

HARMONY OF THE SPHERES

by

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The Real Numerology. A Reconstruction of the lost
theory of Pythagoras.

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HARMONY OF THE SPHERES

C O N T E N T S

	Page
PREFACE.....	1
CHAPTER ONE... THE TRIADIC LAW.....	9
CHAPTER TWO THE TRIADIC STRUCTURE OF MUSIC.....	33
CHAPTER THREE TWO STANDS FOR PUBLIC OPINION.....	49
CHAPTER FOUR NUMBER FOUR STANDS FOR JUSTICE.....	55
CHAPTER FIVE NUMBER FIVE STANDS FOR MARRIAGE.....	63
CHAPTER SIX NUMBER SIX STANDS FOR COLD.....	70
CHAPTER SEVEN NUMBER SEVEN STANDS FOR HEALTH.....	77
CHAPTER EIGHT NUMBER EIGHT STANDS FOR LOVE.....	83
CHAPTER NINE NUMBER NINE STANDS FOR AGGRESSION.....	90
CHAPTER TEN NUMBER TEN STANDS FOR ENERGY.....	97
CHAPTER ELEVEN NUMBER ELEVEN STANDS FOR THE LAW.....	102
CHAPTER TWELVE NUMBER TWELVE COMPLETES THE EDIFICE.....	109
CHAPTER 13 THE MUSIC OF THE STELLAR SPHERES.....	118
APPENDIX: A TABLE OF THE ZODIACAL STARS. (Showing magnitudes, spectral types, right ascensions, declinations, and longitudes) ..	127

FROM THE HINDU SCRIPTURES

1. Verily this is a triad, name, form, and work.

Of these names, that which is called speech is the Uktha (hymn supposed to mean also origin), for from it all names arise. It is their Saman (song, supposed to mean also sameness), for it is the same as all names. It is their Brahman (prayer, supposed to mean also support), for it supports all names.

2. Next, of the forms, that which is called eye is the Uktha (hymn), for from it all forms arise. It is their Saman (song), for it is the same as all forms. It is their Brahman (prayer), for it supports all forms.

3. Next, of the works, that which is called body is the Uktha (hymn), for from it all works arise. It is their Saman (song), for it is the same as all works. It is their Brahman (prayer), for it supports all works.

That being a triad is one, viz. this Self: and the Self, being one, is that triad. This is the immortal, covered by the true. Verily breath is the immortal, name and form are the true, and by them the immortal is covered.

BRIHADARANYAKA UPANISHAD
(The Sixth Brahmana)

P R E F A C E

When I began the task of attempting to reconstruct certain of the theories of Pythagoras from the very slight traces of his work which still remain on record, I speedily found myself confronted by a whole range of enigmas and apparently irresolvable puzzles. For although certain the principles of Pythagoras were quite plainly expressed and seemed to be irresistibly logical, there were many facets of the ideas seemingly wrapped in an impenetrable shroud of mystery.

Eventually I came to the conclusion that the keys to these enigmas are actually to be found in the Apocalypse of St. John. For Revelation contains an abundance of obviously numeralogical allusions which were presumably intended to convey very definite ideas to minds attuned to the significance of the symbols employed. After all, Revelation would contain no revelation at all were it to consist merely of a hodge-podge of mystical jargon intended solely to confuse and puzzle. But very evidently Revelation was intended to be understood, and manifestly St. John himself was satisfied that he had written the prophecies in a form which could be understood by all.

To my mind it has always seemed reasonable to suppose that St. John, who was the don of his times, must have been well grounded in the

HARMONY OF THE SPHERES

culture and knowledge of the Pythagoreans. For he was living in an age in which the accumulated knowledge of great thinkers and of remarkably skilled observers drawn from the Chaldeans, Egyptians and Greeks, had reached its highest peak. And manifestly the contributions of Pythagoras had well advanced that prodigious store of scientific knowledge by marshalling the science of numbers and applying it to the resolution of physical problems relating to shapes, masses, and geometrical figures.

To my eyes Revelation afforded a clear reflection of the numeralogical practice which was current during the epoch in which it was written; and accordingly it seemed obvious to me that very much useful information of the important work of Pythagoras could be gleaned from a study of the context of the prophesies based upon the use of numbers.

I would, however, like to emphasise here, that it has been no part of my purpose to attempt any explanation at all of the prophetical mysteries of Revelation itself. Thus I have confined my attention exclusively to the assumed Pythagorean origins of the numerals specified in the Apocalypse, hoping in that way to reconstruct certain of the puzzling gaps in the theories of Pythagoras which required to be filled before his system of the harmony of the spheres could be grasped and understood.

Independently of Revelation however, the first important discovery - the secret of the law of the triads - was what

HARMONY OF THE SPHERES

provided a vital key to the elucidation of the harmony of the spheres. For it soon became apparent that the whole fabric of nature is compounded of prefabricated units structured after the pattern of the holy city of Jerusalem as conceived in the vision of St. John, the specifications of which were:

"And the city lieth in a FOURSQUARE, of which the height, the length and the breadth are equal. And it had a wall great and high, having TWELVE gates and in the gates TWELVE angels, and names written thereon, which are the names of the TWELVE tribes of the children of Israel. On the east, THREE gates: on the north, THREE gates: on the west, THREE gates: on the south THREE gates. And the wall of the city had TWELVE foundations, and in them, the TWELVE names of the TWELVE apostles of the Lamb."

It is obvious that the number TWELVE in this context must possess a remarkable significance. And indeed we find the same number reproduced in noteworthy manner in nature herself.

It is not without significance that the circle is divided into FOUR quadrants, each of which is trisected into triads or chords or arcs, which, projected into space, demarcate or divide the apparent path of the Sun through the star groups of the ecliptic so as to separate space into the twelve separate and distinct sectors which astrologers call the SIGNS OF THE ZODIAC.

