

On the particular character of this air, that of the various kinds of living creatures depends. The phenomena of corporeal and animate life, especially the circulation of the blood and the activity of the senses, Diogenes endeavoured not without ingenuity to explain by means of his theory. He agreed with the ancient Ionians and with Heracleitus in maintaining an infinite series of successive worlds.

B. THE PYTHAGOREANS.

§ 14. *Pythagoras and his School.*

The history of Pythagoras was very early overgrown with many unhistorical legends and conjectures, and became so more and more as it was handed down by successive traditions. His doctrine also, especially after the rise of the Neo-Pythagorean school, and the extensive forgeries of Pythagorean writings which prevailed there, has been so mixed up with later elements that it requires the most careful criticism to distinguish the unhistorical constituents in the accounts preserved. As far as the history of the Pythagorean school and its founder is concerned,¹ a higher degree of certainty can only be attained in regard to a few main points, and as to their doctrines only for such portions as we can learn from the genuine fragments of Philolaus,² the utterances of Aristotle, and those statements

¹ On the Greek biographies of Pythagoras known to us, cf. p. 9, 12 f.

² All the fragments of Philolaus have been edited by Boeckh, *Philolaos der Pythagor. Lehren*

(1819). When I had proved that a part of them were forgeries, Schaarschmidt (*Die angebl. Schriftstellerei d. Philol.* 1864), attempted to prove the same of all. Repeated examination only

of the later doxographers which we are justified in referring to Theophrastus.¹

Pythagoras, the son of Mnesarchus, was born in Samos, whither his ancestors, who were Tyrrhenian Pelasgians, had migrated from Phlius. From the inexact statements in respect to the time when he lived, which are often contradictory in particular details, this much only can be accepted as probable, that he was born about 580–570 B.C., came to Italy about 540–530 B.C., and died towards the end of the sixth or soon after the beginning of the fifth century. Even Heraclitus calls him the most learned man of his time,² but how and whence he gained his knowledge we do not know. The statements of later writers concerning his travels and the culture acquired in the course of them in the countries of the South and East, by reason of the untrustworthiness of the authorities, lateness of the accounts, and the suspicious circumstances (mentioned *supra*, p. 19) under which they appeared, cannot be regarded as traditions based upon historical recollection, but only as conjectures to which

proves to me that the fragments from the treatise *περὶ ψυχῆς* are not genuine, and that the rest of the fragments, which are in part confirmed by Aristotle, are genuine. Cf. *Pre-Socratic Philosophy*, 318 note 2, 392 ff., 446 ff.

¹ Among the later accounts of the Pythagorean philosophy we may mention, besides well-known and more comprehensive works, Chaignet's *Pythagore et la phil. pyth.* (2 vols. 1873) as a careful book, though giving too much weight to untrustworthy

authorities. Röth's uncritical and romancing *Gesch. uns. abendländischen Philosophie*, vol. ii. (1858), can only be used with the greatest care.

² *Fr.* 17. Byw; in Diogenes, viii. 6. Πυθαγόρης Μνησάρχου ιστορίην ἤσκησε ἀνθρώπων μάλιστα πάντων καὶ ἐκλεξάμενος ταύτας τὰς συγγραφὰς (to what treatises this refers we do not know) ἐποίησε ἐωυτοῦ σοφίην πολυμαθίην κακοτεχνίην. Cf. Herod. iv. 95. Ἑλλήνων οὐ τῷ ἀσθενεστάτῳ σοφιστῇ Πυθαγόρῃ.

the doctrine of transmigration and some Orphic-Pythagorean usages especially gave rise. Even as to the presence of Pythagoras in Egypt, to which no internal improbability is opposed, nothing is known according to all appearance in the older tradition. The earliest evidence for it is an oration of Isocrates which does not even lay claim to historical credibility ('Busir.' 11, 28, cf. 12, 33); Herodotus (ii. 81, 123, cf. c. 49, 53) seems to be quite unacquainted with any sojourn of Pythagoras in Egypt; and by the 'philosophy' which he transplanted thence to Greece even Isocrates doubtless means not so much any scientific doctrines as his whole reformatory procedure. In regard to Plato and Aristotle it is (*vide sup.* p. 21) very improbable that they derived so influential a system as the Pythagorean from Egypt. The statement that Pherecydes was his instructor (attested from the middle of the fourth century *ap.* Diog. i. 118, 119, and others) is more trustworthy, but also not certain; and though the assertion that he was a disciple of Anaximander (*ap.* Porph. 'Vit. Pyth.' 2, 11) seems to rest on a mere conjecture, it is probable (*vide sup.* p. 41) that the astronomical theory of Anaximander influenced that of Pythagoras. Having begun his activity in his home as it appears, he found its chief sphere in Lower Italy (*vide sup.*). He settled in Crotona and established an association there which found numerous adherents among the Italian and Sicilian Greeks. The later legend describes his position in these regions as that of a prophet and worker of miracles, his school as a society of ascetics living under a strict rule and having

