

The influence of Pythagoras
on medical art and science p 227 - 241

Kathryn A. Thomas

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ATTI DEL XIV CONVEGNO INTERNAZIONALE DEL CENTRO DI STUDI
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MONTEPULCIANO - PALAZZO TARUGI - 1977

Fabio Tutrone (Palermo)

Commune lus Animantium (Clem. 1.18.2):

Seneca's Naturalism and
the Problem of Animal Rights

Tutrone, Phasis 2013

p 1 - 41

Aristotle and the Mathematical Tradition

on diastēma and logos:

An Analysis of Physics 3.3, 202a18-21

Monica Ugaglia

Greek, Roman, and Byzantine Studies 56 (2016) 49-67

Los griegos y la doctrina esotérica de los elementos

p 115 - 120

Ronald Casas Ulate

Ulate, Uniciencia 23, 2009

Identity and Ethnicity in Italy: The case of the Tomb of the Diver

By Maarten van Vliet

Course: Burial and Ancient Society

Studentnumber: 10467254 (UvA)/1893661 (VU)

Supervisor: Marijke Gnade

Date: 31-01-2014

29 p

Texas Tech University

Pythagoras and the Pythagoreans

Faissal Zeitouni

Historical Survey of Roman Religion

History 5340, Spring 2014

24 p

CENTRO DI STUDI UMANISTICI « ANGELO POLIZIANO »
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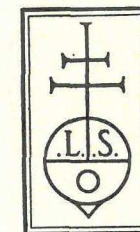
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Il Poliziano tradusse anche epigrammi greci in latino, ma la sua non è una traduzione che presenta caratteri diversi da quelle di altri umanisti. Il Poliziano, tuttavia, ha superato i suoi contemporanei perché egli non considera l'Antologia greca come una fonte di erudizione o come un semplice testo da tradurre; egli la considera come una fonte letteraria dalla quale attingerà immagini e termini per arricchire i suoi versi. Per merito del Poliziano l'Antologia Greca sarà maggiormente conosciuta perché i suoi versi, tanto i latini quanto quelli italiani, ricchi di reminiscenze dell'Antologia, si imporranno all'ammirazione dei posteri.

Gli epigrammi latini del Poliziano non sono diversi da quelli di altri umanisti a lui contemporanei; i « docti Itali » presentano, a volte, composizioni migliori di quelle del Poliziano, mentre questi, in alcuni casi, eccelle su di loro.

Si è già detto all'inizio che l'epigramma greco sorge strettamente connesso con l'elegia e se ne distacca gradatamente per formare una composizione a se stante; i poeti ricorrono ad essa per esprimere sentimenti che possono essere considerati propri della lirica. Si è anche detto che l'epigramma, in origine, era una composizione, di due versi, mentre ben presto, già nel periodo alessandrino, esso divenne una composizione lunga e di maggior respiro. Il termine « epigramma » voleva soltanto indicare una poesia non eccessivamente impegnativa. La stessa cosa può essere affermata per il periodo umanistico poiché mentre in un primo momento l'epigramma è breve e formato di distici, alla fine del Quattrocento, con il termine « epigramma », è indicata ogni forma di poesia lirica dalla struttura metrica varia e non esclude, ad esempio, la strofe saffica e quella alcaica. All'evoluzione di tale forma poetica hanno in modo particolare contribuito i poeti più noti dell'epoca, soprattutto il Poliziano.

The influence of Pythagoras on medical art and science

Kathryn A. Thomas

A study of the multi-faceted influence of Pythagoras and his followers in the world of medical art and science is needed because earlier treatments have been excessively brief and no single study seems to have included more than two aspects of Pythagorean influence. The study is also appropriate to the present Congress which has as its theme *Humanism and Ecumenism*. The Pythagoreans influenced ancient thinking towards humanism as well as towards empiricism; and the pattern of their influence is one of surprising disunity, which points to an ecumenical quality which is natural under certain conditions of society rather than created by the overbearing external influence of a prevailing school of thought, such as is, for example, the influence of a Platonic or an Aristotelian School. Galen's contemporaries did not draw a connection between seven as the number of the critical day in a fever with the recurrence of the number seven in the macrocosm because there was a strong, continuous, traceable influence from Pythagoras. Nor is such influence responsible for the fact that physicians in the Anglo-Saxon Middle Ages used a magical circle of numbers to decide whether to bleed their patients, or that in the seventeenth century the Surgeons Guild in Gouda adopted the Pythagorean pentagram as their device. Rather, the underlying spirit of Pythagoras is an underlying spirit of this oecumene, this inhabited world, not just of the Brotherhood.

