

6396 pdf
ReoGrave, H.S.
1920
Bygone Beliefs 1920

CONTENTS

	PAGE
PREFACE	ix
LIST OF ILLUSTRATIONS	xiii
1. SOME CHARACTERISTICS OF MEDIÆVAL THOUGHT .	i
→ 2. PYTHAGORAS AND HIS PHILOSOPHY	8
3. MEDICINE AND MAGIC	25
4. SUPERSTITIONS CONCERNING BIRDS	34
5. THE POWDER OF SYMPATHY : A CURIOUS MEDICAL SUPERSTITION	47
6. THE BELIEF IN TALISMANS	57
7. CEREMONIAL MAGIC IN THEORY AND PRACTICE .	87
8. ARCHITECTURAL SYMBOLISM	111
9. THE QUEST OF THE PHILOSOPHER'S STONE .	121
10. THE PHALLIC ELEMENT IN ALCHEMICAL DOCTRINE	149
11. ROGER BACON : AN APPRECIATION	183
12. THE CAMBRIDGE PLATONISTS	193

II

PYTHAGORAS AND HIS PHILOSOPHY

IT is a matter for enduring regret that so little is known to us concerning PYTHAGORAS. What little we do know serves but to enhance for us the interest of the man and his philosophy, to make him, in many ways, the most attractive of Greek thinkers ; and, basing our estimate on the extent of his influence on the thought of succeeding ages, we recognise in him one of the world's master-minds.

PYTHAGORAS was born about 582 B.C. at Samos, one of the Grecian isles. In his youth he came in contact with THALES—the Father of Geometry, as he is well called,—and though he did not become a member of THALES' school, his contact with the latter no doubt helped to turn his mind towards the study of geometry. This interest found the right ground for its development in Egypt, which he visited when still young. Egypt is generally regarded as the birthplace of geometry, the subject having, it is supposed, been forced on the minds of the Egyptians by the necessity of fixing the boundaries of lands against the annual overflowing of the Nile. But the Egyptians were what is called an essentially practical

people, and their geometrical knowledge did not extend beyond a few empirical rules useful for fixing these boundaries and in constructing their temples. Striking evidence of this fact is supplied by the AHMES papyrus, compiled some little time before 1700 B.C. from an older work dating from about 3400 B.C.,¹ a papyrus which almost certainly represents the highest mathematical knowledge reached by the Egyptians of that day. Geometry is treated very superficially and as of subsidiary interest to arithmetic; there is no ordered series of reasoned geometrical propositions given—nothing, indeed, beyond isolated rules, and of these some are wanting in accuracy.

One geometrical fact known to the Egyptians was that if a triangle be constructed having its sides 3, 4, and 5 units long respectively, then the angle opposite the longest side is exactly a right angle; and the Egyptian builders used this rule for constructing walls perpendicular to each other, employing a cord graduated in the required manner. The Greek mind was not, however, satisfied with the bald statement of mere facts—it cared little for practical applications, but sought above all for the underlying *reason* of everything. Nowadays we are beginning to realise that the results achieved by this type of mind, the general laws of Nature's behaviour formulated by its endeavours, are frequently of immense practical importance—of far more importance than the mere rules-of-thumb beyond which so-called

¹ See AUGUST EISENLOHR: *Ein mathematisches Handbuch der alten Aegypter* (1877); J. GOW: *A Short History of Greek Mathematics* (1884); and V. E. JOHNSON: *Egyptian Science from the Monuments and Ancient Books* (1891).

