

Measuring Heaven: Pythagoras and His Influence on Thought and Art in Antiquity and the Middle Ages

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Outline

- Pythagoras – Man and Legend
 - Greek World
 - Roman World
 - Late Pagan and Early Christian Worlds
 - In Medieval Memory
- Pythagorean Thought
 - Pythagoreanism in Greek and Roman Antiquity
 - Neopythagoreanism in the Late Pagan and Early Christian Worlds
 - The Middle Ages: A New Pythagoreanism
- Pythagoreanism in Art and Architecture
 - Ancient Art and Architecture
 - The Oldest Surviving Pythagorean Building and Its Significance
 - Hadrian's Pantheon
 - Medieval Art
 - Sacred Siting
- Conclusions

Introduction

- Pythagoras, the Legend
 - Pythagoras was remembered and revered for hundreds of years after he lived
 - His statue was in a gallery of gods and famous men - commissioned by the Roman emperor Septimius Severus in the city of Byzantium 700 years after Pythagoras died.
 - Strong influence on visual arts up until the Renaissance and beyond
- Who were the First Pythagoreans? A 6th century BC syncretic science-religion cult built around certain key principles.
 - Vegetarianism
 - Simplicity of dress
 - Hygiene
 - Moral instruction
 - Musical harmony
 - Metempsychosis (transmigration)
 - Cosmic order
 - Theories of number and numbers as philosophical ideas
 - Associated with teachings of Plato, particularly as given in the *Timaeus* (where Plato asserted that number is a universal and divine principle that explains and governs all things)

Pythagoras in the Greek World / Earliest References to Pythagoras

- Born in 6th century BCE in Samos, easternmost of the Greek Islands off the coast of Ephesus in Turkey
 - Samos saw lots of foreign traders and influence from Chaldea, Syria, Babylonia
- Emigrated to Croton (or Kroton) in Magna Graecia on the southern tip of Italy
- Pythagoras was famous in his own time
- Oldest description comes from the poet Xenophanes, who may have been acquainted with Pythagoras personally
 - His poems refer to the notion of a single “cause” that regulates the universe (rather than the belief in the anthropomorphic gods of the Hesiod)
 - Single “cause” is a form of monotheism, explaining why Pythagoreanism was centered on one god, Apollo
- Another contemporary reference comes from Alcmaeon, whom Aristotle said knew Pythagoras personally.
 - Good health consists of balancing of opposites and avoidance of excess
 - Balance is based on the concept of harmony and proportion
- Heraclitus, late 6th century BCE philosopher disparages Pythagoras as having overly broad interests. But the point is that he is mentioned and is well-known in his own time.

The Greek World / What Have We Learned From Sources Contemporaneous with Pythagoras

- His father was Mnesarchus
- He believed that men have souls that are immortal and transmigrate when one dies
- Sympathetic to animals
- Attached importance to the pairing of opposites
- Famous in his own time as polymath

5th Century BCE References to Pythagoras in the Greek World

- Empedocles and Heraclitus provide additional references
 - Confirms the view of Pythagoras' fame as a teacher and his reputation as a great mind noted for his wisdom
 - Evidence on dietary prohibitions – abstain from eating living creatures because of the transmigration of souls.
 - Discussion of Pythagoras taking a trip to Egypt
 - First mention of the quasi-monastic practice of “silence” practiced by Pythagoras' followers
 - Pythagoras had a daughter named Damo to whom he entrusted his commentaries
- Our image of Pythagoras slowly builds as different authors across time add images to the collage

4th C. BCE to 2nd C. BCE References to Pythagoras in the Greek World

- Myths of Pythagoras as a legendary sage and prophet continue, with two new biographies appearing 200 years after his death
- Aristoxenus of Tarentum in around 365 BCE wrote the first biography of Pythagoras that we still have
 - Suggested that Pythagoras traveled to Chaldea to study with Zoroaster
 - Wrote Harmonic Elements
- Aristotle is said to have told us that Pythagoras and his worshippers paid special attention to the worship of Apollo
- We learn that late in life Pythagoras was driven out of Croton and he sought refuge in Metapontum in Taranto, where he died
- Pythagoras was persecuted and there was a sense of chaos and tragedy after his death
- Heraclides' dialogues from 4th century BCE attribute to Pythagoras the coining of the word philosophy
- Pythagoras ban on meat and beans, a vexatious food, perhaps resembling testicles (avoid sexual excess)
- Hippobotus, a late 3rd century writer says Pythagoras had a wife named Theano
- Mnesarchus sent his son to study under Chaldean masters in Phoenicia – Pythagoras had an exotic oriental education
- He was seen in Antiquity as a promulgator of a coherent body of wisdom on mathematics and number, harmony, music, order, and the cosmos

