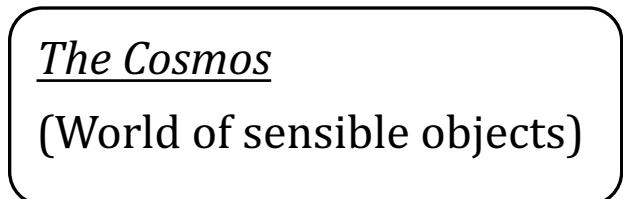
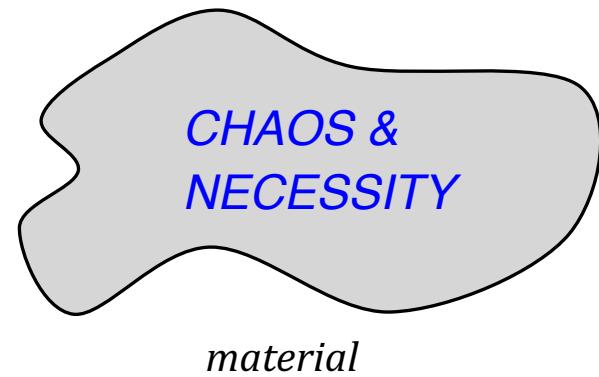
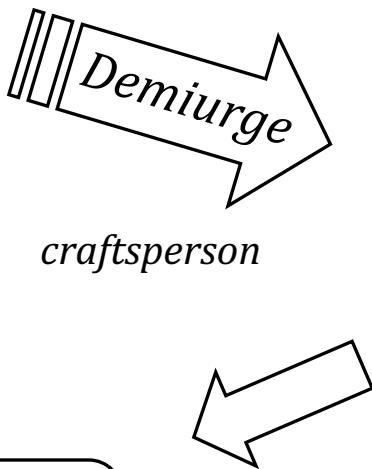
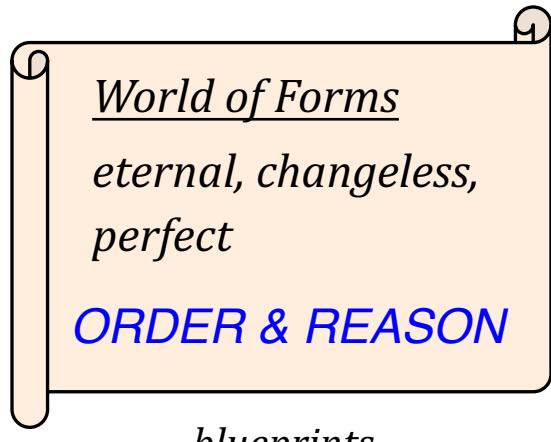
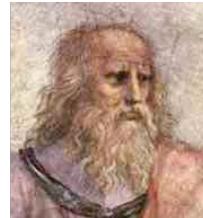


# 02. Plato's Cosmology

## Outline:

1. Demiurge and Creation	5. The World Soul
2. Three Constituents	6. Human Souls
3. The Receptacle	7. Time
4. Geometric Atomism	

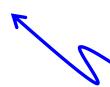


## Creation of the Cosmos

- Top-Down ("Works of Reason")
- Bottom-Up ("What comes about of Necessity")

## 1. Demiurge and Creation

- Demiurge: Craftsperson (manual laborer).
  - *New concept: creator god.*
  - *Distinct from the Good (highest Form which all other Forms seek to emulate).*
- Creation
  - *Not creation ex nihilo (out of nothing): Demiurge uses pre-existing Forms as blueprints to impose order on pre-existing Chaos.*
  - *Reason "persuades" Necessity*



*A response to the Atomists!*

- *Cosmos of Atomists is pure Chaos & Necessity, no Order & Reason.*

## 2. Three Constituents

- Forms: "Father"
- Copies (sensible objects): "Child"
- Receptacle: "Mother" ("nurse of all being")

### 3. The Receptacle

- That in which the cosmos is created: Forms are imposed on the Receptacle to generate individual objects.

#### Gold analogy:

- gold = malleable (plastic) stuff.
- can be shaped into different forms.
- But: gold, in and of itself, has various properties.

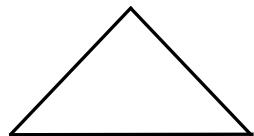
- Receptacle has *no* properties: "an invisible and formless being which receives all things and in some mysterious way partakes of the intelligible and is most incomprehensible".

#### Compare with:

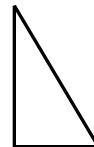
- Anaximander's neutral substratum.
- Aristotle's prime matter.
- Newton's concept of absolute space.

