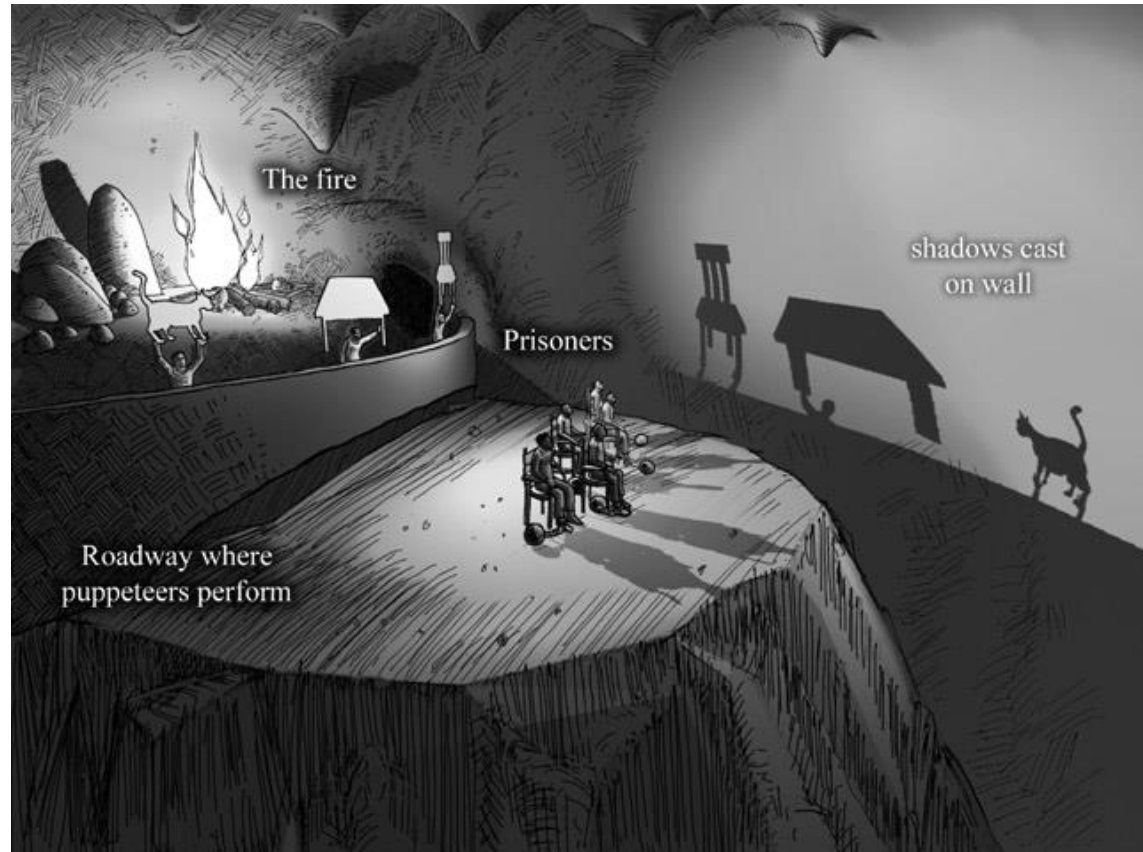


# The History of Philosophy

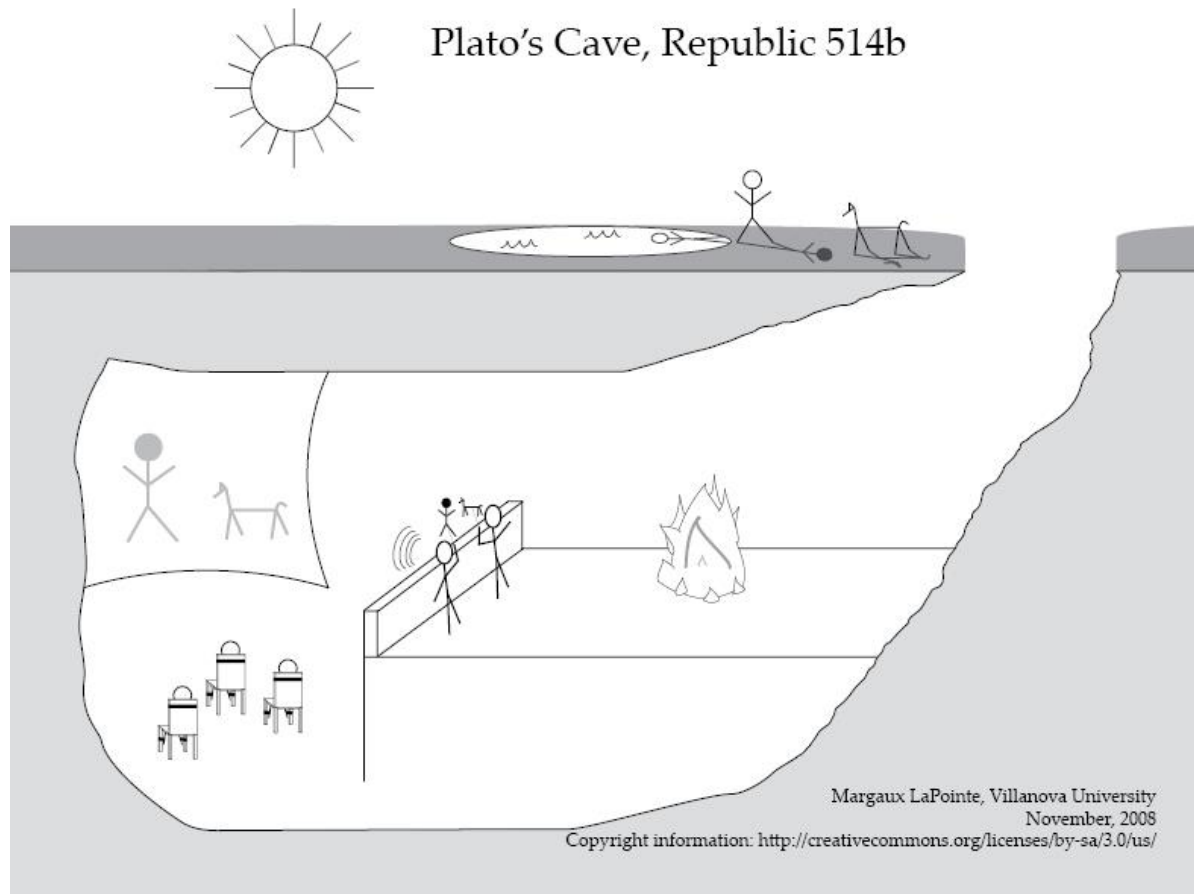
Dualism vs. Materialism  
& Realism vs. Anti-realism

# Plato's Cave

- To explain what happens to a student who begins to study philosophy (e.g. science) Plato tells a story about people initially trapped in a dark cave, seeing only shadows of objects.



- Then someone gets out, and sees real objects, clearly, under the light of the sun.



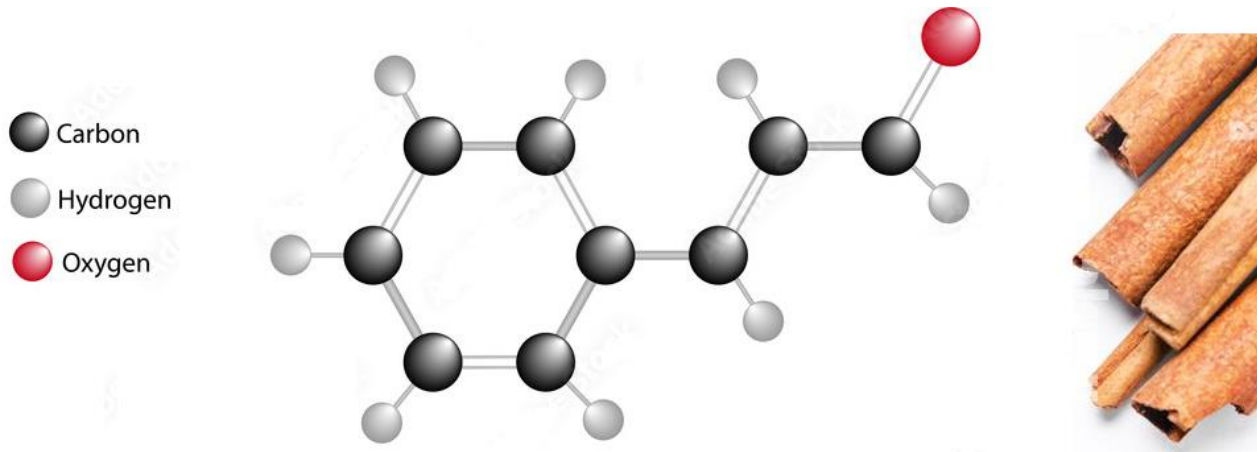
# Philosophy is hard ...