Pythagoras in the Roman World / First Century BC / Cicero

- As Hellenistic kingdoms yielded power to Rome, Greek culture flourished, the memory of Pythagoras has now persisted 500 years
- Pythagoras was increasingly regarded as having magical powers over nature
- Cicero, pre-eminent Latin author 1st century BCE, extolled the supreme wisdom of Pythagoras
 - Credited as coining the term philosophy
 - New explanation for prohibition on beans – they disturb sound sleep and ability to have trustworthy dreams
 - In one of his great books, *On the State*, Cicero has a young statesman Scipio Africanus recount a dream on the workings of the universe (*Somnium Scipionis*)
 - There is life after death
 - In his dream, his grandfather introduces the perfect numbers 7 and 8
 - Shows Scipio the Harmony of the Spheres, seven musical tones, described as extraordinarily harmonious musical chord

Pythagoras in the Roman World / First Century BC / Ovid / Vitruvius

- Vitruvius, 1st century BC Roman architect-engineer,
 - admired in the Renaissance for writing *De Architectura*
 - Supplies the oldest surviving testimony that Pythagoras' name was associated with the Pythagorean theorem (published by Euclid in 300 BC without attribution to Pythagoras)
- Ovid's *Metamorphoses*, (mytho-historical panorama in verse) includes reference to discussion on metempsychosis and vegetarianism
 - Kindness to animals
 - The tetrad is the symbol of the order of the universe
 - Role of Apollo and interest in medicine – Apollo was also known as a healer – laurel tree symbol

Pythagoras in the Roman World / 1st and 2nd Centuries AD / Apollonius and Quintilian – Pythagoras as Healer

- Medical View of Pythagoras and view as spiritual healer
- Apollonius of Tyana – 1st century AD
 - He himself was a celebrated miracle worker and sage
 - Wrote a biography of Pythagoras that shed new light on the evolving image of Pythagoras
 - Seen as practicing medicine – concentrating more on spiritual or moral therapy for the soul than physical ailments
- Quintilian,
 - Famous rhetorician and teacher, tells a story of Pythagoras that recounts him persuading a flutist to change to a solemn spondaic beat rather than music which would inflame the passions.
 - Young men being led astray by their passions and committing “outrageous acts”
 - [cf. Orphism as an antidote to Dionysian excesses – listen to the right music]
- Views of Pythagoras as very well-traveled develop, in Diogenes, etc.
 - He traveled to visit the Egyptians, the Chaldeans, the Hebrews, the Arabs

Pythagoras in the Roman World / 1st and 2nd Centuries AD - Nicomachus, Celebrated Mathematician

- Nichomachus of Gerasa (AD 50-150) Greek mathematician of Syrian origin, self-described Pythagorean,
- Wrote Life Of Pythagoras and Introduction to Arithmetic
- Discussed wisdom as the knowledge of eternal truths. Wisdom can be attained through the quadrivium, which is the foundation of all wisdom
- Handy facts about numbers
- Take measure of the universe with a mathematical tool kit that starts with the concepts of Monad and Dyad as the basis of the universe
 - Beginning of all things lies in sameness and otherness
 - Monad represents sameness and permanence (God)
 - Dyad represents otherness or transitoriness of nature
 - Matter is the cause of things changing and separating
 - Both necessarily coexist. Reconciliation of opposites is the goal which is harmony
- Wrote Introduction to Harmonics.
 - Defines music and credits Pythagoras as revolutionizing music by applying these musical relationships to redesign the traditional seven-string lyre
 - Very similar, in fact, to what Aristoxenus had published 450 years earlier in Harmonic Elements

Pythagoras in the Roman World / 1st and 2nd Centuries AD – The Story of the Blacksmith