their goods in common, abstaining from flesh diet, beans, and woollen clothing, and sworn to inviolable secrecy with regard to their order. From an historical point of view the Pythagorean society appears primarily as a form of the mysteries then in vogue; the 'orgies' mentioned by Herodotus (ii. 81) form its centre, the doctrine of the transmigration of souls mentioned by Xenophanes (*ap.* Diog. viii. 36) is its leading dogma. From the initiated purity of life was demanded (*πυθαγόρειος τρόπος τοῦ βίου*, Plato, 'Rep.' x. 600 B), which enjoined on them however, according to the best testimonies, only a few abstinences, and these not of an oppressive nature. The Pythagorean society was distinguished from all kindred phenomena by the ethical and reformatory character which was here given to the mystic dogma and to the cultus of Pythagoras, and the endeavour to educate its members, in harmony with the Doric customs and view of life, to bodily and mental soundness, to morality and self-control. With this endeavour was combined not only the cultivation of many arts and crafts, of gymnastic, music, and medicine, but also scientific activity, which was practised within the society after the example of its founder, and participation in which, apart from the mysteries of the school, was probably seldom attained by any except the members. The mathematical sciences until the beginning of the fourth century had their chief seat in the Pythagorean school: with them was connected that doctrine of nature which formed the essential content of the Pythagorean system of philosophy. That an ethical reform like that attempted by Pythagoras must of necessity become a political reform was inevitable

among the Greeks of that period ; in their politics the Pythagoreans, in accordance with the whole spirit of their doctrine, were upholders of the Dorian aristocratic institutions, which had for their end the strict subordination of the individual to the whole, and they governed by their influence many of the cities of Magna Græcia in this spirit. Meanwhile this political attitude of the Pythagorean society gave occasion to frequent attacks upon it, which determined Pythagoras himself to remove from Crotona to Metapontum, where he died. After many years of irritation, the burning of the Pythagorean meeting-place in Crotona, probably about 440-430 B.C., gave the signal for a persecution that extended itself over the whole of Lower Italy, in which many of the Pythagoreans lost their lives, and the remainder were dispersed. Among these fugitives, through whom middle Greece first became acquainted with Pythagoreanism, were Philolaus (*sup.* p. 45 note 2) and Lysis, the teacher of Epaminondas, who both lived in Thebes. Eurytus was a disciple of the former, and his scholars are mentioned by Aristoxenus as the last Pythagoreans. About the beginning of the fourth century we meet with Cleinias in Tarentum, and soon afterwards with the famous Archytas, through whom Pythagoreanism once more attained the leadership of a great community ; soon after his time the Pythagorean science, even in Italy, appears to have been extinguished or to have sunk into a state of insignificance, while the Pythagorean mysteries, on the contrary, not only maintained themselves but even spread and increased.

§ 15. *The Pythagorean System : Number, and the Elements of Number.*

As the practical endeavours of Pythagoras had for their object the harmonious and orderly shaping of human life, so the theory of the world which is connected with them, and the leading ideas of which no doubt originated with Pythagoras, kept mainly in view that order and harmony through which the totality of things is combined into a beautiful whole, a cosmos; and which is chiefly perceptible to us in harmony of tones, and in the regular motion of the heavenly bodies. The reason of this, as the Pythagoreans as mathematicians remark, is that everything in the world is ordered according to numerical relations; number, according to Philolaus (*ap. Stob. 'Ecl.' i. 8*), is that which makes the hidden cognisable, rules divine things (the cosmos), and the works of men, music, and handicraft, and allows no falsehood. All is so far formed according to number.¹ But to their unpractised realistic thought this proposition is immediately converted into another —namely, that number is the essence of things, that all is number, and consists of number; and to cancel the obscurity which herein lies, and to ascribe to the Pythagoreans a definite distinction between numbers and things ordered according to numerical relations, would be to mistake the peculiar character of their whole point of view.