It is not without significance that astrologers at the dawn of the Christian Era classified those same twelve signs of the zodiac into FOUR sets of TRIPPLICITIES (TRIADS), grouped in the following patterns:

HARMONY OF THE SPHERES

FIRE SIGNS: ARIES, LEO, SAGITTARIUS

EARTH SIGNS: TAURUS, VIRGO, CAPRICORN

AIR SIGNS: GEMINI, LIBRA, AQUARIUS

WATER SIGNS: CANCER, SCORPIO, PISCES

Nor is it without special significance that in music there are SEVEN full tones and FIVE half-tones to the chromatic scale, making a total of TWELVE notes. The scale is likewise compounded of TRIADS (i.e. chords consisting of THREE concordant notes) which modulate naturally through the scales within the span of THREE octaves.

It is certainly not without significance that the nervous system of the human body itself is compounded of TWELVE pairs of nerves:

The FIRST NERVE consists of the pair of sensory nerves which connect with the nose.

The SECOND NERVE consists of the pair of sensory nerves which connect with the eyes and convey to the brain the sensation of light.

The THIRD NERVE consists of a pair of sensory nerves which connect with the ears and convey to the brain the sensation of hearing.

The FOURTH NERVE consists of a pair of sensory nerves which connect with the tongue and convey to the brain the sensation of taste.

The FIFTH NERVE consists of a pair of sensory nerves connecting with the face and teeth to convey to the brain the sensation of feeling.

The SIXTH, SEVENTH, and EIGHTH NERVES comprise a triad of motor nerves, in pairs, controlling the movements of the eyeballs.

The NINTH NERVE consists of a pair of motor nerves which control the movements of the face.

HARMONY OF THE SPINE

The TENTH NERVE consists of a pair of motor nerves controlling the movements of the tongue.

The ELEVENTH NERVE consists of a pair of motor nerves which control the movements of the neck.

The TWELFTH NERVE consists of a pair of motor and sensory nerves which connect with the larynx, lungs, stomach, heart and liver.

The SPINAL CORD is of course a separate nervous system. It is composed of a tube, connecting with the brain, which is fashioned from three separate layers of material (i.e., gray matter, with a second layer of white matter, enclosed by the outer membranes of the cord).

Thus the spinal cord contains nerves which come off in 36 pairs between the vertebrae (which amounts to THREE octaves of TWELVE), and which are divided into THREE main classes:

- (1) the afferent or sensory nerves.
- (2) The efferent or motor nerves.
- (3) Those nerves which terminate or originate in the cord itself.

The above three classes of nerves connect with and are indivisible with, the THREE great nerve divisions of the brain.

Of course I do not want to convey the impression that nature builds her prefabricated units with a single variety of bonding. Nature does not, for instance, lay the bricks in four rows of three bricks, or three rows of four bricks, in the same way in which we proceed to divide a year of twelve months into four quarters! In music, for instance, the bonding is done by chords modulating through

HARMONY OF THE SPHERES

three octaves; and in fact music discloses a unique way in which nature makes use of an intricate bonding pattern.

Again, in the structure of matter, one finds a variety of bonds which depend for their individual patterns upon the valancy of the particular atoms entering into the combination. Some elemental molecules, for instance, are monatomic; some are diatomic, triatomic, tetratomic or hexatomic - depending on whether the atomicity of the said elemental molecule be 1, 2, 3, or 6.

There remains, in fact, a rare lot to be discovered concerning the precise types of bonding used by nature when cementing her triadic bricks - as scientists have begun to find out since the advent of nuclear physics. For instance, the scientists soon found out, after the atom was split, that atoms which are chemically the same are still capable of possessing nuclei the masses of which are different. It is these differences, indeed, which comprise the various isotopes. Lithium, for example, has two isotopes, the relative masses of which are in the ratio of 6 and 7.

Thus, when a lithium atom of charge 3 and a mass of 7 is combined with an atom of hydrogen of charge 1 mass 1, there results from the transmutation 2 atoms of helium of charge 2, mass 4. Yet a study of the equation reveals that in the process of the transformation a mass of 0.0183 has apparently vanished into thin air!

It is evident that an efficient study of the bonding systems which nature employs when joining the elemental bricks is of major

HARMONY OF THE SPHERES

consequence to scientists. And in my view they will discover that the law of the triads plays a most intimate part in this process.

Nature persists in disguising her moods by means of a direct appeal to the senses. For instance, the spectrum displays visibly seven colour bands: red, orange, yellow, green, blue, indigo, violet. Yet scientists know well enough that those seven colours are in fact compounds of THREE. Red, yellow, and blue, are the three primary colours.

In a similar way the ear assures us that the musical scale consists of seven full tones in precisely the same way that the eye detects and separates the seven colours of the rainbow. Nevertheless musicians know well enough that the chromatic scale requires the addition of five semi-tones for its completion; and they also know that the notes of the chromatic scale are made to harmonise when any three notes, forming a chord, are struck simultaneously.

It is thought that the contribution of the numerical relations which lie at the basis of the principles governing the harmony of the spheres, may well assist scientists in their work of laying bare the exact bonding patterns used by nature when building up intricate molecular structures from the triads of elemental bricks; and that it may further aid them to discover the additional varieties of bonding which supply the cohesive force which builds up molecules into large portions of matter. For the secrets already elicited tend to reveal that the weaving is invariably done within

HARMONY OF THE SPHERES

the span of three octaves of TWELV', the whole of which is compounded
of triads.

THE AUTHOR .

SIDCUP, Kent, England.
January 1955

CHAPTER ONE

THE TRIADIC LAW

"This is your chance. Seize it like men. The country - whether from STUPEFACTION, DESPAIR, or HOPE - is calm. Pray God it may not be the last!" - LLOYD GEORGE in a speech on unemployment delivered to the Commons on 15.2.1933.