- Story about Pythagoras walking past a blacksmith's shop and hearing perfect octaves, fourths, and fifths in the clanging of the hammers against the anvils. This caused him to carry out a series of experiments with hammers and anvils, stringed and wind instruments. Through these experiments, he discovered certain consistent and unchanging relationships in tones
- Discussed diatonic and chromatic scales
- Whether or not true, these stories from Nicomachus served to influence others in the future such as Macrobius, Boethius, Porphyry, Iamblichus, Isidore of Seville

Man and Legend: Pythagoras in the Roman World / 1st and 2nd c. AD / Plutarch to Clement of Alexandria

- Pythagoras is often mentioned mostly with a tone of admiration in the work of Plutarch (50 AD – 120 AD)
 - Teaching had Egyptian origins, numerological and dietary
 - Satirizes Pythagoras and his followers to some extent for reducing philosophy to superstition
 - Refers to “One of the most celebrated among all mankind – Socrates, Plato, and Pythagoras.”
- Apuleius of Madaura (born AD 123)
 - Devoted to preserving the works of Nicomachus
 - Described Pythagoras in his works, him performing on a lyre, traveling to distant lands.
 - Says Pythagoras had an excellent build, and that he was very handsome.
- Theon of Smyrna) AD 120-140
 - Composed a book on number and music theory and astronomy where he attributes the ideas to Pythagoras
 - Discussed the properties of the *tetraktys* and how the universe manifests itself in a fourfold division, called a quaternary (4 seasons, 4 ages of man, 4 faculties of judgment
 - Because 10, is the sum of the first 4 numbers, there is also a chapter extolling the virtues of the number 10, which is said to be the “perfect number.”
- Clement of Alexandria (born around 150 AD)
 - Delighted that Pythagoras had declared God is one – appealing to Christian mentality
 - High praise for Pythagoras as guide to the holy life
 - He outlines the life of Pythagoras in his works, and discusses the *Timaeus* and the role of symbolism in numbers

Man and Legend: Pythagoras in the Roman World / 1st and 2nd Centuries AD / What have we learned from this period?

- He dressed in white and had a beard
- Special interest in the number 4
- Founder of a religious cult with special rituals, dress, and dietary restrictions
- Transformed from sage to miracle worker
- Associated with the holy tetraktys
- Association with Apollo and the 7-stringed lyre

Man and Legend: Pythagoras in the Late Pagan and Early Christian Worlds – Late Pagan / Diogenes

- There continues to be lively 3rd century interest in Pythagoras. In the 3rd century BCE, he is still not forgotten
 - Rise of Constantinople, where Greek was the acknowledged language of the erudite, was important in preserving influence of ancient Greek thought
 - Supernatural elements continue to become increasingly prominent in references to Pythagoras
- Philostratus (around 170 AD) wrote a biography of the Greek mystic Apollonius of Tyana, in which he stresses the parallels between Pythagoras' life and Apollonius
- Diogenes Laertius early 3rd century wrote *The Lives and Opinions of Eminent Philosophers* where he discusses Pythagoras at length
 - Connection between Apollo and Pythagoras
 - Says the name Pythagoras comes from the Pythian oracle of Apollo
 - As proof of his unusual relationship with Apollo, he is said to have a thigh of gold which you could glimpse when he was unrobing
 - Pythagoras urged his followers to sing and play the lyre
 - Repeats maxims of Pythagoras such as “Don't urinate facing the sun.” Pay due respect to the Sun and to Apollo
 - He wore white and his appearance was commanding and majestic

Man and Legend: Pythagoras in the Late Pagan and Early Christian Worlds – Late Pagan / Porphyry

- Roman Syrian Porphyry of Tyre (232 – 305 AD), erudite philosopher and student of religion writes of Pythagoras
- Known as the son of Apollo
- Legend - Apollo impregnated Pythais, Pythagoras' mother, with the knowledge and consent of Mnesarchus, the father
- Golden thigh story – Pythagoras revealed his golden thigh to a priest of Apollo to demonstrate that he himself was the god of the Hyperboreans
- Specific descriptions of the Samian sage's appearance and mode of life
 - Ate honey for breakfast and bread and boiled herbs for dinner
 - He liked to take walks in sacred groves
 - His students included women and boy
 - He could cure the sick by singing
 - He was fond of dancing and believed in keeping the body agile
 - Had extraordinary skill at expressing himself in rhythm and incantation
 - Devoted himself to number their symbolism and meaning
 - The decad symbolizes the interrelationships in the earth. The visual symbol of that is the *tetraktys*