“At first, when any of them is liberated and compelled suddenly to stand up and turn his neck round and walk and look towards the light, **he will suffer sharp pains**; the glare will distress him, and he will be unable to see the realities of which in his former state he had seen the shadows.”

“And suppose once more, that **he is reluctantly dragged** up a steep and rugged ascent, and held fast until he’s forced into the presence of the sun himself, is he not likely to be **pained and irritated?**”

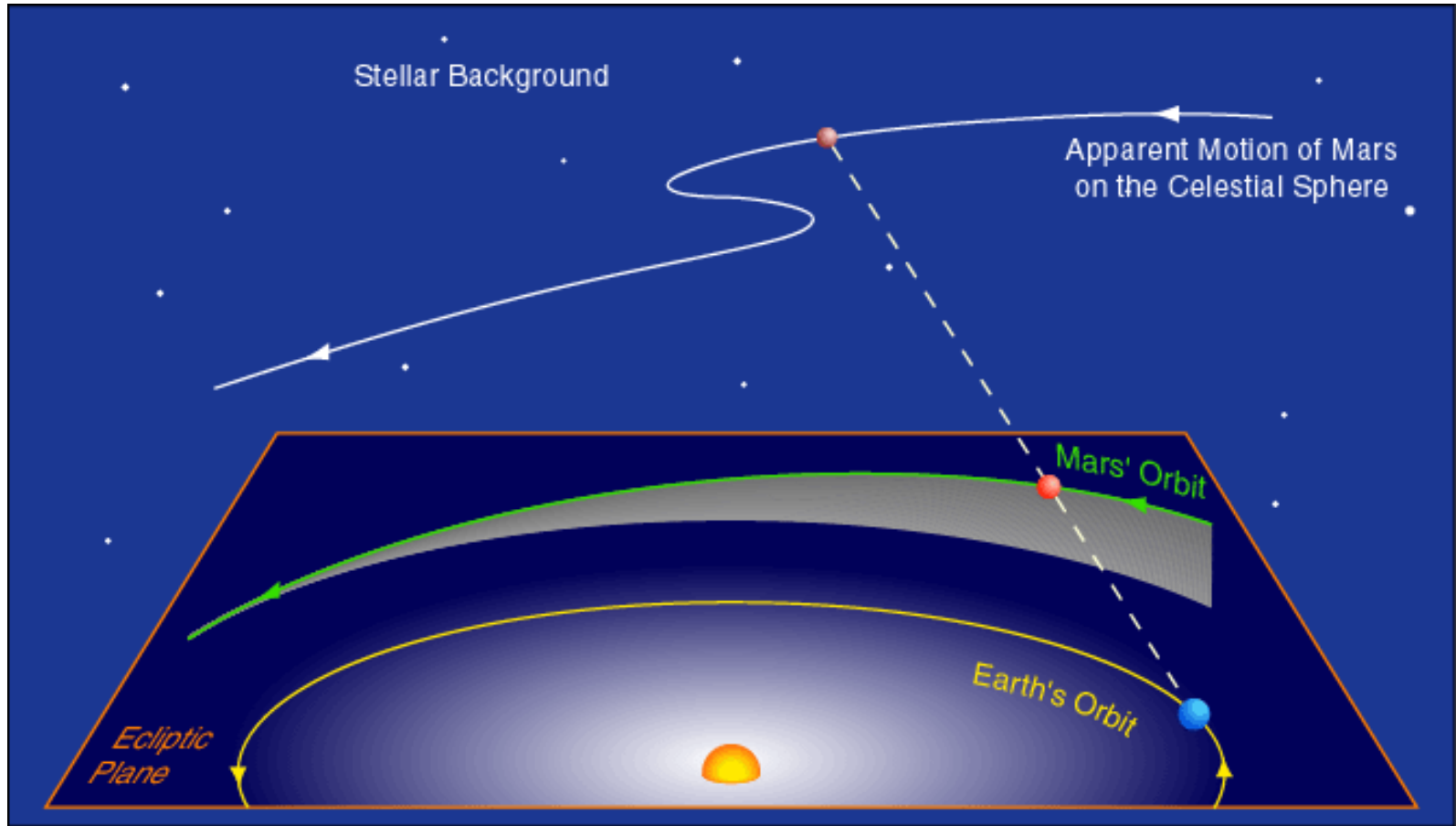
# Plato: Real $\neq$ Apparent

- Science often tells us that the way the world seems to us is incomplete, and even partly an illusion. Most of what's *really* going on is hidden from our senses.



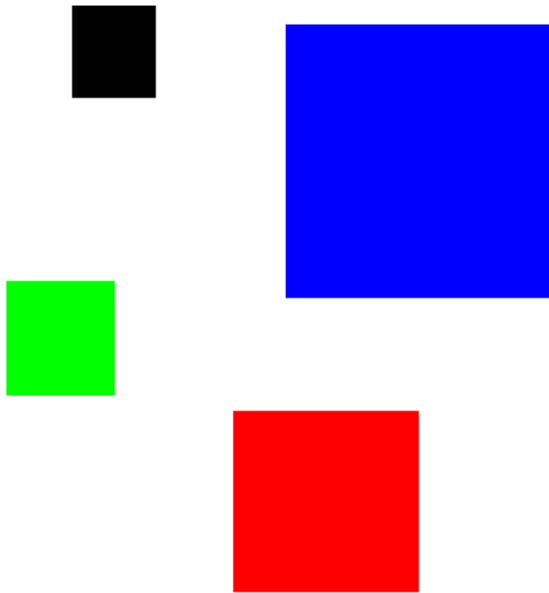
- E.g. while the motion of Mars appears complicated and rather arbitrary to the *eyes*, Kepler's *mind* "saw" perfect elliptical motions.

# Kepler's explanation



# Plato's "Forms"

- The four objects below are quite different from each other, in size, position and colour.  
But do you see anything that is the *same* in them all?



Clearly, says Plato, there is some single “thing” that is “in” all of the objects. That is the Form *Square*.

- *Square* is not a material object.
- *Square* is not just an idea in our minds (why not?) but it’s perceived by the mind. It’s not visible.
- *Square* is permanent, unchanging, indestructible. So it’s more real than a material object.



- N.B. one of the words usually translated “Form” here is ἰδέα in Greek, from which our word *idea* is derived. So sometimes the word “Idea” is used instead of “Form”.

(But, as we have seen, a Form is not something that *exists in* our minds. Rather, it’s *accessible to* our minds.)

# The Form of the Good

- Plato held that one form, the Form of the Good, is superior to the others. Somehow, it gives existence to all the other Forms.

“... in the world of knowledge the idea [Form] of good appears last of all, and is seen only with an effort; and, when seen, is also inferred to be the universal author of all things beautiful and right, parent of light and of the lord of light in this visible world [i.e. parent of the sun], and the immediate source of reason and truth in the intellectual ...”

- It is no surprise that (centuries later) Christian philosophers such as Augustine saw Plato's Form of the Good as a glimpse of God. From there, it is natural to interpret the other Forms as God's ideas, or God's concepts. (This is called *Neoplatonism*.)
- “The Ideas are certain archetypal forms or stable and immutable essences of things, which have not themselves been formed but, existing eternally and without change, **are contained in the divine intelligence**. They neither arise nor pass away, but whatever arises and passes away is formed according to them.” (Augustine, *De Ideis* 2)

- This notion even persists into modern philosophy. Leibniz (1646 – 1716) for example believes that in creating the world God began by considering all the possible worlds, as mere abstract ideas in his mind, and then giving substance to the one he liked best.