PRIMACY OF HEALTH FOR PYTHAGORAS

About the historical Pythagoras we know very little because of the bond of secrecy adopted by one branch of the sect, because of the dispersion of his followers, and because of the late date of most of our sources. There is, however, general agreement that the motivating factor which prompted Pythagoras to adopt his special mode of life was his desire to find for himself and for others a better way of living, that is,

the good life. The basis of this life was *mens sana in corpore sano* to be achieved by purifying the body through medicine and the soul through music. Thus, the Pythagoreans were immediately drawn into medical considerations including diet, regimen, and exercise. Naturally, some of the Pythagorean taboos also grew out of or degenerated into superstition. However, the decided Pythagorean support of scientific research is a much more important factor, and it definitely increased their interest in medicine as a means of finding a better life for men.

The primacy of health for Pythagoras and his followers may also be deduced from an autobiographical anecdote in the writings of Lucian. Lucian confesses in *Pro lapsu* that he was once criticized for greeting an acquaintance with the words « Good health to you » instead of « Joy to you ». However, the author argues for the acceptability of his greeting by pointing out that Pythagoras gave precedence to health because well-being and happiness depend on good health whereas good health does not itself necessarily result from well-being and happiness. Moreover, as Lucian states, the followers of Pythagoras always began their letters to one another with a wish for good health.¹

COSMOLOGICAL THEORY AND NUMBER THEORY

Several ancient medical writers were especially interested in cosmology and the relationship between the operations and qualities of the universe and those of the human body. A passage from Porphyrius' *Life of Pythagoras* indicates that Pythagoras believed in the kinship of all life, out of which belief may have developed the cosmological approach to medicine:

None the less the following became universally known: first, that he maintains that the soul is immortal; next, that it changes into other kinds of living things; also that events recur in certain cycles, and that nothing is ever absolutely new; and finally, that all living things should be regarded as akin. Pythagoras seems to have been the first to bring these beliefs into Greece.²

According to Aristotle, Alcmaeon of Croton, who was a young man when Pythagoras was advanced in years and who was a student of

¹ Charles Iacobitz (ed.), *Luciani Opera*, Leipzig, Teubner 1905, I, 328-334.

² PORPHYRIUS, *Vita Pythagorae* 19 (DK 14, 8a). This and subsequent translations of and references to the Presocratic philosophers will follow Kirk and Raven's enumeration, text, translation, and discussion of the fragments; their location in Diels-Kranz will also be indicated: G. S. KIRK and J. E. RAVEN, *The Pre-socratic Philosophers*, Cambridge 1962, number 271.

Pythagoreanism, gave a more explicit statement about the relationship between the microcosm and the macrocosm:

Alcmaeon also seems to have held much the same view about the soul as these others; for he says that it is immortal owing to its similarity to the immortal; and it has this quality because it is always in motion; for everything divine is in continual motion—the sun, the moon, the stars and the whole heavens.³

Among the Hippocratic works the cosmological approach is found in several treatises, including *Airs, Waters, and Places*, *Fleshes*, and *The Nature of Man*. The author of *The Nature of Man*, for example, maintains that a different set of opposites dominates in each season of the year, so that spring is warm and moist, summer warm and dry, autumn cold and dry, winter cold and moist. As the seasons change, man experiences changes in his body which reflect the changes in the macrocosm.⁴

One of the most interesting cosmological medical texts is the work *Sevens*. The author of the first part of this work (chapters 1-12) argues that the human body reflects the pattern of the macrocosm and that the whole of nature is arranged in groups of seven. Chapters 13-56 of *Sevens*, which describe the causes and treatments of fevers, seem to have been written by a different author because the seven principle is not present and is even contradicted in this section. However, this means only that the primacy of the number seven is not a factor for the author of the second part and does not preclude the possibility that he is otherwise influenced by Pythagorean thinking. In fact, he does equate the bodily constituents with those of the macrocosm in terms of a four-element theory.⁵

In addition to special works within the Hippocratic Corpus, which have a definite Pythagorean flavor, it is possible to point to adaptations of Pythagorean philosophy to general Hippocratean practice. For example, while the physicians did not usually place special emphasis on seven or any other number, they did believe that critical days were

³ KIRK and RAVEN, number 287: ARISTOTLE, *De anima* A2, 405a29.

⁴ For a more detailed discussion of this approach, see T. TRACY, *Early Greek Medicine*, « The Classical Outlook », 41, 1973, p. 19; M. L. WEST, *The Cosmology of 'Hippocrates' De hebdomadibus*, « Classical Quarterly », 21, 1971, 365-388, indicates on page 365 that he thinks Plato (*Phaedrus* 270c) also attributes this methodology to Hippocrates. However, it is not clear that τῆς τοῦ ὅλου φύσεως refers to the whole of nature rather than the whole of the nature of man in this passage which reads ψυχῆς οὖν φύσιν ἀξίως λόγου κατανοῆσαι οἷε δυνατόν εἶναι ἀνευ τῆς τοῦ ὅλου φύσεως.