practical minds never advance. The classic example of the utility of seemingly useless knowledge is afforded by Sir WILLIAM HAMILTON's discovery, or, rather, invention of Quarternions, but no better example of the utilitarian triumph of the theoretical over the so-called practical mind can be adduced than that afforded by PYTHAGORAS. Given this rule for constructing a right angle, about whose reason the Egyptian who used it never bothered himself, and the mind of PYTHAGORAS, searching for its full significance, made that gigantic geometrical discovery which is to this day known as the Theorem of PYTHAGORAS—the law that in every right-angled triangle the square on the side opposite the right angle is equal in area to the sum of the squares on the other two sides.¹ The importance of this discovery can hardly be overestimated. It is of fundamental importance in most branches of geometry, and the basis of the whole of trigonometry—the special branch of geometry that deals with the practical mensuration of triangles. EUCLID devoted the whole of the first book of his *Elements of Geometry* to establishing the truth of this theorem; how PYTHAGORAS demonstrated it we unfortunately do not know.

¹ Fig. 3 affords an interesting practical demonstration of the truth of this theorem. If the reader will copy this figure, cut out the squares on the two shorter sides of the triangle and divide them along the lines AD, BE, EF, he will find that the five pieces so obtained can be made exactly to fit the square on the longest side as shown by the dotted lines. The size and shape of the triangle ABC, so long as it has a right angle at C, is immaterial. The lines AD, BE are obtained by continuing the sides of the square on the side AB, *i.e.* the side opposite the right angle, and EF is drawn at right angles to BE.

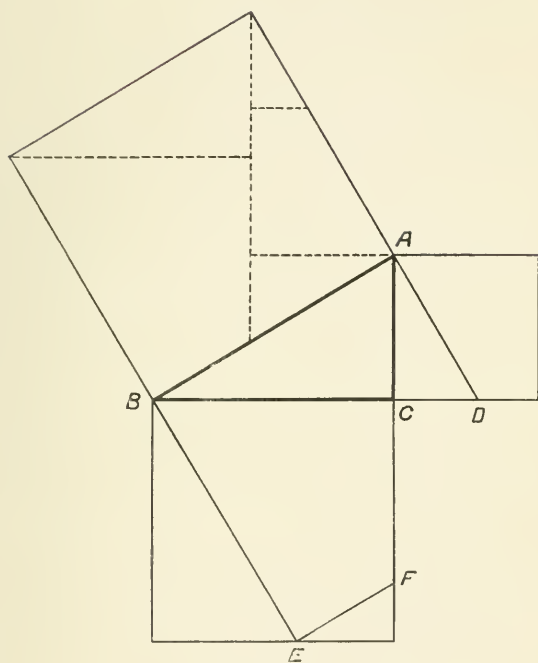


FIG. 3.

Diagram to illustrate the Theorem of PYTHAGORAS.

After absorbing what knowledge was to be gained in Egypt, PYTHAGORAS journeyed to Babylon, where he probably came into contact with even greater traditions and more potent influences and sources of knowledge than in Egypt, for there is reason for believing that the ancient Chaldeans were the builders of the Pyramids and in many ways the intellectual superiors of the Egyptians.

At last, after having travelled still further East, probably as far as India, PYTHAGORAS returned to his birthplace to teach the men of his native land the knowledge he had gained. But CRÆSUS was tyrant over Samos, and so oppressive was his rule that none had leisure in which to learn. Not a student came to PYTHAGORAS, until, in despair, so the story runs, he offered to pay an artisan if he would but learn geometry. The man accepted, and later, when PYTHAGORAS pretended inability any longer to continue the payments, he offered, so fascinating did he find the subject, to pay his teacher instead if the lessons might only be continued. PYTHAGORAS no doubt was much gratified at this ; and the motto he adopted for his great Brotherhood, of which we shall make the acquaintance in a moment, was in all likelihood based on this event. It ran, " Honour a figure and a step before a figure and a tribolus " ; or, as a freer translation renders it :—

" A figure and a step onward :
Not a figure and a florin."

" At all events," as Mr FRANKLAND remarks, " the motto is a lasting witness to a very singular devotion to knowledge for its own sake." ¹

¹ W. B. FRANKLAND, M.A. : *The Story of Euclid* (1902), p. 33.