## 4. Geometric Atomism

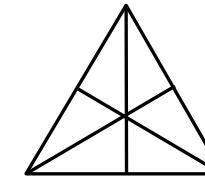
- Two types of fundamental geometric atoms:



*isosceles* ( $45^\circ, 45^\circ, 90^\circ$ )



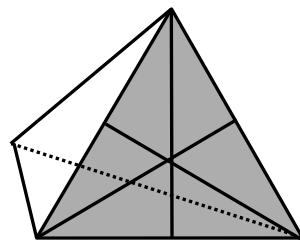
*scalene* ( $30^\circ, 60^\circ, 90^\circ$ )



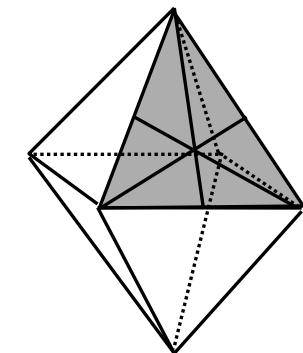
*6 scalenes make up an equilateral.*

- Four elements are geometric solids comprised of geometric atoms:

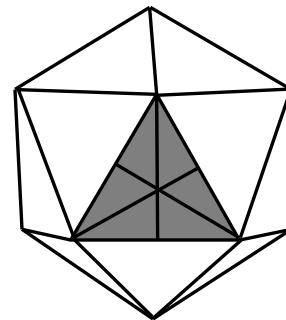
- *Fire particle = tetrahedron (4-sided solid).*
- *Each side = equilateral.*
- *24 atomic triangles.*



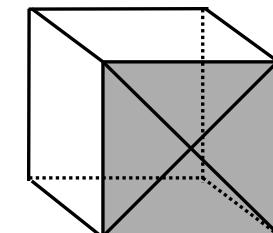
- *Air particle = octahedron (8-sided solid).*
- *Each side = 1 equilateral.*
- *48 atomic triangles.*



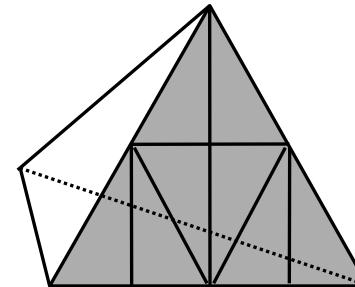
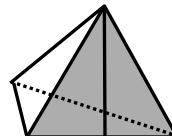
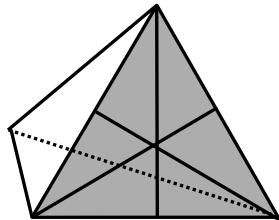
- *Water particle = isosahedron (20-sided solid).*
- *Each side = equilateral triangle.*
- *120 atomic triangles.*



- *Earth particle = cube (6-sided solid).*
- *Each side = 4 isosceles.*
- *24 atomic triangles.*

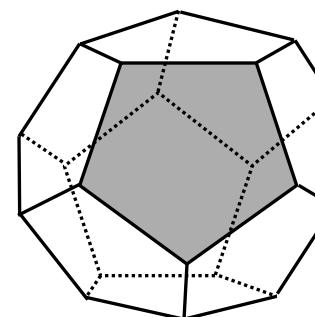


- Any given element can come in different sizes.
  - *Ex:* Primary fire particle has 24 atoms. A smaller version can be constructed from 8; a larger version from 32.



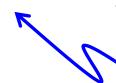
- Fifth regular solid = 12-sided dodecahedron.
  - *Demiurge uses it to construct the spherical cosmos.*

- *Cosmos = dodecahedron (12-sided solid).*
- *Each side = 1 pentagon.*
- *Cannot be constructed from geometric atoms.*



## Motivations

- Only 5 possible *regular solids*.
- Foundation of Cosmos = *geometry* (harmony and order).



*Distinguish geometry from number.*

- Pythagoreans emphasize number as foundation of Cosmos.
- Compare later with Galileo and Kepler.

- Provides an account of transformations between elements (*change*).

- *Transformations between the elements occur by breaking a given element up into its constituent parts and recombining the parts.*

- Thus:

$$1 \text{ water (20 sides)} = 1 \text{ fire (4 sides)} + 2 \text{ air (16 sides)} = 2.5 \text{ air (8 + 8 + 4 = 20 sides)}$$

$$1 \text{ air (8 sides)} = 2 \text{ fire (4 + 4 = 8 sides)}$$

- But: Earth particles cannot be transformed into the others, since earth is made up of isosceles triangles.
  - Also: Scheme doesn't preserve volumes (no conservation of matter).



Possible response:

- The "matter" of an element consists only in its surface area.
- Its volume consists of space (the receptacle).

## 5. The World Soul

- The Cosmos is a *living being*: possesses a *soul* (self-moving thing) and a body.
- World soul is a mixture of divisible and indivisible Sameness, Difference ("other"), and Being ("essence").
- Divided into harmonically proportionate parts.

## 6. Human souls

- Composed of remains from World Soul.
- Each soul is assigned to a star.
- Death:
  - *Good souls return to their stars for "a blessed and congenial existence".*
  - *Evil souls are reincarnated, first as women, then as "lesser brutes".*
    - *Scientific claim?*
    - *Reflection of patriarchal ancient Greek society?*
    - *Is contemporary science any more immune to cultural and societal influences?*

## 7. Time

- Created along with Cosmos.
- A "moving image of eternity", "moving according to number".
- A measure of change in the Cosmos.
- Planets as instruments of time.