⁵ Examples of Pythagorean influence on the authors of *Sevens* are pointed out in West, *passim*, and especially on pages 372, 374, 376, and 387. See also J. MANSFELD, *The Pseudo-Hippocratic Tract Περὶ ἑβδομάδων ch. I-XI and Greek Philosophy* (Philosophical Texts and Studies 20), Assen, Van Gorcum 1971, ch. 3 *passim*.

important. Also, while they declined to consider individual factors such as heat and cold as ultimates, they did place great importance on climate. There are really two aspects of Pythagorean thought involved here: the belief that the individual's constitution and the condition of his health, at least in a general way, are related to the constitution of the universe in which he lives and his environment, and secondly, the belief that the constitution of the universe and similarly of man involves numbers which led to a belief in the power of numbers. The former teaching enjoyed wide support in the mainstream of ancient medicine and exercised influence on physicians wherever the Hippocratic method was followed. The *locus classicus* for Hippocratic teaching in this vein is *Airs, Waters, and Places*, which begins as follows:

Whoever wishes to investigate medicine properly must proceed as follows. First he must consider what powers each season of the year possesses. For the seasons are by no means alike: they differ widely both in themselves and in their changes. Next he must take account of the winds, both warm and cold, especially those common everywhere, but also those peculiar to each locality. Similarly, the qualities of waters must be considered; just as these vary to the taste and in weight, so also each has a property quite peculiar to itself. Thus when anyone comes to a city which is strange to him, he should thoroughly examine its situation, how it lies with respect to the winds and to the sun's rising; for a city exposed to the north has not the same qualities as one exposed to the south, nor one lying towards the rising sun the same as one turned towards its setting.⁶

Among Galen's writings the same thinking is explicit in *On Habits and That the Faculties of the Soul Follow the Temperaments of the Body*. It is also reflected in an extremely interesting letter which he wrote to the father of an epileptic youth. In this letter he advises the father that it will be impossible for Galen to recommend treatment for the boy in much detail because the family will be travelling to Athens and Galen will not be able to monitor the effects on the boy's constitution of the geographical and chronological changes involved. Therefore, he urges the father to trust Dionysius, the attending physician, to rightly assess the boy's constitution and to prescribe appropriate treatments as the seasons change.⁷

The Pythagorean number theory began to have considerable impact during the troubled years of the declining Roman Empire when magic

⁶ *Airs, Waters, and Places* 1. Unless otherwise indicated, translations of Greek medical texts will follow A. J. Brock, *Greek Medicine*, London, J. M. Dent and Sons, Ltd. 1929 (reprinted by AMS Press, Inc. 1972).

⁷ Owsei Temkin (translator and commentator), *Galen's 'Advice for an epileptic Boy'*, « Bulletin of the Institute for the History of Medicine », 2, 1934, 179-189.

had great appeal for the people who were not able to find answers for the needs of their world in the traditional religions. Even Galen accepted the use of some magical amulets, although he denied the validity of mystical numbers on the grounds that the crisis in a disease might occur on any day and that the seven mouths of the Nile or the seven stars of the Pleiades had nothing to do with a crisis on the seventh day. His protest against this form of Pythagorean thought, however, points to its rising dominance among his contemporaries.⁸

To see how this aspect of Pythagoreanism was transferred into the Dark Ages, one can look at Anglo-Saxon medicine. Although very little of Anglo-Saxon medicine is rational, there are to be found in the literature faint traces of the philosophically based medicine of the Greco-Romans. Thus, they still believed in a close relationship between the macrocosm and the microcosm and they perpetuated the humoral theory around which they extended an elaborate system based on fours—four ages of man, four elements, four cardinal points, and so forth.

The barbarian minds were also very receptive to number lore, and the doctrine of critical days was readily adopted. Eventually, it was elaborated and applied in medical practice in an arbitrary, uncritical manner. The most interesting manifestation of this process is the so-called Sphere of Pythagoras which was used virtually in place of medical prognosis. Although the exact method of using the circle is not known for certain, the general procedure was to identify the day of the week and of the lunar month on which the patient fell ill and then the numerical value of the patient's name based on a chart which was provided with the sphere. If the resultant number fell in the upper part of the sphere, which was actually a circle filled with columns of numbers, the patient would live. If the number fell in the lower part of the sphere, the patient would die. There is some evidence that these circles were used not only by the leeches to determine whether or not to bleed their patients but also by clerics in order to decide whether to anoint the sick. A copy of the circle would be included in small missals used for visiting the sick along with church calendars and lists of lucky and unlucky days.⁹

⁸ J. SCARBOROUGH, *Roman Medicine*, Ithaca, Cornell University Press 1969, pp. 119-120.