PYTHAGORAS, great philosopher and mystic and the father of mathematics, who lived on this earth in the era circa 572-497 B.C., created an immense vogue in his day with the numerical and mathematical system which he invented through correlating numbers with geometrical figures.

Pythagoras it was who evolved a wonderful system of universal harmonics in series, by means of which he aspirred to compose the music of the spheres.

Unfortunately, most of the essential secrets died with Pythagoras. Whatever he may have committed to writing was presumably destroyed by the Arab vandals in A.D.640 when they set fire to the incomparable Library in Alexandria said to contain 900,000 scrolls of papyrus. And although Pythagoras had hosts of followers known as the Pythagoreans, the latter were so proud and jealous of their knowledge that they organised themselves into secret societies under oath.

HARMONY OF THE SPHERES

So inevitably the accumulated knowledge died out with the brotherhood.

Thus we are left with mere traces of the real work of Pythagoras and must perforce attempt the task of reconstructing a system of the 'harmony of the spheres' from the existing traces which are reflected in the writings of people who lived elsewhere during the period sited at the beginning of the Christian era.

Pythagoras demonstrated how to trisect a circle. And by drawing lines to connect the three points, he showed how an equilateral triangle can be inscribed within the circle (see Fig.1). This figure, in fact, constitutes the actual basis of the TRIAD.

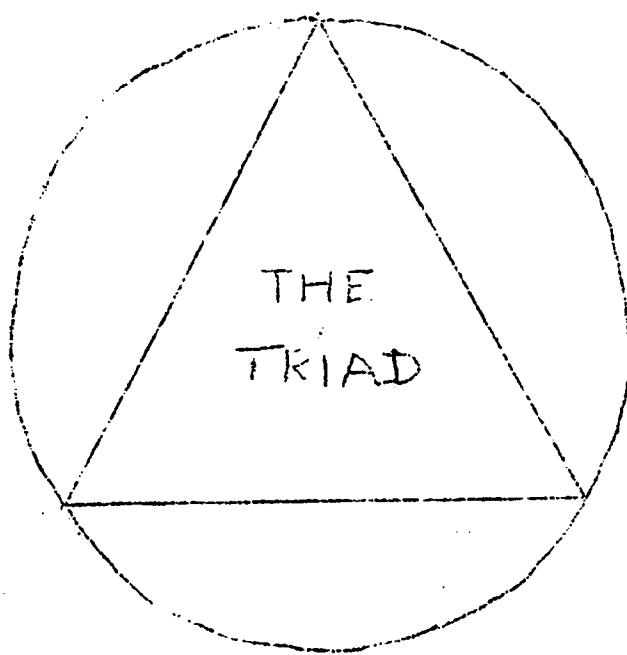


Fig. 1.

Pythagoras next trisected each side of the equilateral triangle, and in that way produced NINE points. These, when added to the central point of the circle, made up the figure TEN, which then became the perfect number of the Pythagoreans (see Fig. 2).

HARMONY OF THE SPHERES

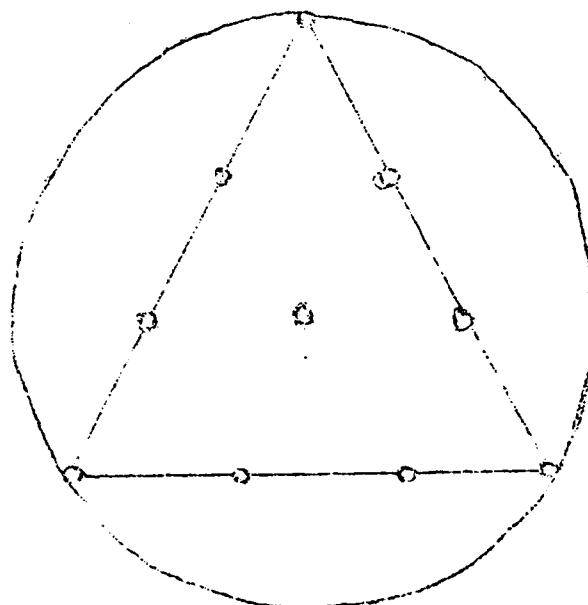


Fig. 2

If we now join the two interior points of each of the three sides of the equilateral triangle, we produce a six-faced figure. This, then, was the figure which Pythagoras declared to contain the secret of the Earth (see Fig. 3):

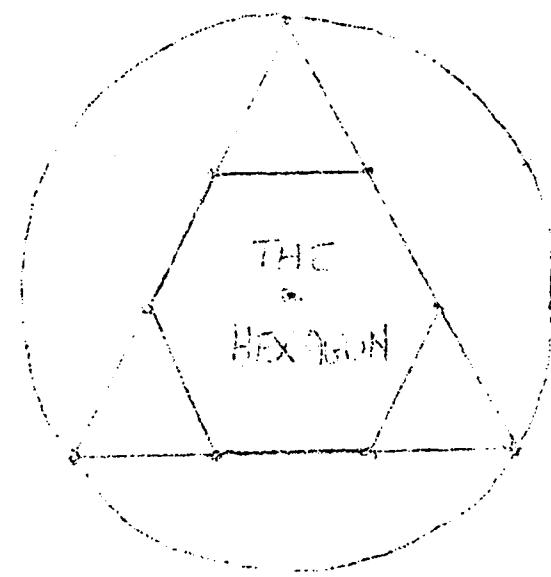


Fig. 3

How the whole figures: circle, triangle, hexagon, and the ten points, comprise in toto UNITY and demonstrate the oneness of

HARMONY OF THE SPHERES

things.

Number TWO, according to Pythagoras, stood for Opinion. And since the Moon (in astrology) represents the People - and thereby Public Opinion - she was accorded this number.

Number THREE, Pythagoras said, was the first male number and therefore stood for Potency. In actual fact this important number contains the secret of the triadic law. Pythagoras, however, does not seem to have stumbled upon that particular discovery, or traces of it would surely have been left behind for us to observe. This number was accorded by the Pythagoreans to the planet Jupiter.