But PYTHAGORAS needed a greater audience than one man, however enthusiastic a pupil he might be, and he left Samos for Southern Italy, the rich inhabitants of whose cities had both the leisure and inclination to study. Delphi, far-famed for its Oracles, was visited *en route*, and PYTHAGORAS, after a sojourn at Tarentum, settled at Croton, where he gathered about him a great band of pupils, mainly young people of the aristocratic class. By consent of the Senate of Croton, he formed out of these a great philosophical brotherhood, whose members lived apart from the ordinary people, forming, as it were, a separate community. They were bound to PYTHAGORAS by the closest ties of admiration and reverence, and, for years after his death, discoveries made by Pythagoreans were invariably attributed to the Master, a fact which makes it very difficult exactly to gauge the extent of PYTHAGORAS' own knowledge and achievements. The regime of the Brotherhood, or Pythagorean Order, was a strict one, entailing "high thinking and low living" at all times. A restricted diet, the exact nature of which is in dispute, was observed by all members, and long periods of silence, as conducive to deep thinking, were imposed on novices. Women were admitted to the Order, and PYTHAGORAS' asceticism did not prohibit romance, for we read that one of his fair pupils won her way to his heart, and, declaring her affection for him, found it reciprocated and became his wife.

SCHURÉ writes : " By his marriage with Theano, Pythagoras affixed *the seal of realization* to his work. The union and fusion of the two lives was complete. One day when the master's wife was asked what

length of time elapsed before a woman could become pure after intercourse with a man, she replied : ‘ If it is with her husband, she is pure all the time ; if with another man, she is never pure.’ ” “ Many women,” adds the writer, “ would smilingly remark that to give such a reply one must be the wife of Pythagoras, and love him as Theano did. And they would be in the right, for it is not marriage that sanctifies love, it is love which justifies marriage.” ¹

PYTHAGORAS was not merely a mathematician : he was first and foremost a philosopher, whose philosophy found in number the basis of all things, because number, for him, alone possessed stability of relationship. As I have remarked on a former occasion, “ The theory that the Cosmos has its origin and explanation in Number . . . is one for which it is not difficult to account if we take into consideration the nature of the times in which it was formulated. The Greek of the period, looking upon Nature, beheld no picture of harmony, uniformity and fundamental unity. The outer world appeared to him rather as a discordant chaos, the mere sport and plaything of the gods. The theory of the uniformity of Nature—that Nature is ever like to herself—the very essence of the modern scientific spirit, had yet to be born of years of unwearied labour and unceasing delving into Nature’s innermost secrets. Only in Mathematics—in the properties of geometrical figures, and of numbers—was the reign of law, the principle of harmony, perceivable. Even at this present day when the marvellous has become com-

¹ EDOUARD SCHURÉ : *Pythagoras and the Delphic Mysteries*, trans. by F. ROTHWELL, B.A. (1906), pp. 164 and 165.

monplace, that property of right-angled triangles . . . already discussed . . . comes to the mind as a remarkable and notable fact : it must have seemed a stupendous marvel to its discoverer, to whom, it appears, the regular alternation of the odd and even numbers, a fact so obvious to us that we are inclined to attach no importance to it, seemed, itself, to be something wonderful. Here in Geometry and Arithmetic, here was order and harmony unsurpassed and unsurpassable. What wonder then that Pythagoras concluded that the solution of the mighty riddle of the Universe was contained in the mysteries of Geometry ? What wonder that he read mystic meanings into the laws of Arithmetic, and believed Number to be the explanation and origin of all that is ? ” ¹

No doubt the Pythagorean theory suffers from a defect similar to that of the Kabalistic doctrine, which, starting from the fact that all words are composed of letters, representing the primary sounds of language, maintained that all the things represented by these words were created by God by means of the twenty-two letters of the Hebrew alphabet. But at the same time the Pythagorean theory certainly embodies a considerable element of truth. Modern science demonstrates nothing more clearly than the importance of numerical relationships. Indeed, “ the history of science shows us the gradual transformation of crude facts of experience into increasingly exact generalisations by the application to them of mathematics. The enormous advances that have been made in recent years in physics and chemistry are very largely due to mathematical methods of