⁹ C. J. SINGER, *Early English Magic and Medicine*, « Proceedings of the British Academy », 9, 1919-1920, 341-374, especially pp. 348 ff., gives a detailed account of manuscript evidence for the Sphere of Pythagoras. Although it was variously assigned to different persons, including Hippocrates, Plato, Democritus, and Apuleius, Singer believes that it is Greek in origin, that the name Pythagoras is most reasonable, and that it was probably imported into the Anglo-Saxon world by a Greek speaking ecclesiastic. See also C. J. SINGER, *Anglo-Saxon Magic and Medicine*, New York, Oxford University Press 1952, p. 42.

BALANCE OF OPPOSITES

Alcmaeon is perhaps best known for his theory that health is based on an equal balance of opposite powers. This theory represents a second area of Pythagorean doctrine which enjoyed an influence outside the circle of Pythagorean brotherhood. Aetius summarizes the doctrine of opposites as taught by Alcmaeon:

Alcmaeon maintains that the bond of health is the 'equal balance' of the powers, moist and dry, cold and hot, bitter and sweet, and the rest, while the 'supremacy' of one of them is the cause of disease; for the supremacy of either is destructive. Illness comes about directly through excess of heat or cold, indirectly through surfeit or deficiency of nourishment; and its centre is either the blood or the marrow or the brain. It sometimes arises in these centres from external causes, moisture of some sort or environment or exhaustion or hardship or similar causes. Health on the other hand is the proportionate admixture of the qualities.¹⁰

The overwhelming impact of this theory of opposites may be realized from the fact that the author of the medical papyrus *Anonymous Londinensis* divides all medical theorists into but two categories: those who theorized that disease results from poisonous residues in the body and those in the Pythagorean tradition who theorize that disease results from an imbalance of elements in the body. Actually, among those ancients who held that health resulted from a balance of elements there arose two schools of thought. The first group followed Alcmaeon closely and taught that there was an indefinite number of opposites to be balanced. The second group was influenced by Empedocles, another follower of Pythagoras. These medical theorists limited the number of opposites to four and they developed the humoral theory which is introduced in the Hippocratic treatise *On the Nature of Man*. Because the Pythagorean theory of opposites did have direct influence on subsequently formalized theories of humors among the Greeks and secondary humors among the Arabic thinkers, it is inevitable that Pythagorean influence forms the background for such far-removed developments in intellectual history as the vitalistic periods of modern biology and medicine, affecting such theorists as Sydenham and Stahl or Bier and Driesch.¹¹ However,

¹⁰ KIRK and RAVEN, number 286: Aetius V, 30,1.

¹¹ There are two studies which treat this aspect of Pythagorean influence: T. S. HALL, *Life, Death, and the Radical Moisture*, «Clio Medica», 6, 1971, 3-23 and A. MEYER, *The Tradition of Ancient Biology and Medicine in the Vitalistic Periods of Modern Biology and Medicine*, «Bulletin of the Institute of the History of Medicine», 5, 1937, 800-821.

the present author would like to limit discussion to the more direct line of influence from Alcmaeon.

One of the more interesting adaptations of Alcmaeon's theory is found in Plato's *Phaedo*. Plato agrees with Alcmaeon in allowing for more than four elements, and he has Simmias posit a possible applicability of this theory to the health of the psyche as well as to corporeal health. Thus, diseases of the soul for Simmias are not blemishes or *harmartia* which are cured by cleaning or catharsis. Rather, they are *ametria* of the beliefs, senses, and appetites of the soul. The pertinent passage from Plato follows:

And I fancy, Socrates, that it must have occurred to your own mind that we believe the soul to be something after this fashion; that our body is strung and held together by heat, cold, moisture, dryness, and the like (καὶ τοιούτων τινῶν), and the soul is a mixture and a harmony of these same elements, when they are well and properly mixed. Now if the soul is a harmony, it is clear that when the body is too much relaxed or is too tightly strung by diseases or other ills, the soul must of necessity perish, no matter how divine it is, like other harmonies in sounds and in all the works of artists, and the remains of each body endure a long time until they are burnt or decayed. Now what shall we say to this argument, if anyone claims that the soul, being a mixture of the elements of the body, is the first to perish in what is called death?¹²

The influence of Alcmaeon on Plato is seen also in the *Republic* (444D) when Socrates is discussing justice and the health of the soul. He first points out that health is produced in the body when the various parts of the body are in their natural relationship of authority or subservience to one another. Then, he suggests that similarly justice is produced when the parts of the soul are in their natural relationship of authority or subservience. Virtue, Socrates says, is a kind of health of the soul. Aristotle (*De anima* A4 407b27) also attests to the fact that some philosophers believed that the soul was an attunement of opposites because the body is constituted of opposites.