Numbers are some of them odd and some even, and individual numbers are also composed of these

¹ Arist. *Metaph.* i. 6, 987 b. 11, *μυθήσει τὰ ὄντα φασὶν εἶναι τῶν ἀριθμῶν.*

constituents. Uneven numbers are those which set a limit to bi-partition; the even are those which do not; the former are limited, the latter unlimited. From this the Pythagoreans concluded that the odd and even, or, as it is more generally expressed, the limiting¹ and the unlimited, are the fundamental constituents of numbers and of all things (the *πράγματα ἐξ ὧν συνέστα ὁ κόσμος*, Philol.). And as the limited was held by the Greeks to be more perfect than the unlimited and formless, and the odd number more lucky than the even, they connected therewith the observation that the opposition of the limited and unlimited, of the better and the worse, runs through everything, and a table of ten opposites was drawn up (no doubt first by later members, such as Philolaus), which was as follows:—1. limited and unlimited; 2. odd and even; 3. one and many; 4. right and left; 5. masculine and feminine; 6. rest and motion; 7. straight and crooked; 8. light and darkness; 9. good and evil; 10. square and oblong.

On account of this opposition in the primary constituents of things, a principle was necessary to unite the opposites; this principle is harmony, as 'unity of the manifold,' and 'agreement of the discordant.' Since therefore all is called number, it may also be said that all is harmony; but, owing to the obscurity of the school in co-ordinating the particular and the universal, the symbol and the conception designated by it, no attempt is made to discriminate not only

¹ Called by Philol. (*Fr.* i.) *περαῖνον*: in Plato and Arist. we have *πεπερασμένον*, *πέρας ἔχον*.

harmony in the cosmic sense from musical harmony, but musical harmony from the octave, which was also called 'Harmony.'

§ 16. *The Pythagorean Physics.*

In applying their doctrine of numbers to given phenomena, the procedure of the Pythagoreans was for the most part very arbitrary and unmethodical. When they found a number or a numerical relation in anything, they explained it as the essence of the thing; thus, not unfrequently the same object was designated by different numbers, and still more commonly the same number was used for the most various objects, and these consequently, no doubt, were placed in relation one with another (*e.g.* the *καυρός*, and the sun), But a more methodical development of the doctrine of numbers was attempted when the various classes of things were arranged according to numbers, and their qualities were explained by numbers. The fundamental scheme of numbers is itself the decadal system; each of the first ten figures has its own power and significance. Among these the decad is pre-eminent as the perfect all-embracing number; next to it the potential ten, the Tetractys with which the well-known form of oath was connected. On numerical relations, as the Pythagoreans (and, it is said, their founder) first discovered, the acuteness and concord of tones are founded; the relation of these tones, determined by the length of the vibrating strings, and computed according to the diatonic division of the heptachord (later, octachord), is thus given by Philolaus (*ap. Stob.*

'Ecl.' i., 462): for the octave (*ἁρμονία*, later *διὰ πασῶν*) 1 : 2; for the fifth (*δι' ὀξείαν*, later *διὰ πέντε*) 2 : 3; for the fourth (*συλλαβία*, later *διὰ τεσσάρων*) 3 : 4; for the tone 8 : 9. From numbers were derived geometrical forms (in which Greek mathematics were accustomed to present numerical relations); two was called the number of the line, three the number of the plane, four of the solid. Philolaus made the elementary nature of matter dependent on the form (of its smallest parts); for of the five regular solids he assigned the tetrahedron to fire, the octahedron to air, the icosahedron to water, the cube to the earth, the dodecahedron to the universe (perhaps to the æther). The eternity of the world is attributed to Pythagoras only by later writers, in contradiction to Aristotle. The formation of the world began from the one, *i.e.* from the fire of the centre; and this fire attracted to itself and limited the nearest portions of the unlimited. In it lies the central point and union of the world, it is 'Hestia,' 'the citadel of Zeus,' &c. Around this central fire the earth, together with the other heavenly bodies, moves; and here for the first time the thought appears of explaining the daily motion of the heaven by a motion of the earth. But in order to preserve the perfect number ten for these heavenly bodies, the counter-earth is inserted between the earth and the central fire. This astronomical system, which can be proved to have been held by Philolaus, seems to have first proceeded from the successors of Pythagoras; the doctrine of the spherul harmony, which, starting from the popu-