Man and Legend: Pythagoras in the Late Pagan and Early Christian Worlds – Late Pagan / Iamblichus

- Iamblichus of Chaclis (Syria 250 – 325 AD) wrote a 10-volume encyclopedic work on Pythagorean philosophy, theology, geometry, music, and astronomy, as well as his life
- Book 1, On the Pythagorean Way of Life is now commonly referred to as *Vita Pythagorica*
 - What distinguishes his book from others is the quality of religiosity in the biographical description
 - His personal piety, brotherly love, temperance, and communal spirit are extolled
 - Pythagoras is Apollo, who was sent to earth to teach the worthy (those who practice silence and understand his aphoristic utterances)
 - Divine birth of Pythagoras
 - Apollo's association with Pythagoras contributed to a shift in the way Apollo was portrayed, from a vengeful sharp-shooter to the god of civilization
 - Describes Pythagoras' teachings
 - Silence
 - Piety
 - Abstinence from beans and meat
 - Sunrise is more honored than sunset
 - Moderation of human passion – balance opposites and find a central path
 - Pythagoras wants to instill in men the many values of music
 - Repeats the story of the blacksmith from Nicomachus of Gerasa

Man and Legend: Pythagoras in the Late Pagan and Early Christian Worlds – Early Christian / Jerome & Augustine

- Saint Jerome (328 – 420 AD) in *De viris illustribus*
 - Well-acquainted with Pythagoras, admired his ascetic lifestyle
 - First mention of the greek Y (upsilon,) used to refer to the choice of two roads, good and evil. Sometimes called the “letter of Pythagoras”.
- Augustine of Hippo (354-430 AD) in *De civitate Dei* (The City of God) cites Pythagoras’ notions about the divinity of numbers and his own interest in divination and the idea that Pythagoras travelled in Egypt
- Macrobius (365 – 420 AD) discusses in his *Commentary on the Dream of Scipio* the great influence of Pythagorean ideas.
 - Discusses numerical ratios of musical concords
 - Helps these ideas survive from classical into the Middle Ages
- Martianus Capella (430 AD) introduces the Seven Liberal Arts in a dramatic fashion – quadrivium + grammar, rhetoric, and logic
 - Pythagoras is the chaperone of Arithmetic, a striking woman clad in golden dress with 10 rays emanating from her head
 - Magical qualities of the numbers in the decad

Man and Legend: Pythagoras in the Late Pagan and Early Christian Worlds – Early Christian / Boethius

- Learned Roman Boethius Severus (475 – 525 AD) admired Pythagoras
 - Pythagoras was recognized as the ultimate authority on arithmetical learning
 - Of the *quadrivium*, arithmetic is the most important because it lays the foundations for the principles of harmony and the divine mathematics of creation
 - This work *De institutione arithmetica* was of great importance because it came to be the basic text in the study of arithmetic through medieval times
 - More discussion on how Pythagoras could inspire *enkrateia* or continence through music – story of an inflamed youth who had been excited by listening to something in the Phrygian tempo and pursuing a harlot in the house of a rival lover. Through the spondee, Pythagoras calmed him down.
- In 529 AD, Emperor Justinian closed the Platonic Academy of Athens, resulted in a hiatus of study of Pythagoras

Man and Legend: Pythagoras in Medieval Memory (early)

- Early 6th century, Neoplatonist scholars still trying to keep Pythagoras' name alive, e.g., Olympiodorus of Alexandria
- Monasteries, with their love of learning greatly admired Pythagoras with his love of wisdom, devotion to one God, and belief in the immortality of the soul, as well as his importance for number and music
- In the 9th century, the scholar and patriarch Photius preserved in the Constantinople library a biography of Pythagoras, showing that he was still considered important enough to preserve 1000 years after he lived
- He remained popular in Baghdad and in the Muslim world as well