Alcmaeon's influence among the writers of medical treatises is most evident in the work *Ancient Medicine*. In tone and spirit this essay was a polemic against the Sophists—some of them physicians—who were trying to develop the aetiology of disease by introducing novel philosophical

¹² Plato, *Phaedo* 86B-D. I have followed the translation by H. N. Fowler in the Loeb Series. Simmias' argument is further expanded by Galen in his work *That the Faculties of the Soul Follow the Temperaments of the Body*. See also L. G. BALLESTER, *Diseases of the Soul* (Nosēmata tēs psychēs) in *Galen: The Impossibility of a Galenic Psychotherapy*, «Clio Medica», 9, 1974, 35-43, especially pp. 38 ff.

hypotheses. The author's effort leads him into exploration of the nature of the art of medicine and its origin. The remarkable fact is that he rejects the traditional view that medicine, along with all the other arts, was revealed to man by the gods. Rather, he proposes that as man evolved from a primitive, cave-dwelling state the art of medicine also evolved. His basic thesis is that medicine was sought out and discovered by evolving man because the same diet and regimen are not beneficial to the healthy person and to the weak or ill person.

Normal human regimen was developed because the strong natural diet of wild animals, e.g., fruits, wood, and grass, causes men to suffer violent pain and frequent death. By trial and error early man therefore discovered that he fared better if he ground and baked his grains into breads and cakes and cooked fruits and meats. Similarly, he discovered that the strength of foods could be further altered for persons with weak constitutions by diluting them or making them into gruels. Thus, the author of *Ancient Medicine* demonstrates that medicine is an established *techne* which was developed naturally out of necessity (*ἀνάγκη*) because of need (*χρεία*).

In the process of developing this thesis the author makes it very clear that he agrees with Alcmaeon's theory of health. Disease for him results from a disturbance of the balance of an indefinite number of opposites in the body. Health may be restored by treating the body through proper regimen and diet. One of the theories which he opposes directly by way of example is based on the hypothesis that the causes of disease are the hot, cold, moist, and dry. The argument put forth in *Ancient Medicine* is that heat and cold, the moist and dry are not used as remedies for disease. Rather, health is restored by adjusting the dietary regimen of the patient so that the qualitative strengths of the foods in the diet will not be too strong for the patient's constitution. Foods may be too salty, bitter, sweet, acidic, sour, and so forth. In order to achieve correct balance the effects of various foods upon constitutions of various kinds must be measured as accurately as possible.¹³

It should be stressed that Alcmaeon, the author of *Ancient Medicine*, and other physicians in this tradition advocated a fairly simple, sensible diet for the physical well-being of the body. A rigid, ascetic diet is less easily substantiated based on the evidence even in testimony about Pythagoras himself. Various diets seem to have been required of various

¹³ For further commentary and the text of *Ancient Medicine*, see W. H. S. JONES, *Philosophy and Medicine in Ancient Greece*, Baltimore, Johns Hopkins 1946, Sections III-IV and H. W. MILLER, *On Ancient Medicine and the Origin of Medicine*, «Transactions of the American Philological Association», 80, 1949, 187-202.

individuals, depending on such factors as age, occupation, and so forth. For example, athletes were allowed to eat meat. This may, in part, account for the confusion in Diogenes Laertius' description of Pythagoras' prescriptions:

Above all else he forbade the eating of red mullet and black-tail; and he enjoined abstinence from the heart and from beans; also, according to Aristotle, on certain occasions, from the womb and from mullet ... He sacrificed only inanimate things; but others say that he used only cocks and sucking kids and piglings, as they are called, and never lambs.¹⁴

Galen will not be treated in any detail with regard to the theory of balance because he was one of the physicians who adhered to the humoral theory. However, his work *On Habits* is a rich source of information for demonstrating that diet and regimen ought to be adjusted according to the person's age, physique, sex, and so forth. A selection regarding food is given here.