lar conception, treats the seven planets as the sounding strings of the heavenly heptachord, is more ancient. The theory of a world-soul was attributed to the Pythagoreans in spurious writings of a Neo-Pythagorean origin; but it is clear from what Aristotle says that it was foreign to them. Nor do they seem to have instituted any more particular inquiries in regard to the human soul. Aristotle only states in regard to this subject that they held the solar corpuscles, or, also, that which moves them, to be souls ('De An.' i. 2, 404 a. 16); in 'Metaph.' i. 5, 985 a. 30, he also enumerates under the category of things reduced by the Pythagoreans to number, soul and understanding (*νοῦς*); and thereby confirms the statement (Iamb. 'Theol. Arith.' 56) that Philolaus, in connection with his derivation of the body (*sup.* p. 53), assigned the physical qualities to the number five, animation to six, intelligence (*νοῦς*), health, and 'light' to seven, and love, wisdom, and practical knowledge to eight. The soul is also described as harmony, perhaps likewise as the harmony of the body; and it may be true that Philolaus placed the seat and germ (*ἀρχή*) of reason in the head, that of the soul in the heart, that of growth and germination in the navel, that of seed and generation in the sexual parts. The further particulars handed down by tradition as belonging to the ancient Pythagoreans, but bearing a stronger resemblance to the Platonic psychology, are not to be considered authentic.



§ 17. *Religious and Ethical Doctrines of the Pythagoreans.*

Together with the scientific determinations of the Pythagorean system, a number of doctrines have been handed down to us as Pythagorean, which arose independently, and have been brought into very slight combination, or none at all, with those determinations. To these belong first of all the doctrine of the transmigration of souls, taken by Pythagoras from the Orphic mysteries (*sup.* p. 48), and the theory connected with it (mentioned by Eudemus as Pythagorean) that after the expiration of the Great Year (probably reckoned at 10,000 years) the previous course of the world down to the smallest details will be repeated. Likewise the belief in demons, by which are chiefly meant the souls waiting in Hades, or floating about in the air (*vide* p. 54). Finally some theological utterances attributed to Philolaus of which the one that recalls Xenophanes and his purer conception of God has no certain authority, and the rest bear no philosophical stamp. The *ethical* precepts of the Pythagoreans were combined, by means of the doctrine of future retribution, with the dogma of transmigration of souls; but this religious motive which is not exclusively Pythagorean, has nothing in common with a scientific foundation of ethics. Nor is such a foundation to be found in the practical rules and prescripts which have been handed down to us partly in symbolical maxims, and partly in other forms. A collection of such prescripts (dating at earliest from the third

century before Christ) contains the so-called Golden Poem (a second, probably enlarged by his own additions, was composed by Aristoxenus, vide *sup.* p. 10). The ethical principles of the Pythagoreans here find expression; they require reverence for the gods, the government, and the laws, love of country, fidelity to friends, self-examination, temperance, and purity of life, but these demands are as little based on scientific formulæ as in the proverbial maxims of the people and the poets. The only authenticated attempt to apply their theory of numbers to the sphere of ethics lies in the proposition that justice is an equal number multiplied by an equal (or more accurately that it is one of the two first square numbers, four and nine), because it returns equal for equal. It may also be true that they described virtue as harmony, which, however, asserts nothing particular about it. Though the ethical tendency of the Pythagorean society was most valuable, therefore, from a practical point of view, the contribution of Pythagorean philosophy to the scientific treatment of ethical questions was but meagre; for the necessity of such a treatment, as distinguished from directly ethical and religious exhortation, was not yet experienced.

§ 18. *Pythagoreanism in Combination with other Doctrines.*

A combination of the Pythagorean doctrine with other standpoints produced the physical theories of Hippasus and Ecphantus. Hippasus of Metapontum (about 450 B.C.), who is generally described as a

Pythagorean, seems to have combined the Pythagorean central fire with the first principle of Heraclitus; for he declared fire to be the primitive matter of the world. Ecphantus (who lived, it would appear, about the beginning of the fourth century) united the doctrine of the Pythagoreans with that of Democritus; instead of the units, which are the elements of number, he substituted corporeal atoms; but he assumed, like Anaxagoras, that a Divine spirit had formed the world. Previous to his time, Hicetas of Syracuse, with whom he herein agrees, had exchanged the movement of the earth around the central fire for a movement round its own axis. That, on the other hand, philosophers who did not belong to the Pythagorean society were affected by certain of its doctrines, is shown, not only by the examples of Parmenides and Empedocles, but also by that of Alcmaëon, the Crotoniate physician (first half of the fifth century). When he remarks that human life moves between opposites, we are reminded of the corresponding doctrine of the Pythagoreans; and there is a reminiscence of their doctrine of immortality in his saying that the soul is immortal, for it resembles the imperishable heavenly natures, the stars being like them involved in perpetual motion. In the fragments also of the famous comic poet, Epicharmus (about 550–460 B.C.), we find, together with certain propositions of Xenophanes and Heraclitus, the Pythagorean doctrine of immortality; but we are not justified in calling him, as some of the ancient philosophers do, a Pythagorean.