Number FOUR Pythagoras identified with Justice. It must have been thought highly abstract since at no time in history has it been accorded to a celestial body - which on the face of things is peculiar since this number does play a particularly important part in the scheme of harmonies. In astrology, for example, the zodiac is compounded of FOUR triplicities or sets of TRIADS.

Number FIVE, according to Pythagoras, stood for Marriage. He himself explained it as a marriage between the number TWO (which is the first female number) and number THREE (the first male number). Pythagoras also claimed that the number 5 contains the secret of colour. The number was allocated to the planet Mercury.

Number SIX, according to Pythagoras, contained the secret of cold. It was allocated to the planet Venus.

Number SEVEN was said to contain the key to the secret of health,

HARMONY OF THE SPHERES

and this again was a number which was not accorded to any planet.

Number EIGHT contains the key to the secret of love, according to Pythagoras. But the Philosopher's idea seems to have been that the number was produced by adding 3 (Potency) to 5 (Marriage). Number 8 was accorded to the planet Saturn.

Number NINE does not appear to have been identified with anything in particular. Probably in the early days it was associated with fire. However, Pythagoras himself ultimately came to the conclusion that it was the Pyramid which holds the secret of fire. The Pythagoreans ultimately allocated number 9 to the planet Mars. Which again is the symbol of fire (in astrology).

According to the Pythagoreans, the 12-sided figure (formed by dividing the perimeter of a circle into twelve equal parts, the points of which are connected with chords) contained the secret of the heavens. It was regarded as the most perfect figure. In this there appears to be evidence that Pythagoras had come to the conclusion that the zodiac ought to contain twelve signs.

Finally, Pythagoras accorded the stars a series of harmonic numbers which he related to their distances, thus evolving an astonishing system which reproduced the 'harmony of the spheres'.

It is related (though I do not know the source of the story) that a merchant once asked Pythagoras what he could teach him.

"To count," replied Pythagoras laconically.

"But I already know how to count," retorted the merchant.

"Show me how you do it," challenged Pythagoras.

HARMONY OF THE SPHERES

The merchant began: "One, two, three, four...."

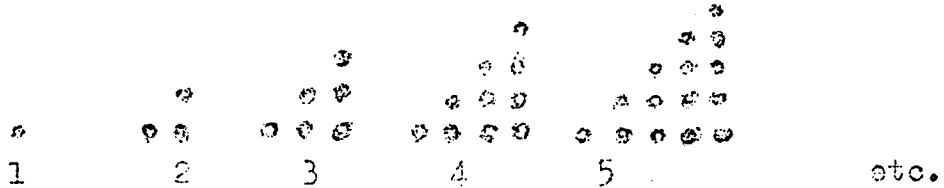
"Stop!" interrupted Pythagoras. "That is not correct. What you take to be four is ten. It so happens that ten forms the perfect triangle and our symbol."

To explain his meaning, Pythagoras took a parchment upon which he laid out ten dots in the form of a right-angled triangle:



In this way he demonstrated that the Number FOUR was in fact TEN.

Pythagoras created a series of these figures:



In the Pythagorean lore there is also contained what is known as amicable numbers. And the explanation of these seems to be contained in the story about Pythagoras when he was asked the question: what is a friend? He replied:

"One who is the other I. Such are 220 and 284."

Now the secret of this apparently enigmatical reply is contained in the fact that when all possible divisors of the number 220 (these being 1, 2, 4, 5, 10, 11, 20, 22, 44, 55, 110) are added to a total, they yield the figure 284. Likewise, when all possible divisors of the number 284 (these being 1, 2, 4, 71, 142) are added together, they make a total of 220. Hence these two numbers are called amicable numbers because they form the basis of friendship!

HARMONY OF THE SPHERES

As already stated, there is nothing to be found in the traces of the work of Pythagoras to suggest that he had discovered the clue to the universal law of the triads. In actual fact this law was discovered by my brother, JAMES TUCKER. ² For it was he who discovered that each and every natural entity and abstraction assumes basically a triadic form (though only divisible by abstract reasoning) characterised physically by UNITY.

For example, the UNIVERSE may be analysed by the mind in terms of the three abstractions: SPACE, MATTER, and MOTION. These abstractions comprise the perfect triad, because if a single one of the three is omitted, the thinker is no longer considering the Universe but something else. Or, if one were to add an extra abstraction to the three necessary ones, something more than Unity is being considered.

It is useless, therefore, to add the further abstraction TIME, since our notion of time is dependent upon matter moving through space. Should we therefore add TIME to the triad of abstractions which have already been specified, we are merely adding the self-same abstractions: SPACE, MATTER, MOTION, once again, thus increasing the unit idea of UNIVERSE to something more than unity.

Each separate abstraction (e.g. SPACE, MATTER, MOTION) is likewise resolvable by the mind into further triads. For instance, SPACE has THREE DIMENSIONS. MATTER has THREE STATES (liquid, solid, gaseous).

It is curious, but the temptation to add to a valid and sufficing

² JAMES TUCKER, contributor of a brilliant series of articles to Science and Astrology under the pseudonym "PYTHAGORIAN". He died in 1944.

HISTORY OF THE SPHERES

triad is ever present and must be strenuously resisted. Because to fall into it is to perpetrate an error of thought. For instance, we hear of a fourth dimension and a fourth state of matter. In such cases it should be perfectly obvious that something more than space is being spoken of when a fourth dimension is postulated. That something more than matter is being thought of when to the three states a fourth (radiant, for example), is added. Radiant matter is obviously matter to which energy is added.