Just, then, as among the various classes of animals the difference is no small one between the foods akin to each, similarly also great differences are found among the species in each class. Thus some people are not even able to taste wine, while others drink large quantities with impunity ... When in the absence of any other food, as happens in time of famine, some people force themselves to eat flesh, they cannot digest it without harm ... Now these being matters of observation, we must in the first place keep in mind that men find one food more pleasant than another by reason of its natural kinship or affinity with them ... Thus habit is a *sign* of natural affinity. And that it also often becomes a *cause* is clear from the fact that substances which are at first found by certain people unpleasant or noxious, no longer continue so if one waits till a habit gradually establishes itself. Now the cause of this is as follows: just as every article of food and drink becomes altered in quality, so also is the altering factor itself affected. A clear proof of this may be found in the different humours produced by each article of food; some produce a melancholic (atrabilary) blood, others a phlegmatic blood or blood containing a fair amount of the pale, so-called yellow, bile; some again produce pure blood. So also there is necessarily a difference brought about in the parts nourished, according to the kind of blood which nourishes them.¹⁵

Similar thoughts may be found in the Hippocratic Corpus. For example, the author of *On Regimen I* teaches that the proper balance in males is more warm and moist than in females and that infants are extremely

¹⁴ KIRK and RAVEN, number 274: Diogenes Laertius, VIII, 19.

¹⁵ BROCK, pp. 187-188.

warm and moist but become dry as they become older until they approach old age, when they become cold and moist. The author of *Regimen in Health* distinguishes among various types of physiques. Thus, the fleshy physique is more moist than the lean physique, which is dry.

Incidentally, the variations in proper balance according to various ages and physiques, while not diseases in themselves, do cause persons to be more susceptible to different diseases depending on age and circumstances.

EMPIRICAL METHOD

In his essay « The Distinctive Hellenism of Greek Medicine » Ludwig Edelstein credits the Greeks with turning empirical data into knowledge. He says that the orientals had noted details or moments of sickness, whereas Greek medicine encompassed the whole process of illness. Therefore, in his opinion, the Greeks invented the science of medicine.¹⁶

On the science, as well as on the art, the Pythagoreans placed their stamp. The legends about the different experiments by which Pythagoras discovered the numerical relations of the musical scale form a good starting point. While some of these accounts are admittedly pure legend and fantasy, nonetheless they do provide some valid information. If nothing else, they show that the value of the experimental method was recognized in the ancient world and that it was associated with the name of Pythagoras. Also, at least two of the experiments attributed to Pythagoras would yield correct information about the musical intervals. The first valid experiment involved the discovery of the relationship between tension and pitch by attaching different weights to a string and the second involved measuring the different lengths of pipes through which columns of air pass to create tones.

Other early Pythagoreans are reported to have been engaged in other experiments. Hippasus is supposed to have constructed bronze disks of different thicknesses in order to produce certain harmonies, and Archytas seems to have been involved in a number of experiments while he was working on his theory that the pitch of a note is related to its speed.

It is not surprising, therefore, to learn that the key method of empirical research in the field of medicine was first practiced in Greece by Alcmaeon. Dissection among the Greeks began with the dissection of dead adult animals. However, even Alcmaeon extended his research

¹⁶ L. EDELSTEIN, *The Distinctive Hellenism of Greek Medicine*, « Bulletin of the History of Medicine », 40, 1966, 197-225, especially p. 199.

to embryology and noted that the head of the fetus is the first part to develop. His most important contributions to anatomy were the discoveries of the optic nerves and the Eustachian tubes. Not only did Alcmaeon himself engage in dissections. He also excited the interest of two pupils, Acron and Pausanias, who continued his anatomical investigations. Plato's contemporary Philistion of Locri should also be mentioned because he follows in a direct line of succession. Eventually, the Greeks even extended their investigations to vivisection, especially at the great center for anatomical studies at Alexandria.¹⁷

HUMANIZING EFFECTS

In addition to their influences on medical theory and empirical research, the Pythagoreans exercised an influence on medical ethics and the humane practice of medicine. Much of this influence resulted from the type of religious life that Pythagoras and his followers required of themselves.

The Pythagoreans placed a high value on ethical discipline. Like the Orphics they believed in the transmigration of souls, which lent religious support to their dietary restrictions. However, the discipline which they prescribed for the mind and soul was much more important. Pythagoras and his followers were interested in the immaterial, emphasized the duality of man, and stressed the need for self-examination, reflection, and the pursuit of truth. Too often the belief in transmigration of souls or the religious taboos of the Pythagoreans have been noted without mention of the philosophical basis for their discipline.

Although it is impossible to point to solid proof, nonetheless there are some strong arguments for crediting the Pythagoreans with the introduction of the *Hippocratic Oath*. In the latter part of the fourth century the Greeks reshaped their thinking about the value of the crafts, including the craft of medicine. According to the thinking of the earlier Greeks, an artisan was not bound to have goodness or even able to have goodness in the same way as a free gentleman, because artisans were servants, were not their own masters, and worked with their hands. The new attitude of the fourth century is reflected in Aristotle who states that virtue may not be required of artisans in the same way as for slaves,

¹⁷ C. SINGER, *Greek Biology and Greek Medicine*, Oxford, Clarendon 1922, p. 88. For a general study of experimentation among the Greeks, see G. E. R. LLOYD, *Experiment in Early Greek Philosophy and Medicine*, « Proceedings of the Cambridge Philological Society », 190, 1964, 50-72.

because the artisan does not share in his master's life in the same way as a slave. Therefore, his moral goodness is his own concern.