¹ *A Mathematical Theory of Spirit* (1912), pp. 64-65.

interpreting and co-ordinating facts experimentally revealed, whereby further experiments have been suggested, the results of which have themselves been mathematically interpreted. Both physics and chemistry, especially the former, are now highly mathematical. In the biological sciences and especially in psychology it is true that mathematical methods are, as yet, not so largely employed. But these sciences are far less highly developed, far less exact and systematic, that is to say, far less scientific, at present, than is either physics or chemistry. However, the application of statistical methods promises good results, and there are not wanting generalisations already arrived at which are expressible mathematically ; Weber's Law in psychology, and the law concerning the arrangement of the leaves about the stems of plants in biology, may be instanced as cases in point." ¹

The Pythagorean doctrine of the Cosmos, in its most reasonable form, however, is confronted with one great difficulty which it seems incapable of overcoming, namely, that of continuity. Modern science, with its atomic theories of matter and electricity, does, indeed, show us that the apparent continuity of material things is spurious, that all material things consist of discrete particles, and are hence measurable in numerical terms. But modern science is also obliged to postulate an ether behind

¹ Quoted from a lecture by the present writer on "The Law of Correspondences Mathematically Considered," delivered before The Theological and Philosophical Society on 26th April 1912, and published in *Morning Light*, vol. xxxv. (1912), p. 434 *et seq.*

these atoms, an ether which is wholly continuous, and hence transcends the domain of number.¹ It is true that, in quite recent times, a certain school of thought has argued that the ether is also atomic in constitution—that all things, indeed, have a grained structure, even forces being made up of a large number of quanta or indivisible units of force. But this view has not gained general acceptance, and it seems to necessitate the postulation of an ether beyond the ether, filling the interspaces between its atoms, to obviate the difficulty of conceiving of action at a distance.

According to BERGSON, life—the reality that can only be lived, not understood—is absolutely continuous (*i.e.* not amenable to numerical treatment). It is because life is absolutely continuous that we cannot, he says, understand it; for reason acts discontinuously, grasping only, so to speak, a cinematographic view of life, made up of an immense number of instantaneous glimpses. All that passes between the glimpses is lost, and so the true whole, reason can never synthesise from that which it possesses. On the other hand, one might also argue—extending, in a way, the teaching of the physical sciences of the period between the postulation of DALTON'S atomic theory and the discovery of the significance of the ether of space—that reality is essentially discontinuous, our idea that it is continuous being a mere illusion arising from the coarseness of our senses. That might provide a complete vindi-

¹ Cf. chap. iii., "On Nature as the Embodiment of Number," of my *A Mathematical Theory of Spirit*, to which reference has already been made.

cation of the Pythagorean view ; but a better vindication, if not of that theory, at any rate of PYTHAGORAS' philosophical attitude, is forthcoming, I think, in the fact that modern mathematics has transcended the shackles of number, and has enlarged her kingdom, so as to include quantities other than numerical. PYTHAGORAS, had he been born in these latter centuries, would surely have rejoiced in this enlargement, whereby the continuous as well as the discontinuous is brought, if not under the rule of number, under the rule of mathematics indeed.

PYTHAGORAS' foremost achievement in mathematics I have already mentioned. Another notable piece of work in the same department was the discovery of a method of constructing a parallelogram having a side equal to a given line, an angle equal to a given angle, and its area equal to that of a given triangle. PYTHAGORAS is said to have celebrated this discovery by the sacrifice of a whole ox. The problem appears in the first book of EUCLID's *Elements of Geometry* as proposition 44. In fact, many of the propositions of EUCLID's first, second, fourth, and sixth books were worked out by PYTHAGORAS and the Pythagoreans ; but, curiously enough, they seem greatly to have neglected the geometry of the circle.