Sometimes the same unity is divided mentally for different purposes into different triads. For instance, a man may, for some purposes, be considered as skin flesh and bones; for other purposes into head body and limbs. But in no case is less than a triad sufficient for a complete description. For there is something mystical in the mentality of a man which renders this necessary. Observe how, if the validity of the triad be denied, the terms of the two descriptions of a man become loose in definition. The description: skin flesh and bones is quite valid and complete for the purpose for which it is made. It applies equally to head body and limbs. To omit the skin, for instance, makes the description incomplete. If one adds to the terms, one either adds to the unity considered, or takes away from one of the terms of the triad. For instance, suppose we add veins or nerves to the triad. We see at once that both these terms were originally contained in the term flesh. Also, observe the looseness of the term

HARMONY OF THE SPHERES

'body' if we connect it, in turn, to each of the above triads.

It is obvious that in the one case the term 'man' means 'body of man', whilst in the other case it just as obviously means, not 'body of man is man' but 'part of man'.

It is now established that the use of the triad automatically defines the terms, completes the description of the subject-matter and limits the subject-matter to itself as a distinct unity.

It is often said that man is composed of body and soul. But this is dualism, and the statement is incomplete. For the triad insists that man is composed of soul, body, and life - life being caused by the union of soul and body. And this definition goes no further than stating the simultaneous existence of the three things in man, i.e. the living man. Thus false reasoning is excluded, and in fact most of the sciences ought to be re-examined by this method. The same applies to religion and philosophy.

It is now proposed to give a few examples of triads and, where possible, point out where error creeps in, or has crept in in the past, by adding a fourth term to the triad.

The old philosophies recognised three elements: earth, water and air. This triad is valid and complete. It was only when fire was added that the system became false and unnatural. Fire is the act of change of form of substance and is not a fourth element as at first thought.

All things are included in the three kingdoms: the mineral, vegetable and animal kingdoms. Much trouble may be caused by

HARMONY OF THE SPHERES

forcing a fourth term - e.g. spiritual kingdom - into the definition of the world, without perceiving that, with this addition, we are talking about something other than the world as we know it.

Thus, things are no longer hot or cold: they are hot, temperate and cold. No longer are they good or evil: they are good, indifferent and bad. So long as we talk in triads of terms, each mutually exclusive, whether the divisions be useful or not, there is no longer any danger of the fallacies which dualism gives rise to. For example, it may not be useful to describe all things as hot, temperate and cold. It can be argued that cold does not exist except as absence of heat. That, simply th. temperature of things varies according to the amount of heat contained in them. Even so, it may readily be seen that nevertheless, no fundamental misunderstanding of this view of things arises by virtue of the definition we postulated. Whereas, by dualism, one is readily tempted to the fallacy that there are two separate entities, viz. heat and cold. For when speaking of a unity in a triad, although only one thing at a time is thought of, yet the other two are never lost sight of, and, likewise, never the fact that these three things are one.

Thus, every single thing in nature is one of a triad composing some larger unity. Hence we may speak of any one thing in three different ways: UNIQUELY, ANALYTICALLY, SYNTHETICALLY. But to understand anything properly, we are obliged to think about

HARMONY OF THE SPHERES

everything in these three ways:

In order to test the authenticity of the triadic law, let us make a rapid survey of the sciences.

ANTHROPOLOGY

In the science of Anthropology we discover that nature has arranged the species according to a triadic conception. For instance, we find three species of Raja Torpedo (Electric Ray). And if the science of anthropology be systematically re-examined, it will probably be found that throughout the whole range of organic and animal life, the species fall naturally into triadic groups. In ETHNOLOGY, for example, we find mankind classified into three skin-colour divisions: white, yellow and black - each of which divisions is further subdivided into three primary stocks. Thus the white-skinned races are found to spring from the three stocks: NORDIC, ALPINE, MEDITERRANEAN. The black races spring from the three stocks of BANTU, SIDENESE, NILALE. The yellow-skinned races spring from the three stocks of CHINESE, JAP, KALNUCH. (See Fig. 4).

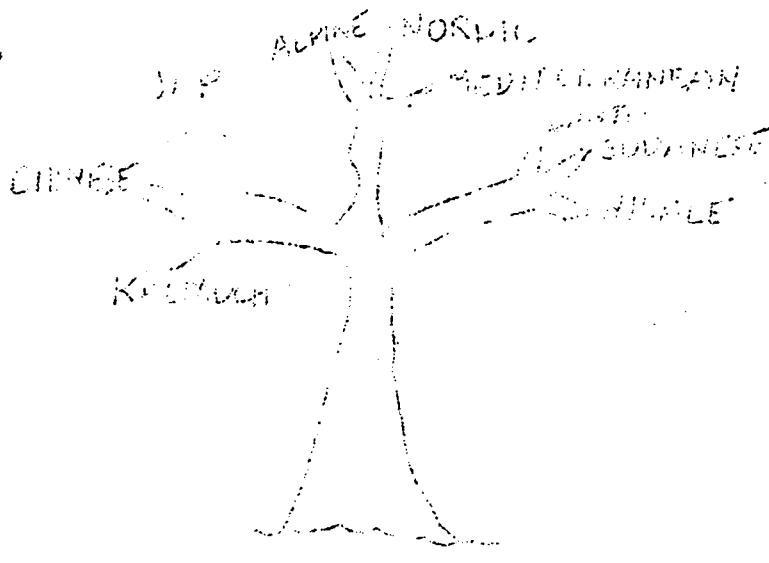


FIG. 4.

HARMONY OF THE SPHERES

MAGNETISM

In order to specify the exact magnetic conditions at any point of the Earth's surface, three things must be known: (1) the DECLINATION, (2) the INCLINATION or DIP; (3) the INTENSITY of the magnetic force.

There are three observable stages in the gradual magnetisation of iron and steel.

There are three ferro-magnetic compounds: MAGNETITE, MAGNETIC PYROXENE, FERROIC ANTIMONYDE.

There are three ferro-magnetic elements: IRON, COBALT, NICKEL.

There are three stages in the molecular groupings (according to Ewing):

(1) With a very small magnetising force the needles turn through a small angle.