Now we determined that a slave is useful for the wants of life, and therefore he will obviously require only so much of virtue as will prevent him from failing in his duty through cowardice or lack of self-control. Someone will ask whether if what we are saying is true, virtue will not be required also in the artisans, for they often fail in their work through the lack of self-control? But is there not a great difference in the two cases? For the slave shares in his master's life; the artisan is less closely connected with him, and only attains excellence in proportion as he becomes a slave. The meaner sort of mechanic has a special and separate slavery; and whereas the slave exists by nature, not so the shoemaker or other artisan.¹⁸

The Pythagoreans took a further step and attempted to raise the craftsmen to a higher plane by placing personal responsibility on workmen with regard to their crafts and their morals. Basically, the Pythagoreans argued that the « good » could be achieved through the crafts. In Hellenistic times the teaching was reflected in the distinction between the happy life which presupposed a person of independent means and the good life which could be enjoyed by a person with an occupation. Finally, the Stoics completed the development with their teaching that a person could and should lead an ethical life no matter what his station in life.

Since medicine was a craft in ancient Greece, frequently practiced by travelling tinkers, the new thinking about the responsibilities of craftsmen had a profound influence on the practice of medicine. The *Hippocratic Oath* demands of the physician a life bound by strict ethical rules and pleasing to gods and men, a life free from all intentional injustice or wrong-doing. Thus, in the *Oath*, the type of life enjoined by Pythagoras is demanded of the physician.¹⁹

Another consequence of the Pythagoreans' ethical considerations may have been the moral support which they gave to the practice of public medical assistance. Diodorus Siculus (XII.13.4), in speaking about Charondas, a legendary lawgiver in Sicily, says that one of his worthiest laws required that the city of Katana provide salaries for teachers so that the sons of all citizens would learn to read and write. Diodorus goes on to point out that Charondas thus surpassed his predecessors who insisted that men's bodies be cared for by state physicians, because he saw to

¹⁸ *Politics* 1260a34-1260b2. I have followed Jowett's translation.

¹⁹ See L. EDELSTEIN, *The Hippocratic Oath*, Baltimore, Johns Hopkins 1943, p. 60 *et passim* and by the same author, *The Professional Ethics of the Greek Physician*, « Bulletin of the History of Medicine », 30, 1956, 391-419.

the care of their souls. Kerényi believes that it is significant that Charondas seems to have found state medical assistance already in existence and suggests that the Pythagorean religious setting in which medicine was practiced in Magna Graecia was a necessary condition for the development of nationalized medicine on a « selflessly spiritual » foundation in classical Greece.²⁰

Given that the Pythagoreans made significant contributions to medical theory and research and to the ethical practice of medicine, it is somewhat disconcerting to recall that they were subjected to exiles and to strong vituperation from Heraclitus and others, who accused Pythagoras of miracle-mongering, dilettantism, and malpractice.²¹ Part of the reason for their unpopularity stems from another of the humanizing effects which they had on medicine and one which is only recently beginning to be appreciated. Improperly understood, many of the practices of the Pythagoreans appear to be purely magical cures. This aspect is reflected in their statements about expelling daimons from the body, their use of music, and their cathartic conception of diet. On the surface it would seem that the Pythagoreans may not have been much better than the quacks who are described in the Hippocratic treatise *On the Sacred Disease*.

The main treatment employed in the so-called magical medicine of the Pythagoreans was the music of the lyre accompanied by chants or songs. By singing passages from Homer and Hesiod the Pythagorean sought to free the patient from the daimon and to spiritually purify him. However, Pythagoras was not satisfied with simply making a magical use of music in a primitive manner. Rather, he marks the transition from magical medicine to scientific medicine. By asking and partially answering the question « What is music? » Pythagoras came to recognize the cosmic and religious value of harmony and number as these imitate the harmony of the movement of the stars.

The relationship of this aspect of Pythagorean thought to Alcmaeon's theory of health as the balance of opposites becomes quite clear. The good psychic and somatic health of man is purity and harmony. If health is lost it can be restored by conforming one's life through regimen, diet, exercise, song, and science to the universal order of nature. This, then, is the purpose of the *vita pythagorica*—the preservation of or restoration to health.