The symmetrical solids were regarded by PYTHAGORAS, and by the Greek thinkers after him, as of the greatest importance. To be perfectly symmetrical or regular, a solid must have an equal number of faces meeting at each of its angles, and these faces must be equal regular polygons, *i.e.* figures whose sides and angles are all equal. PYTHAGORAS, perhaps,

may be credited with the great discovery that there are only five such solids. These are as follows :—

The Tetrahedron, having four equilateral triangles as faces.

The Cube, having six squares as faces.

The Octahedron, having eight equilateral triangles as faces.

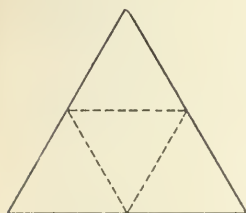
The Dodecahedron, having twelve regular pentagons (or five-sided figures) as faces.

The Icosahedron, having twenty equilateral triangles as faces.¹

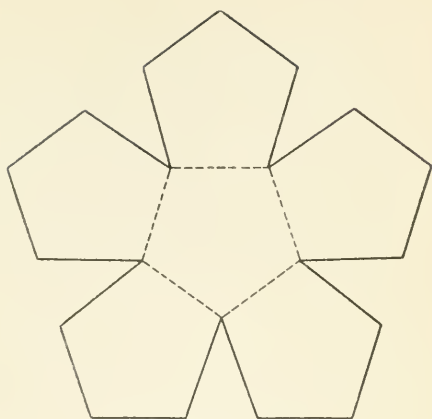
Now, the Greeks believed the world to be composed of four elements—earth, air, fire, water,—and to the Greek mind the conclusion was inevitable² that the shapes of the particles of the elements were those of the regular solids. Earth-particles were cubical, the cube being the regular solid possessed of greatest stability ; fire-particles were tetrahedral, the tetrahedron being the simplest and, hence, lightest solid. Water-particles were icosahedral for exactly the reverse reason, whilst air-particles, as intermediate between the two latter, were octahedral. The dodecahedron was, to these ancient mathematicians, the most mysterious of the solids : it was by far the most difficult to construct, the accurate drawing of the regular pentagon necessitating a rather

¹ If the reader will copy figs. 4 to 8 on cardboard or stiff paper, bend each along the dotted lines so as to form a solid, fastening together the free edges with gummed paper, he will be in possession of models of the five solids in question.

² Cf. PLATO : *The Timæus*, §§ xxviii—xxx.

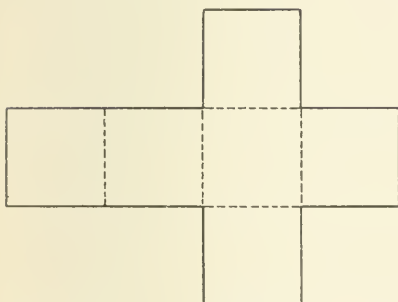


TETRAHEDRON.

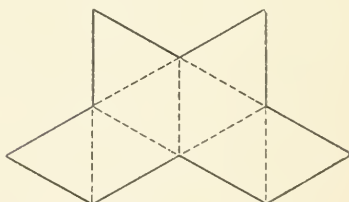


DODECAHEDRON.

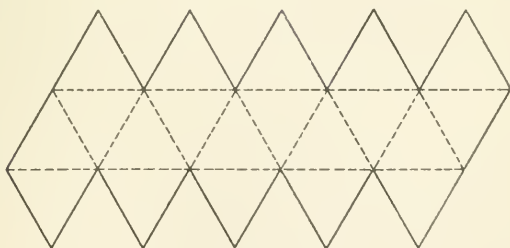
TWO FIGURES LIKE THE ABOVE MUST
BE CUT OUT AND FITTED TOGETHER



CUBE.