(2) When a certain force is applied, the grouping becomes unstable, some of the needles swinging round to a new position, but resulting in the majority of the needles pointing approximately along the direction of the flow of the force.

(3) A further increase in the force of magnetisation pulls the needles perfectly into line.

ELECTRICITY

A voltaic cell requires three parts: an ANODE, a KATHODE, and an ELECTROLYTE.

Three things are required before electricity will flow: an ELECTROMOTIVE FORCE, a CONDUCTOR, and a CURRENT.

HARMONY OF THE SPHERES

Electricity is measured by the triad: VOLTAGE, OHMS, AMPERAGE.

There are three classes of electric cells:

- (1) Those with mechanical depolarisation.
- (2) Those with chemical depolarisation.
- (3) Those with electrochemical depolarisation.

There are three kinds of electric furnaces: (1) Arc furnaces,
(2) Resistance furnaces, (3) Induction furnaces.

There are three fundamental units for the measurement of
electrical quantity: CENTIMETRE-GRAINE-SECOND.

The quantitative laws of electrolysis are three in number:

- (1) The amount of chemical action is equal at all points of a circuit.
- (2) The amount of substance liberated at an electrode in a given time is proportional to the strength of the current.
- (3) The amount of a substance liberated at an electrode in one second is equal to the current multiplied by the electrochemical equivalent of that substance.

There are three methods of damping the needles of aperiodic galvanometers: (1) Air damping; (2) Oil damping; (3) Magnetic damping.

There are three reasons dictating the grouping of cells: (1) For best economy; (2) For greatest current; (3) For quickest action.

There are three radically different kinds of lightning: (1) Zigzag flash or 'forked lightning'; (2) Sheet lightning; (3) Globular lightning.

There are three forms to Ohm's law:

- (1) i equals E/R
- (2) E equals $i \times R$
- (3) R equals E/i

There are three laws applying to parallel and oblique circuits:

- (1) Two parallel portions of a circuit attract one another if the currents in them are flowing in the same direction. And they repel one another if the currents flow in opposite directions.
- (2) Two portions of circuits crossing one another obliquely attract one another if both the currents run either towards or from the point of crossing. And they repel one another if one runs to and the other from that point.

HARMONY OF THE SPHERES

- (3) When an element of a circuit exerts a force on another element of a circuit, that force always tends to urge the latter in a direction at right angles to its own direction.

There are three laws of resistance:

- (1) Resistance of a conducting wire is proportional to its length.
- (2) The resistance of a conducting wire is inversely proportional to the area of its cross-section.
- (3) The resistance of a conductor of given length breadth and thickness depends upon the material of which it is made. (Specific resistance).

M E C H A N I C S

Matter consists of the triad: BODY, SUBSTANCE, MATERIAL. *

Bodies assume three forms: RIGID, DEFORMABLE, FLUID.

There are three kinds of motion: KINEMATIC, VIBRATORY, REST.

Motion has three relations: VELOCITY ($v = \frac{s}{t}$);
SPACE ($s = vt$); TIME ($t = \frac{s}{v}$).

There are three laws of motion:

- (1) The law of inertia.
- (2) The law of force and motion.
- (3) The law of stress.

Velocity is determined by the triad: FORCE ($v = \frac{F}{m}$);
ACCELERATION ($F = ma$); MASS ($a = \frac{F}{m}$).

Gravity has the three relations of:

$$m = \frac{W}{g} \quad W = mg \quad F = \frac{W}{g}$$

There are three laws governing gravitation:

- (1) Bodies weigh most at the surface of the earth.

* DEFINITIONS. A BODY is a limited portion of matter (for example, a block of wood). SUBSTANCE is matter of a special kind (such as water, steel, etc.). MATERIAL is the kind of matter used in architecture (brick, stone, etc.)

HARMONY OF THE SPHERES

- (2) Below the surface the weight decreases as the distance to the centre increases.
- (3) Above the surface the weight decreases as the square of the distance increases.

Bodies assume three states in relation to the application of forces: (1) TENSION, (2) COMPRESSION, (3) UNSTRESSED.

To solve a problem concerning the composition and resolution of forces, it is necessary to take account of three things:

- (1) The point of application of the force.
- (2) The line of action of the force.
- (3) The direction of the force.

A parallelogram of forces requires two concurrent forces and one resultant.

There are three conditions attaching to equilibrium:

- (1) The resultant of the forces must be zero.
- (2) The sum of the resolutes of the forces in each of any two directions must be zero.
- (3) The sum of the moments of the forces about three points in their plane, not in the same straight line, must be zero.

CONDITION I is expressed by the equation $R = 0$.

CONDITION II is expressed by the equations:

$$\begin{aligned}\sum X &= \sum F \cos H = 0. \\ \sum Y &= \sum F \sin H = 0.\end{aligned}$$

CONDITION III is expressed by the equation: $\sum M = 0$.

There are three parts to a couple: (1) The LEVER ARM, (2) the PLANE, (3) the AXES.

Three cases apply to the equilibrium of two coaxial couples:

CASE I. When both couples are in the same plane and the forces of one are parallel to the forces of the other.

CASE II. When both couples are in the same plane and the lines of action of the forces of one intersect the lines of action of the other.

HARMONY OF THE SPHERES

CASE III. When the planes of the couples do not coincide but are parallel.

There are three relations between Angular and Linear Velocity:

$$(1) \text{Angular Velocity} = \frac{\text{Velocity}}{\text{Radius}}$$

$$(2) \text{Velocity} = \text{Radius} \times \text{Angular Velocity}$$

$$(3) \frac{\text{Velocity 1}}{\text{Velocity 2}} = \frac{\text{Radius 1}}{\text{Radius 2}}$$

Angular Velocity has three relations in terms of the number of revolutions per minute of time:

$$(1) \text{Velocity} = \frac{2\pi \text{ m}}{60} = \frac{\pi \text{ m}}{30} = .10472 \text{ m}$$

$$(2) \omega = \frac{2\pi \text{ m}}{60} = \frac{\pi \text{ m}}{30} = .10472 \text{ radian}$$

$$(3) n = \frac{30\omega}{2\pi} = 9.5493 \frac{\omega}{\pi} = 9.5493 \omega$$

A unit of horsepower depends on the relationship of (1) DISTANCE, (2) WEIGHT, (3) TIME.