Man and Legend: Pythagoras in Medieval Memory (middle)

- Scholars of Chartres (including Thierry of Chartres, c. 1150) had a particular interest in mathematics and Pythagoras, the *tetraktys* demonstrating the power of number and the number 4
- 13th and 14th century, Thomas Aquinas appreciated ancient sages but focused mostly on Christianizing Aristotle and tended to overlook Pythagoras
- New humanism of Dante and Petrarch, however, for example, appreciated Pythagoras. Dante refers to Pythagoras 8 times in the *Convivio*, a tribute to divine wisdom.
 - Dante reminds us Pythagoras discovered and named philosophy.
 - Heavenly hierarchy has 10 circles
 - Admired Pythagoras' emphasis on friendship

Man and Legend: Pythagoras in Medieval Memory (late)

- A contemporary of Dante's, Walter Burley wrote an original biography of Pythagoras, citing all the ancient authors
 - He traveled in Egypt and Babylonia
 - Invented philosophy
 - Live a frugal life
 - Importance of number
 - Concept of soul and eternal life
 - Lived in community and taught temperance
 - Venerated in the ancient world
- Petrarch admired Pythagoras and mentioned him repeatedly – refers to the “Y of Pythagoras”, the *bivium or crossroads*
- Early Medieval times also saw the development and rise of Pythagorean cultism
 - Magical practices like numerology, divination, prophecies, incantations, geomancy, and alchemy

Pythagoreanism in Early Greek and Roman Antiquity

- Sappho, born in 612 BC might have been acquainted with Pythagoras. She was often seen with a lyre and was associated with Apollo. He also supported female intellectuality and education and had female followers
- The great poet Pindar (518-438 BC) lyric poet who forever changed the cult of Apollo from an avenging and terrifying deity to a god that made music and cured the ills of mankind and who enabled mankind to become civilized. Apollo's music distributes peace and order on earth.
- Parmenides of Elea (515 BC) was known in his time as a Pythagorean
 - Recommended restraint in daily life, man's obligation to choose between carelessness and virtue, symbolized by the letter Y.
 - Immortality and transmigration of the soul
 - *Harmonia* is established by balancing opposed but equal elements
- Philolaus of Croton, sometimes called Philolaus the Pythagorean
 - Importance of number and the five regular geometric solids, harmony governs all
 - Put forth philosophical concepts based on the cosmic roles of number and balance
- Archytas of Tarentum was known as a Pythagorean
 - First to clearly enunciate the concept of the *quadriivium*

Pythagorean Thought: Pythagoreanism in Greek and Roman Antiquity (Plato and the Academy)

- Although Plato was known as a Pythagorean, the oppression suffered by Pythagoreans may explain his reluctance to mention Pythagoras
 - Soul as immortal
 - Harmony of the spheres, astronomy and music as kindred sciences
 - Plato discusses that basic to all geometrical forms is the triangle
 - Man fits into the cosmic order and a divinely ordered cosmos is an inspiration for the immortal soul
- Speusippus, Plato's nephew, who was the head of the Old Academy was a zealous advocate for the teachings of Pythagoras
 - Perfection of the number ten
- Xenocrates (396-314 BCE) became head of the Old Academy, which was imbued with the study of Pythagorean form and number
 - Pythagorean ideas remained an inspiration for the Athenian Academy, which promoted number theory and the five geometrical solids

Pythagorean Thought: Pythagoreanism in Greek and Roman Antiquity (Aristotle)

- Aristotle demonstrated an appreciation for Pythagoreanism, the primacy of number, the importance of the tetraktys and the number 10
- Credits the Pythagoreans as source of knowledge and learning in astronomy and the natural sciences
 - In *De Caelo*, Aristotle discusses harmony of the spheres, the ideas of concords and contraries that balance each other and establish the unity in the universe
- Although he doesn't share the idea of transmigration, he does believe in the importance of the soul
- By the end of the 4th century BC, the term Pythagorean could mean ascetic wanderers or those with scientific interests. However, in those times, these two areas weren't so distinct as they are today. They were held in reverence for their secrecy, always wearing clean white clothing

Pythagorean Thought: Pythagoreanism in Greek and Roman Antiquity (Roman)