OCTAHEDRON.



ICOSAHEDRON.

FIGS. 4-8.

Diagrams for constructing the Regular (or Platonic) Solids.

elaborate application of PYTHAGORAS' great theorem.¹ Hence the conclusion, as PLATO put it, that "this [the regular dodecahedron] the Deity employed in tracing the plan of the Universe."² Hence also the high esteem in which the pentagon was held by the Pythagoreans. By producing each side of this latter figure the five-pointed star (fig. 9), known as

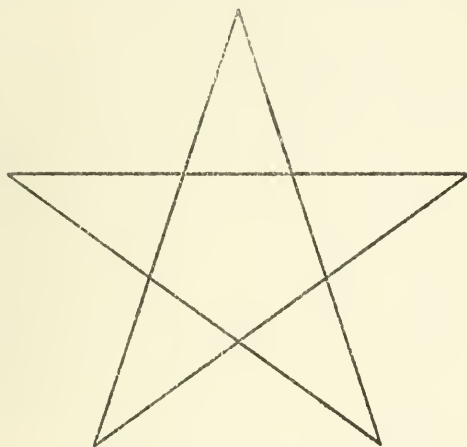


FIG. 9.
The Pentagram.

the pentagram, is obtained. This was adopted by the Pythagoreans as the badge of their Society, and for many ages was held as a symbol possessed of magic powers. The mediæval magicians made use

¹ In reference to this matter FRANKLAND remarks: "In those early days the innermost secrets of nature lay in the lap of geometry, and the extraordinary inference follows that Euclid's *Elements*, which are devoted to the investigation of the regular solids, are therefore in reality and at bottom an attempt to 'solve the universe.' Euclid, in fact, made this goal of the Pythagoreans the aim of his *Elements*."—*Op. cit.*, p. 35.

² *Op. cit.*, § xxix.

of it in their evocations, and as a talisman it was held in the highest esteem.

Music played an important part in the curriculum of the Pythagorean Brotherhood, and the important discovery that the relations between the notes of musical scales can be expressed by means of numbers is a Pythagorean one. It must have seemed to its discoverer—as, in a sense, it indeed is—a striking confirmation of the numerical theory of the Cosmos. The Pythagoreans held that the positions of the heavenly bodies were governed by similar numerical relations, and that in consequence their motion was productive of celestial music. This concept of “the harmony of the spheres” is among the most celebrated of the Pythagorean doctrines, and has found ready acceptance in many mystically-speculative minds. “Look how the floor of heaven,” says Lorenzo in SHAKESPEARE’S *The Merchant of Venice*—

“ . . . Look how the floor of heaven
Is thick inlaid with patines of bright gold :
There’s not the smallest orb which thou behold’st
But in his motion like an angel sings,
Still quiring to the young-eyed cherubins ;
Such harmony is in immortal souls ;
But whilst this muddy vesture of decay
Doth grossly close it in, we cannot hear it.”¹

Or, as KINGSLEY writes in one of his letters, “ When I walk the fields I am oppressed every now and then with an innate feeling that everything I see has a meaning, if I could but understand it. And this feeling of being surrounded with truths which I cannot grasp, amounts to an indescribable awe some-

¹ Act v. scene i.

times ! Everything seems to be full of God's reflex, if we could but see it. Oh ! how I have prayed to have the mystery unfolded, at least hereafter. To see, if but for a moment, the whole harmony of the great system ! To hear once the music which the whole universe makes as it performs His bidding ! ”¹ In this connection may be mentioned the very significant fact that the Pythagoreans did not consider the earth, in accordance with current opinion, to be a stationary body, but believed that it and the other planets revolved about a central point, or fire, as they called it.