Energy assumes three forms: (1) KINETIC (2) VIBRATORY, (3) POTENTIAL

There are three kinds of levers:

- (1) Wheel and Axle
- (2) Toothed Wheels
- (3) Pulleys

There are three orders to the levers: (1) FULCRUM (2) WEIGHT (3) POWER

There are three systems of pulleys.

L I G H T

To see any object, three things are needed:

- (1) An object to be seen
- (2) An eye with which to see the object
- (3) A form of energy called LIGHT which must exist independently of the object and the eye, but which must perform an action between the object and the eye.

HARMONY OF THE SPHERES

Bodies are classified into three groups according to their behaviour with light: (1) TRANSPARENT, (2) TRANSLUCENT, (3) OPAQUE.

In Optics, rays of light are of three kinds: (1) INCIDENT, (2) REFLECTED (3) NORMAL.

Mirrors and lenses are of three kinds: (1) CONCAVE (2) PLANE (3) CONVEX.

White light is composed of three primary colours: (1) RED (2) YELLOW (3) BLUE.

The human eye has three outer structural parts:

- (1) the SCLEROTIC COAT
- (2) the CHOROID COAT
- (3) the CORNEA

There are three inner parts to the eye:

- (1) the CRYSTALLINE LENS
- (2) the IRIS
- (3) the PUPIL.

S O U N D

Sound-waves consist of three parts: (1) AMPLITUDE, (2) WAVELENGTH, (3) FREQUENCY.

Sound is acted upon in three ways: (1) By REFLECTION, (2) by ABSORPTION, (3) by REFRACTION.

H E A T

There are three methods of transmitting heat: (1) CONDUCTION, (2) CONVECTION, (3) RADIATION.

C H E M I S T R Y

In Chemistry there are three branches: (1) INORGANIC, (2) ORGANIC, (3) PHYSIOLOGICAL.

HARMONY OF THE SPHERMS

There are three laws of combinations:

- (1) The Law of Constant Proportion
- (2) The Law of Multiple Proportions
- (3) The Law of Chemical Affinity

There are three kinds of salts: (1) ACID (2) BASIC (3) NORMAL.

There are three kinds of chemical reactions: (1) SYNTHESIS,
(2) ANALYSIS, (3) METATHESIS.

There are three groups of acids which are precipitated by reagents:

- (1) Acids precipitated by Barium Chloride
- (2) Acids precipitated by Silver Nitrate
- (3) Acids precipitated by Lead Acetate

There are three groups of non-volatile alkaloids: *

GROUP I: Consisting of those alkaloids which are precipitated from solutions of their salts by sodium hydrate and dissolve in an excess of their reagents. These are: MORPHINE and COCAINE.

GROUP II: Consisting of those alkaloids (non-volatile) which are precipitated by sodium hydrate and are insoluble in an excess of the reagent. Sodium bicarbonate will precipitate them even from acid solution. These are: QUININE, CINCHONINE, NARCOTINE.

GROUP III: Consisting of the non-volatile alkaloids which are precipitated by sodium hydrate and are insoluble in an excess of the reagent but are not precipitated from acid solutions by sodium bicarbonate. These are: STRYCHINE, BRUCINE, ATROPINE.

Matter is divisible into (1) Molecules (2) Atoms (3) Electrons

There are three forms of attraction inherent to matter: (1) Gravitation

* A non-volatile alkaloid is a solid alkaloid which cannot be distilled with water.

HARMONY OF THE SPHERES

(2) Cohesion, (3) Chemical Affinity.

There are three states of matter: (1) Liquid (2) Solid (3) Gaseous.

Matter has three motions:

- (1) Mass motion, or visible mechanical motion.
- (2) Molecular motion, or motion of the molecule within the mass.
- (3) Atomic motion.

There are three modes of chemical action:

- (1) Direct combination of two molecules to form a more complex molecule. E.g. $\text{Fe} + \text{S} \rightarrow \text{FeS}$.
- (2) A mutual exchange of atoms in two molecules. E.g. $2\text{Cu}_2\text{S} + \text{Fe}_2\text{Cl}_2 \rightarrow \text{FeCl}_2 + 2\text{Cu}_2\text{Cl}_2 + 2\text{S}$.
- (3) A rearrangement of the atoms in the molecule. E.g. $(\text{CN})_2(\text{NH}_4) + \text{heat} \rightarrow (\text{NH}_2)_2\text{CO}$.

There are three forms of chemical attraction: (1) COHESION,
(2) ADHESION, (3) CAPILLARY ATTRACTION.

A S T R O N O M Y

There are three systems for locating an object on the celestial sphere:

- (1) The Equinoctial System
- (2) The Horizon System
- (3) The Hour-Angle System

Angles are measured in three ways:

- (1) Arc or Degrees measure (in Degrees, Minutes, Seconds).
- (2) Time measure (in Hours, Minutes, Seconds)
- (3) Circular measure (in Radians).

There are three kinds of time: (1) SIDEREAL (2) APPARENT SOLAR
(3) MEAN.

There are three methods for determining latitude:

- (1) By observing a star on the meridian
- (2) By observing the Sun on the meridian
- (3) By observing Polaris at its culmination

HARMONY OF THE SPHERES

The Moon has three librations: (1) Libration in latitude, (2) Libration in longitude, (3) Libration in Diurnal Longitude.

PNEUMATICS

Pneumatic power is affected by three factors: (1) PRESSURE (2) VOLUME (3) TEMPERATURE.