- Cicero had Pythagorean tendencies
 - Explained beans cause flatulence and interrupted dreams
- Varro referred to Pliny the Elder as being buried in the “Pythagorean style”, with leaves of myrtle, olive, and black poplar. Roman Pythagoreans were ritually distinguished by the inclusion of these things.
- Vitruvius
 - The cube is a perfect shape
 - 6 and 10 are perfect numbers
 - introduces the idea of architectural proportion

Pythagorean Thought: Neopythagoreanism in the Late Pagan and Early Christian Worlds – 1st century AD – Arithmology and Arithmosophy

- Platonists with strong Pythagorean interests created this revival of Neopythagoreanism in late first century BC and early first century AD – the Romanized world saw this as a basis of thought and behavior
- Philo of Alexandria (30BC – AD 44) – Hellenized Jew with deep interest in Plato and Pythagoras
 - Influenced Plotinus and Augustine
 - Through Philo, Pythagoras was rediscovered in the Renaissance
 - May have authored Book of Wisdom
 - Immortality of the soul and the importance of number symbolically
 - Perfect number 4 source of eternal order in the world
 - 6 symbolizes productivity
 - 7 is the most revered of all numbers, the 7-string lyre being the perfect expression of the number 7
 - The most complete number is 10
 - But the monad is the only perfect number and connotes God

Pythagorean Thought: Neopythagoreanism in the Late Pagan and Early Christian Worlds – 1st century AD – Seneca, Hadrian, Nicomachus

- Seneca in his letters discusses his ardent zeal for Pythagoreanism in his youth
- Apollonius, a divinely inspired sage practiced ascetic lifestyle (wearing shoes of bark), practiced silence, wore only white linen
- The emperor Hadrian (AD 76 – 138) was interested in Apollonius of Tyana, wore a beard (uncommon at the time) and was a devotee of the sun. Believed the soul was a guest of the body.
- Nicomachus of Gerasa, contemporary of Hadrian, says number divulges the plan of the Divine Craftsman in the *Theology of Arithmetic*. *Arithmetic is God's wisdom and brings its practitioners closer to God.*
 - The Monad is identified with the sun or Apollo
 - Strong influence of Plato's *Timaeus*
- Plutarch tells us of Pythagorean customs
 - Pythagorean custom of joining right hands and embracing each other at the end of the day.
 - Played the lyre before going to sleep at night to quell the turmoil of the day.
 - Important for worshippers not to turn their backs to the sun

Pythagorean Thought: Neopythagoreanism in the Late Pagan and Early Christian Worlds – Dissemination of Neopythagoreanism after the 1st century

- Clement of Alexandria
 - Wrote the Golden Verses
 - Order and harmony, frugality and self-control
- Continued influence – intellectuals who were also religiously inspired, such as Plotinus (205-270 AD)
 - Celibate and vegetarian
 - Values of friendship
 - Attempted to start a commune
- Iamblichus
 - Vita Pythagorica – 10 volume encyclopedia of Pythagoreanism
 - Importance of numbers for ethics and understanding the structure of the universe
- Saint Jerome also admired Pythagoras and advocated frugality, temperance, early rising and singing, moderation
 - Encouragement of emergent Christian church (Jerome, Augustine, Clement) encouraged Pythagoreanism to remain active
- Macrobius and Boethius kept the Pythagorean tradition alive into the Middle Ages in such things as the *quadrivium*, beginning each day with singing

Pythagorean Thought: Neopythagoreanism in the Late Pagan and Early Christian Worlds – The Druids and Pythagoreanism

- Druids were Elite members of the Celtic tribe that had migrated to Gaul and had ancient Greek roots. Caesar describes them as an educated, superior class with strong philosophical interests.
- Their initiates practiced secrecy, silence, the immortality of the soul, the order of nature.
- Practiced divination
- They liked music and they played lyres
- Uttered their philosophy in the form of riddles
- Known as educators, judges, astronomers, physicians and prophets
- The Druidic schools probably inherited ideas that were transferred from Greece to Italy to France

Pythagorean Thought: The Middle Ages: A New Pythagoreanism – Assimilation into Christianity

