonious period. And concerning the things that arise from the earth and the universe they say that Zaratas spoke as follows: There are two divinities, one of the heavens and the other of the earth; the one of the earth produces things from the earth, and it is water; and the divinity of the heavens is fire with a portion of air, warm, and cold; wherefore he says that none of these things will destroy or even pollute the soul, for these are the essence of all things. And it is said that

Zaratas forbade men to eat beans because he said that at the beginning and composition of all things when the earth was still a whole, the bean arose. And he says that the proof of this is that if one chews a bean to a pulp and exposes it to the sun for a certain time (for the sun will affect it quickly), it gives out the odour of human seed. And he says that there is another and clearer proof: if when a bean is in flower we were to take the bean and its flower, and putting it into a pitcher moisten it and then bury it in the earth, and after a few days dig it up again, we should see in the first place that it had the form of a womb, and examining it closely we should find the head of a child growing with it. He perished in a conflagration with his disciples in Kroton in Italy. And it was the custom when one became a disciple for him to burn his property and to leave his money under a seal with Pythagoras, and he remained in silence sometimes three years, sometimes five years, and studied. And immediately on being released from this he mingled with the others and continued a disciple and made his home with them; otherwise he took his money and was sent off. The esoteric class were called Pythagoreans, and the others Pythagoristae. And those of the disciples who escaped the conflagration were Lysis and Archippos and Zalmoxis the slave of Pythagoras, who is said to have taught the Pythagorean philosophy to the Druids among the Celts.¹ It is said that Pythagoras learned numbers and measures from the Egyptians; astonished at the wisdom of the priests, which was deserving of belief and full of fancies and difficult to buy, he imitated it and himself also taught his disciples to be silent, and obliged the student to remain quietly in rooms underneath the earth.

Epiph. *Pro.* i.; *Dox.* 587. Pythagoras laid down the doctrine of the monad and of foreknowledge and the interdict on sacrificing to the gods then believed on, and he bade men not to partake of beings that had life, and to refrain from wine. And he drew a line between the things from the moon upwards, calling these immortal, and those below, which he called mortal; and he taught the transmigration of souls from bodies into bodies even as far as animals and beasts. And he used to teach his followers to observe silence for a period of five years. Finally he named himself a god.

Epiph. *Haer.* iii. 8 ; *Dox.* 390. Pythagoras the Samian, son of Mnesarchos, said that the monad is god, and that nothing has been brought into being apart from this. He was wont to say that wise men ought not to sacrifice animals to the gods, nor yet to eat what had life, or beans, nor to drink wine. And he was wont to say that all things from the moon downward were subject to change, while from the moon upward they were not. And he said that the soul goes at death into other animals. And he bade his disciples to keep silence for a period of five years, and finally he named himself a god.

Herm. *I.G.P.* 16; *Dox.* 655. Others then from the ancient tribe, Pythagoras and his fellow-tribesmen, revered and taciturn, transmitted other dogmas to me as mysteries, and this is the great and unspeakable ipscedit: the monad is the first principle of all things. From its forms and from numbers the elements arose. And he declared that the number and form and measure of each of these is somehow as follows: -Fire is composed of twenty-four right-angled triangles, surrounded by four equilaterals. And each equilateral consists of six right-angled triangles, whence they compare it to the pyramid. Air is composed of forty-eight triangles, stir-rounded by eight equilaterals. And it is compared to the octahedron, which is surrounded by eight equilateral triangles, each of which is separated into six right-angled triangles so as to become forty-eight in all. And water is composed of one hundred and twenty triangles, surrounded by twenty equilaterals, and it is compared to the icosahedron, which is composed of one hundred and

twenty equilateral triangles. And aether is composed of twelve equilateral pentagons, and is like a dodecahedron. And earth is composed of forty-eight triangles, and is surrounded by six equilateral pentagons, and it is like a cube. For the cube is surrounded by six tetragons, each of which is separated into eight triangles, so that they become in all forty-eight.