PHYSIOLOGY

There are three kinds of joints: (1) Immovable (2) Partly movable (3) Movable.

There are three varieties of cartilage: (1) HYALINE, (2) WHITE FIBROUS (3) YELLOW ELASTIC.

There are three varieties of bone: (1) Ivory or Dentine, (2) Compact Tissue, (3) Cancellous Tissue.

There are three parts to a tooth: CROWN, FANGS, NECK.

There are three varieties of teeth: INCISOR, CANINE, MOLAR.

Saliva is formed in three pairs of glands: (1) PAROTID, (2) SUBLINGUAL, (3) SUBMAXILLARY.

There are three parts to the small intestine and three parts to the large intestine.

Food must consist of three essentials: (1) PROTEIDS, (2) CARBOHYDRATES, (3) HYDROCARBONS.

Digestion is completed in three stages.

Mastication consists of a combination of TEARING, CUTTING and GRINDING of food into pulp with the teeth.

The blood has three parts: (1) Red Corpuscles, (2) White Corpuscles, (3) Serum.

HARMONY OF THE SPHERES

There are three kinds of pipes or bloodvessels: (1) VEINS, (2) ARTERIES, (3) LYMPHATIC DUCTS.

Each kidney has three parts: CORTEX, MEDULLARY, PELVIS.

The three great excretory organs of the body are: (1) The Lungs, (2) the Skin, (3) the Kidneys.

The Spinal Cord performs three functions:

- (1) Conduction (to conduct sensations and impressions)
- (2) Reflex sensation
- (3) Reflex Action.

The brain performs three actions:

- (1) Voluntary and conscious
- (2) Acquired or artificial reflex actions
- (3) Natural reflex actions.

The human ear consists of three parts: (1) the outer ear, (2) the inner ear, (3) the middle ear. And it has three drums: (1) the drum on the outer wall of the chamber, (2) the fenestra ovalis, (3) the fenestra rotunda. It has also three bones: (1) the anvil, (2) the hammer, (3) the stirrup-bone.

The tongue is covered with three varieties of papillae or pimples: (1) FILIFORM, (2) FUNGIFORM, (3) CIRCUMVALLATE.

Three tissues compose the vocal cords: (1) elastic (2) muscular (3) fibrous.

There are three types of noses: (1) Snub (2) Roman (3) Aquiline.

These three things we derive from our parents: (1) EXISTENCE, (2) NOURISHMENT, (3) EDUCATION. (Vide Aristotle in Ethics viii 11,12)

C A T E G O R I E S

Categories are of three kinds:

- (1) QUANTITY: UNITY, PLURALITY, TOTALITY
- (2) QUALITY: ACTUALITY, POTENTIALITY, LIMITATION
- (3) RELATIONS: SUBSTANCE AND ACCIDENT, CAUSE AND EFFECT,
ACTION AND REACTION.

HARMONY OF THE SPHERES

S P I R I T U A L O G Y

The understanding is defined as the faculty of judging. The function of thought in a judgment falls into FOUR sets of TRIADS:

- (1) QUALITY in judgments: UNIVERSAL, PARTICULAR, SINGULAR
- (2) QUALITY: AFFIRMATIVE, NEGATIVE, INFINITE
- (3) RELATION: CATEGORICAL, HYPOTHETICAL, DISJUNCTIVE
- (4) MODALITY: PROBLEMATICAL, ASSEMBTORY, APODIOTIC

G E O L O G Y

There are three classes of rocks: (1) CRYSTALLINE (2) SEDIMENTARY (3) METAMORPHIC.

Prospectors examine to see whether rocks are: (1) Crystalline or non-crystalline, (2) Stratified or unstratified, (3) Fossiliferous or non-fossiliferous.

J O U R N A L I S M

Journalism has three purposes: (1) To record, (2) to comment, (3) to describe.

O L D E N G L A N D A N D H I S T O R Y

Our direct ancestors were: (1) JUTES, (2) SAXONS, (3) ANGLES

History itself is divided into three parts: (1) ANCIENT, (2) MEDIEVAL (3) MODERN.

A R T

The art of Ancient Egypt has three main characteristics: (1) MASSIVENESS, (2) PERMANENCE, (3) MYSTERY.

E N G I N E E R I N G

There are three main branches: (1) Civil Engineering, (2) Mechanical

HARMONY OF THE SPHERES

Engineering, (3) Electrical Engineering.

F R I E N D S H I P

There are three requisites for friendship: (1) Loyalty,
(2) Constancy (3) Personal Interest.

Of course we could go on and on with this. For triads are to be found on all hands. But naturally it would be idle to expect a complete tabulation of triads in this book. All we propose to do here is to describe a few of the surface triads appertaining to some of the main sciences and a few other important branches of human thought, in order to satisfy students of the reality of the law which applies throughout the whole range of nature, as well as to the structure of thought, knowledge and metaphysics.

To show how the fabric of any science is built up of triads and related triads, tier upon tier throughout the complete structure or department of knowledge, I am demonstrating as a model the subject of MUSIC in the following chapter. In the present chapter the aim has been to present the triadic law and to disclose its universal applicability. For, as we have now seen, the very bricks of matter have a triadic basis, and these bricks fall into place row upon row to build up a complete Universe. For example, the triads of nuclear particles: (1) the POSITION, (2) the PHOTON, and (3) the NEUTRON, combine to form the ATOM. And matter comes into being with the triad: (1) ELECTRON (2) ATOM (3) MOLECULE.

Using molecules, the triads accumulate by the million until gigantic bodies are formed which become worlds, planets and stars.

HARMONY OF THE SPHERES

Indeed, we are left with the impressive thought that CREATION itself was brought into being by the triad: (1) MATTER (2) ENERGY and (3) the DIRECTION OF ENERGY - the Direction being supplied by the designing mind of God the Creator!