- Pythagorean ideas were assimilated into Christianity for example with the ethical aphorisms called the *Sentences of Sextus* which advocated love of the truth, avoiding polluting the body, anticipating death with joy
- The importance of the *Timaeus* can't be overemphasized. Discussed the numerical explanations of proportion and harmony. This culminated in the work of the cathedral schools in the late 11th, 12th and early 13th centuries, which preserved Pythagorean numerical concepts (Chartres scholars)
- Christianized form of Platonism made its debut in the Greek-speaking world around AD 500. Highly influenced by the 1st century Christian Dionysius the Areopagite (Pseudo-Dionysius) who discussed the Celestial Hierarchy consisting of 12 orders,
- Isidore of Seville, Christian bishop, repeatedly propounds the importance of numbers
 - *De natura rerum* describe the 7 days of the week, 12 months, 4 seasons, 4 elements, cube, sphere, etc.

Pythagorean Thought: The Middle Ages: A New Pythagoreanism – Kabbalah and Fibonacci

- Early Pythagoreans discussed the quadrivium and the Seven Liberal Arts and these ideas were continued into the middle ages education and scholarship
- Emergence of the Jewish Kabbalah in the Middle Ages was influenced by Philo of Alexandria
 - 10 principles or emanations (*sefiroth*)
 - Paths of divine wisdom
 - Moses Maimonides (1135-1204) rabbi and physician that studied Plato's relation to the Old Testament
- Fibonacci (1170-1250 AD) profound scholarship in pure mathematics. Introduced Arabic numbers into Italy
- He developed a method of generating three sets of 3 square numbers first attributed to Pythagoras by Vitruvius.

Pythagorean Thought: The Middle Ages: A New Pythagoreanism – Magical Ideas

- Magical ideas entertained by medieval people led to magical practices in medicine and divination, which led to increased interest in alchemy, a concept that also had roots in Antiquity
- The Sphere of Apuleius or the Sphere of Pythagoras was an magical device for determining through a mathematical method the outcome of a given illness
- Alchemy gained new energy in the 9th century, especially in Baghdad. Many hermetic texts spurred interest interest and experimentation

Art and Architecture: Pythagoreanism in Ancient Art and Architecture

- Worship of Apollo cult in Southern Italy, where Pythagoras' legacy was strong. It is significant that the temples to Apollo in Croton, Samos, and Metapontum are in places where Pythagoras was known to reside and teach
- Many antique images on coins and carvings of Pythagoras
- In Roman thought, Apollo was esteemed as an oracular god and associated with Pythagoras. The linking of Apollo and Pythagoras was seen in the iconography of Roman culture and architecture, statues, golden tripod, building of temples to Apollo by Tiberius, and Nero

Art and Architecture: The Oldest Surviving Pythagorean Building and Its Significance – Subterranean Basilica at Porta Maggiore

- Oldest surviving Pythagorean structure - AD 45 to 54
- Pythagorean preference for a dark or underground location where mysteries might be contemplated in anticipation of the ascent of the soul into the light of celestial immortality
- Why do we say the Porta Maggiore Basilica is a Pythagorean structure?
 - Apse in the east signifying respect for the rising sun and sign of their obedience to the injunction not to turn their backs to the sun
 - Narrow paths / cosmic cavern
 - Oculus representing the Monad, the light of the sun, the symbol of Apollo
- Suggests Pythagoreanism had developed a liturgy for an interior space

Art and Architecture: The Pythagoreanism of Hadrian's Pantheon

- Built by Hadrian 118-125 AD
- Hadrian had strong interests in mathematics and may have incorporated Pythagorean references into the building plans
 - Hadrian was more engaged with the single god Apollo rather than the whole pantheon of gods. He used architectural symbolism to express his claimed relationship with Apollo.
 - Hadrian's known interests in Greek and Greek culture, as well as interests in astrology, divination, and magic
- Numerological arrangement of architectural elements incorporated numbers for symbolizing cosmological concepts considered "perfect" by Pythagoreans
- Sphericity
- Cosmological orientation
- Numerical symbolism
- The light that enters through the oculus represents the power of Apollo

Art and Architecture: Pythagoreanism in Medieval Art – The Seven Liberal Arts and Pythagoras in Medieval Architecture

- Pythagoras continues to be honored in the art of the medieval ages as he is closely associated with the rise of the concept of the Seven Liberal Arts, a topic which the famous medieval philosopher Boethius also spoke
- Pythagoras is depicted in the portal at Chartres and the Cathedral of Clermont-Ferrand
- Painting of all sorts arise, particularly one beautiful one by Bonaiuto, *The Allegory of the Catholic Religion*
 - Depicted Arithmetic and Pythagoras. At the Santa Maria Novella, Florence.