As concerns PYTHAGORAS' ethical teaching, judging from the so-called *Golden Verses* attributed to him, and no doubt written by one of his disciples,² this would appear to be in some respects similar to that of the Stoics who came later, but free from the materialism of the Stoic doctrines. Due regard for oneself is blended with regard for the gods and for other men, the atmosphere of the whole being at once rational and austere. One verse—"Thou shalt likewise know, according to Justice, that the nature of this Universe is in all things alike " ³—is of particular interest, as showing PYTHAGORAS' belief in that principle of analogy—that "What is below is as that which is above, what is above is as that which is below"—which held so dominant a sway over the

¹ CHARLES KINGSLEY: *His Letters and Memories of His Life*, edited by his wife (1883), p. 28.

² It seems probable, though not certain, that PYTHAGORAS wrote nothing himself, but taught always by the oral method.

³ Cf. the remarks of HIEROCLES on this verse in his *Commentary*.

minds of ancient and mediæval philosophers, leading them—in spite, I suggest, of its fundamental truth—into so many fantastic errors, as we shall see in future excursions. Metempsychosis was another of the Pythagorean tenets, a fact which is interesting in view of the modern revival of this doctrine. PYTHAGORAS, no doubt, derived it from the East, apparently introducing it for the first time to Western thought.

Such, in brief, were the outstanding doctrines of the Pythagorean Brotherhood. Their teachings included, as we have seen, what may justly be called scientific discoveries of the first importance, as well as doctrines which, though we may feel compelled—perhaps rightly—to regard them as fantastic now, had an immense influence on the thought of succeeding ages, especially on Greek philosophy as represented by PLATO and the Neo-Platonists, and the more speculative minds—the occult philosophers, shall I say?—of the latter mediæval period and succeeding centuries. The Brotherhood, however, was not destined to continue its days in peace. As I have indicated, it was a philosophical, not a political, association; but naturally PYTHAGORAS' philosophy included political doctrines. At any rate, the Brotherhood acquired a considerable share in the government of Croton, a fact which was greatly resented by the members of the democratic party, who feared the loss of their rights; and, urged thereto, it is said, by a rejected applicant for membership of the Order, the mob made an onslaught on the Brotherhood's place of assembly and burnt it to the ground. One account has it that PYTHAGORAS himself died in

the conflagration, a sacrifice to the mad fury of the mob. According to another account—and we like to believe that this is the true one—he escaped to Tarentum, from which he was banished, to find an asylum in Metapontum, where he lived his last years in peace.

The Pythagorean Order was broken up, but the bonds of brotherhood still existed between its members. “ One of them who had fallen upon sickness and poverty was kindly taken in by an innkeeper. Before dying he traced a few mysterious signs [the pentagram, no doubt] on the door of the inn and said to the host: ‘ Do not be uneasy, one of my brothers will pay my debts.’ A year afterwards, as a stranger was passing by this inn he saw the signs and said to the host: ‘ I am a Pythagorean; one of my brothers died here; tell me what I owe you on his account.’ ”¹

In endeavouring to estimate the worth of PYTHAGORAS’ discoveries and teaching, Mr FRANKLAND writes, with reference to his achievements in geometry: “ Even after making a considerable allowance for his pupils’ share, the Master’s geometrical work calls for much admiration ”; and, “ . . . it cannot be far wrong to suppose that it was Pythagoras’ wont to insist upon proofs, and so to secure that rigour which gives to mathematics its honourable position amongst the sciences.” And of his work in arithmetic, music, and astronomy, the same author writes: “ . . . everywhere he appears to have inaugurated genuinely scientific methods, and to have laid the foundations of a high and liberal education ”; adding, “ For nearly

¹ EDOUARD SCHURÉ: *Op. cit.*, p. 174.

a score of centuries, to the very close of the Middle Ages, the four Pythagorean subjects of study—arithmetic, geometry, astronomy, music—were the staple educational course, and were bound together into a fourfold way of knowledge—the Quadrivium.”¹ With these words of due praise, our present excursion may fittingly close.

¹ *Op. cit.*, pp. 35, 37, and 38.