Empedocles seems to have been instrumental in further developing

²⁰ C. KERÉNYI, *Asklepios: Archetypal Image of the Physician's Existence* (translated by Ralph Manheim), New York, Bollingen Foundation 1959, p. 51.

²¹ Cf. KIRK and RAVEN, numbers 259-261: APOLLONIUS *Hist. Mir.* 6 (DK 14, 7), HERACLITUS, fr. 40, DIOGENES LAERTIUS IX, 1, and HERACLITUS, fr. 129, DIOGENES LAERTIUS VIII, 6.

this aspect of Pythagoreanism. He is supposed himself to have given the following account:

Whenever I enter the prosperous townships with these my followers, men and women both, I am revered; they follow me in countless number, asking where lies the path to gain, some seeking prophesies, while others, for many a day stabbed by grievous pains, beg to hear the word that heals all manner of illness.²²

The word which heals all manner of illness is the word which produces *sophrosyne* in the soul, which creates harmony in the beliefs, feelings, and thoughts of the psychic life. According to Aristotle there is a threefold power of the word: convincing, rhetorical, and cathartic. All three of these may have significance for the physician but especially the cathartic word, because he will be therapeutically more affective with some patients if he is able to produce in them psychological effects similar to those of tragic poetry.

Complete health cannot exist without *sophrosyne*. However, this is one aspect of Pythagoreanism which had more influence among philosophers and rhetoricians than among practicing physicians in antiquity. Although the Hippocratic physicians were aware of verbal psychotherapy, they seldom used it as more than a confidence-gaining tool. The fourth-century physician Diocles of Carystus, however, may be an exception. Notable as being the first important physician to gain prominence in Athens and to write medical treatises in the Attic dialect, Diocles seems to have been influenced both by his contemporary Aristotle and by the Sicilian school of medicine.

Pythagorean influence is shown first of all by his interest in dissection and anatomy about which he wrote a treatise. During the fourth century most Hippocratic physicians had only a minimal interest in anatomy because they considered illness to be a general disorder. Secondly, Diocles was interested in hygiene which he believed would lead to harmony in the body. He prescribed a daily regimen which very much resembles the *vita pythagorica* with regard to personal hygiene, diet, and exercise. Finally, and pertinent to the present discussion about the value of the word in medicine, Diocles considered it important for the physician to offer friendly consolation to the patient for the reason that if the patient fixed his attention on the physician the flow of his blood would be slowed.²³

²² KIRK and RAVEN, number 478: Fr. 112, DIOGENES LAERTIUS VIII, 62 and CLEMENT, *Strom.* VI, 30.

²³ On Diocles see H. E. SIGERIST, *The Great Doctors, A Biographical History of Medicine* (translated by Eden and Cedar Paul), New York, W. W. Norton 1933, pp. 38-41.

Thus, the Pythagoreans had a humanizing effect on medical ethics and attitudes towards the right to medical care and, to a lesser degree, they brought about an awareness of the value of verbal therapy as an aid to scientific therapy.

THE PENTAGRAM: PYTHAGOREAN SYMBOL OF HEALTH

In medical theory and practice the Pythagoreans made significant contributions. In some cases, their ideas became part of the standard teaching and practice of ancient physicians, but the Pythagoreans never escaped the charge of being outside the mainstream. Therefore, it is interesting to note that they also had their own symbol of health different from the staff of Asclepius, the standard symbol for physicians even in our own time.

The geometrical figure of the pentagram, probably borrowed from the Babylonians, symbolized the balance and harmony which was the goal of the Pythagorean way of life. In the Middle Ages and Renaissance, this symbol was used as a charm against demons without any consciousness that it was a Pythagorean device. Also, among more learned circles it was associated directly with the Pythagorean concept of health. Finally, the symbol was significantly revived in post-Reformation years. When the Surgeons Guild of Gouda was reestablished in 1660, the physicians chose the Pythagorean pentagram as a neutral emblem for their coat-of-arms to replace Saints Cosmas and Damien. Well into the seventeenth century the pentagram continued to be used as a medical symbol for coats-of-arms, frontispieces for medical treatises, and related purposes. Today, however, the medical symbol of the Pythagoreans is less well known than many of the ideas, theories, and principles for which it stood.²⁴

Fragments of Diocles' writings are collected in M. WELLMANN, *Die Fragmente der Sikelischen Aertze* (Berlin 1901). For a full historical treatment of the therapeutic use of songs and words in the ancient Greece, see P. L. ENTRALGO, *The Therapy of the Word* (ed. and trans. by L. J. Rather and John M. Sharp), New Haven, Yale 1970.

²⁴ On the pentagram see J. L. SCHOUTEN, *The Pentagram as a Medical Symbol*, Nieuwkoop, de Graaf 1968.