Art and Architecture: Pythagoreanism in Medieval Art – Dodecahedrons, Pentagons and Prognostication

- Dodecahedrons, bronze geometric objects found from the 3rd-4th centuries AD. Probably served a cultish purpose. Existence of precious and portable Pythagorean object suggests a connection between cosmology, health, and divination
- Dodehedron had sacred purpose in ancient times
 - Plato's Timaeus describes the dodecahedron as the structure used by god for inspiration as he shaped the universe.
 - Symbology of Platonic Solids: the cube gives birth to the earth, the pyramid to fire, the octahedron to air, the icosahedron to water, and the dodecahedron to the sphere of the universe.
- Iamblichus told us that Pythagoras particularly loved the sphere and he had been the first to construct a sphere from twelve pentagons, forming the dodecahedron
- The Pentagon thereby gains its significance and the number 5 is given importance, particularly as a symbol of health
- May have been used in association with Druidic prognostication
- The Sphere of Pythagoras (or Sphere of Apuleius) medical diagnostic tool – circle with number patterns

Art and Architecture: Sacred Siting

- Concepts of order in Gothic cathedrals
- Attention to number in gothic architecture and symbolic qualities of number often used to demonstrate religious truths
- Concept of harmony was demonstrated by using geometric relationships throughout the architectural plan, uniting the whole with equilateral triangles, squares, pentagons
- Gothic cathedrals were cosmological structures based on the perfection of mathematical forms, to motivate men to seek God's wisdom
- His influence on Boethius and the *quadrivium* are important, even though Pythagoras might not be mentioned, when these things are referenced, Pythagoras is there

Conclusions: (1 of 3)

- He was kind to animals
- From contemporaries, Philolaus and Empedocles, we learn that he was deeply admired as a man of prodigious learning
- Single cause unites the universe, bringing balancing of opposites and harmony
- Initiates maintained silence and secrecy
- Famous in his day for wisdom and humility
- In Magna Graecia where Pythagoras lived, there were temples to Apollo
- He was represented on Greek coinage
- By the 4th century, he was already a legend
- Plato revered Pythagoras and in the Timaeus explained the value of geometry. Here he described the Platonic solids
- 3rd century BC persona emphasized his persecution and that he died a martyr's death
- Aristotle first mentions him as having a golden thigh

Conclusions – (2 of 3)

- Augustus identified himself with Apollo
- Cicero in his *Somnium Scipionis* desired the music of the spheres and their concordant unity
- Vitruvius –
 - Temples should face east
 - high esteem for the cube and its divine character
 - Found practical uses for the Pythagorean theorem, which although first published by Euclid several centuries earlier, Vitruvius was the first to attribute it to Pythagoras
- Influence on the Druids
 - Celtic tribe originating in Greece migrated northward through the Alps. They are referred to in Greek and Roman writing as having characteristics of Pythagoreanism
 - Druidic philosophy continued to be transmitted underground throughout Gaul
 - Emphasis on divination and prognostication
 - Druids recalled their distant ancestors from Greece
 - Bronze dodecahedrons

Conclusions: (3 of 3)

- Influence on Philo
 - God and matter are interconnected
 - Language of universal harmony and concord, whose characteristics can be explained by number
- Subterranean Basilica at Santa Maggiore is earliest example of architecture influenced by Pythagorean concepts
- Nicomachus of Gerasa, an important mathematician historically, discussed the cosmological importance of mathematics
- Hadrian, builder of the Pantheon, was known to be a Pythagorean
- Subterranean Basilica of Porta Maggiore
- Clement of Alexandria, Saint Augustine, Isidore of Seville and many other Christian writers admired Pythagoras, honored the east, played lyres, etc.
- Dante saw Pythagoras as a prophet