

Plato



RAPHAEL: *School of Athens*. Center section

Profile:

Plato (c.427-347 B.C.E.) was born to an aristocratic family in Athens. As a young man Plato had political ambitions, but he became disillusioned by the political leadership in Athens. He eventually became a disciple of Socrates, accepting his basic philosophy and dialectical style of debate, the pursuit of truth through questions, answers, and additional questions. Plato witnessed the death of Socrates at the hands of the Athenian democracy in 399 BC. In Raphael's *School of Athens* we see Socrates prone, with cup nearby.

Plato's most prominent student was Aristotle, shown here with Plato in Raphael's *School of Athens*, Aristotle holding his *Ethics* and Plato with his *Timaeus*.

In 387 BCE Plato founded an Academy in Athens, often described as the first university. It provided a comprehensive curriculum, including astronomy, biology, mathematics, political theory, and philosophy.

Plato's final years were spent lecturing at his Academy and writing. He died at about the age of 80 in Athens in 348 or 347.

Over the doors to his academy were the words "*Let no one destitute of geometry enter my doors.*" (<http://www.dartmouth.edu/~matc/math5.geometry>)

The Timaeus

Plato left lots of writings. We've mentioned his *Republic* in our unit on number symbolism in which he gave the four cardinal virtues, but his love of geometry is especially evident in the *Timaeus*.

Written towards the end of Plato's life, c. 355 BCE, the *Timaeus* describes a conversation between Socrates, Plato's teacher, Critias, Plato's great grandfather, Hermocrates, a Sicilian statesman and soldier, and Timaeus, Pythagorean, philosopher, scientist, general, contemporary of Plato, and the inventor of the pulley. He was the first to distinguish between harmonic, arithmetic, and geometric progressions.

In this book, Timaeus does most the talking, with much homage to Pythagoras and echos of the *harmony of the spheres*, as he describes the geometric creation of the world.

Although Plato loved geometry, he would not have been good at teaching a course in Art & Geometry because he had a low opinion of art. He taught that, since the world is a copy or image of the real, then a work of art is a copy of a copy, at third remove from reality. (<http://www.dartmouth.edu/~matc/math5.geometry>)

Timaeus

by Plato
Sections 16-23

I. Section 16: The receptacle of becoming

- A. Description of the universe continued from previous sections
 - 1. Plato started with two descriptions of the universe which he described as two forms of reality:
 - a) Model: intelligible and unchanging, invisible (what Plato considers real)
 - b) Copy of it: visible and changing (earth, things)
 - 2. Now it is necessary to consider a third form of reality
 - a) The receptacle:
 - (1) Plato will explain the receptacle through a discussion of fire and the other elements (bodies).

II. Section 17: The names fire, air, water, earth really indicate differences of quality not of substance

- A. We should not define these bodies so rigidly because they are in a constant state of cyclical change.
 - 1. For example:
 - a) Water can change into a solid state and become earth
 - b) Water can evaporate and become air
 - c) Air under combustion becomes fire
 - d) Fire, when extinguished becomes air again
 - e) Air condenses into clouds and eventually running water
 - f) And running water turns back into earth or stone
 - 2. Earth, fire, air and water are qualities of the same thing which Plato calls the receptacle. Because none of these bodies ever appear constantly under the same form, we should not name them as a thing, but describe their qualities.

III. Section 18: The receptacle compared to a mass of plastic (meaning malleable) material upon which differing impressions are stamped. As such it has no definite character of its own.

- A. Plato uses the example of a man who makes geometric shapes out of gold and constantly melts them down to make different shapes.
 - 1. We should not call object by its shape, we should say that it is gold, regardless of what shape the gold is currently taking.
- B. The same thinking applies to the natural receptacle of all bodies (elements):
 - 1. The receptacle continues to receive all things and never takes a permanent impression from the things that enter it.
 - 2. The receptacle is a neutral malleable material on which changing impressions are stamped, making it appear different at different times.

3. We should not call the receptacle by the name of the sensible things that are imprinted on it.

IV. Section 19: The originals on which the qualities of fire, air, etc., which appear in the receptacle, are modelled are the forms, which exist 'in themselves' and whose reality is guaranteed by the difference between opinion and intellectual knowledge.

A. The originals which appear in the receptacle are called forms.

1. Plato questions whether or not the forms exist unto themselves as a separate reality or are only the things we see the real reality.
 - a) Plato is referring to the forms as infinitesimal in size and therefore not able to be seen right away. He is asking if a thing is still real even if we can not see it and drawing a connection to 'thoughts' verses 'things'.

V. Section 20: Summary description of the three factors Form, Copy and Receptacle, which is now called Space.

- A. Form: unchanging, indestructible, uncreated and imperceivable to sight and senses. (thoughts and ideas)
- B. Copy: bears the same name as the form, but we see it and sense it. It has come into existence and is in constant motion. (opinions, things and images)
- C. Space (Receptacle): eternal, indestructible. Provides a position for everything that comes to be.

VI. Section 21: Description of the primitive chaos

- A. Backing up a bit: Plato describes what things were like before the world came into existence. There were three distinct realities:
 1. Being
 2. Space
 3. Becoming: Plato describes becoming as the positioning of the 4 elements. By it's constant motion, the 4 elements were moved, sifted and shifted until similar sized bodies grouped together by pushing and pressing. The four bodies began to occupy different regions of space before they were arranged into an ordered universe.
 - a) Before this, the four bodies were without proportion or measure. They were disorganized until god gave them a shape and number.
 - b) The next task is to attempt an explanation of the structure and origin of each.

VII. Section 22: The four elements and the regular solids. Geometrically, solids are bound by planes, and the most elementary plane figure is the triangle. Two types of triangles are chosen as the basic constituents of all solid bodies, and four basic solids are constructed from them. Transformation of the elements one into another is accounted for from three of them being built

up from the same type of basic triangle: the fourth (earth) being built up from triangles of the other type cannot be transformed into the remaining three.

- A. Fire, earth, water and air are bodies
 - 1. All bodies are:
 - a) solid
 - b) bound by surfaces
 - c) composed of triangles
 - 2. There are two basic types of triangles from which the four bodies are constructed:
 - a) Three are composed of the scalene and "*can pass into one another*"
 - b) One is composed of the isosceles.
 - 3. Plato describes each body and how it is geometrically composed.

VIII. Section 23: Assignment of the four solids to the four elements. Each element is composed of particles of the figure assigned to it. the particles being individually invisible (as we might say, of atomic size).

- A. Assignment of the four solids to the four elements
 - 1. Earth: Cube, most immobile, most stable
 - 2. Water: Icosahedron, least mobile, least sharp, smallest figure
 - 3. Air: Octahedron, intermediate mobility
 - 4. Fire: Pyramid, most mobile, fewest faces, sharpest and largest figure
 - 5. Cosmos: dodecahedron. Plato writes "*There still remained a fifth construction, which the god used for embroidering the constellations on the whole heaven.*"

Plato's statement is vague, and he gives no further explanation. Later Greek philosophers assign the dodecahedron to the ether or heaven or the cosmos.

- B. The figures only become visible when massed together in large numbers
- C. Plato concludes the section with the assumption "*that the god has adjusted the proportion, movement and qualities of the forms to the exactest perfection permitted by the willing consent of necessity.*"