# Aristotle

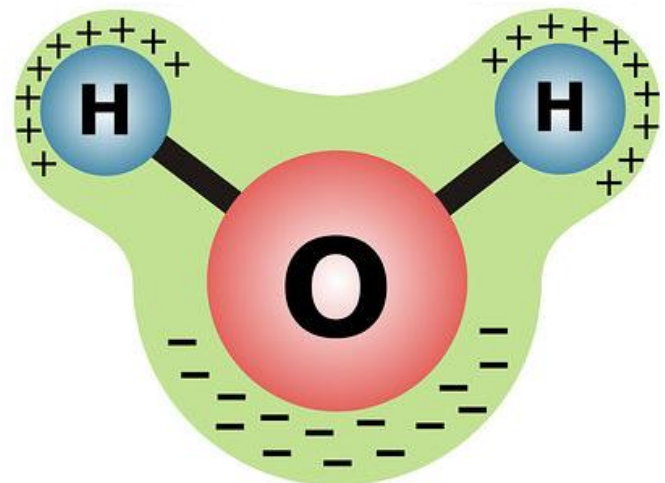
- Aristotle was Plato's most famous student – and became greater than his teacher according to many.
- Aristotle is considered to be the first biologist, and studied animals and plants in great detail. Indeed, his study of biology influenced his work in other areas of philosophy, such as physics, astronomy, ethics, metaphysics, etc.

# Essentialism

- Plato and Aristotle both accepted *essentialism*, the view that each kind of object has a certain property (or some properties) that are essential to making it an object of that kind.
- Fire is naturally hot. Stone is naturally solid. A dog naturally has 4 legs.
- There are also non-essential properties, or “accidents”. E.g. a stone may be hot (heated by a fire) or a dog may be painted blue.

# Essentialism in Chemistry

- Essentialism works pretty well in Chemistry.
- For example, what is the essence of water? Is there some property that **makes** a thing water?
- Yes, water is  $H_2O$ .



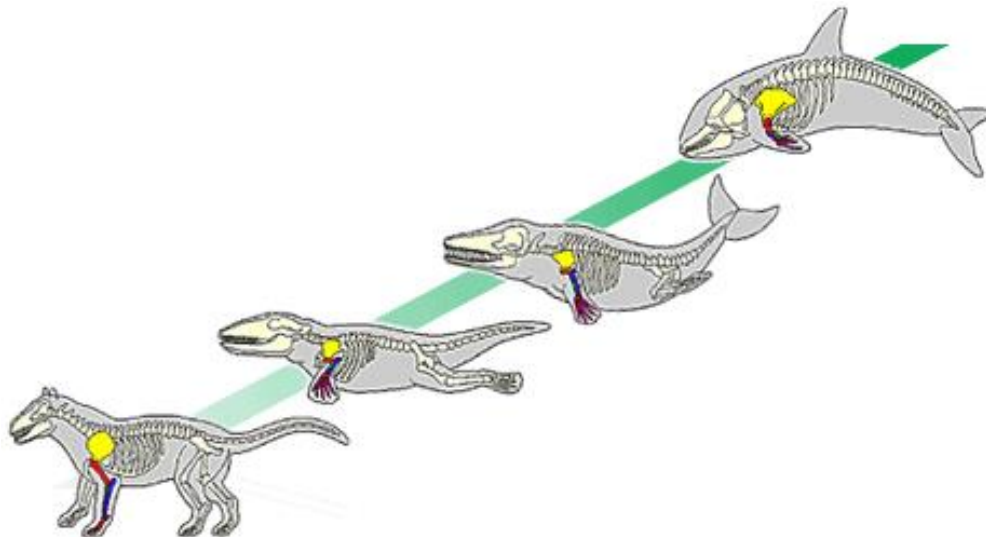
# Essentialism in Philosophy

- Plato applied this idea of essences to philosophical questions, e.g.
- What is justice?
- What is virtue?
- What is knowledge?
- In the case of knowledge, for example, we require not just a list of kinds of knowledge (from perception, memory, reasoning, ...) but an understanding of *what it is that makes* some belief a case of knowledge.



# Essentialism in biology

- Over long time scales, essentialism doesn't fit well with evolutionary biology. (Ernst Mayr made this point especially.)
- If a dog-like animal evolves to become a dolphin, for example, at what exact point is the doggy essence lost, and the dolphin essence acquired?



# The Place of Mathematics in the World

- Platonism gets some support from the fact that the world seems to be built upon mathematical (or rational) principles.

$$m\vec{E} + m\vec{v} \times \vec{B} = \frac{\partial}{\partial t} m\vec{v} \quad (1)$$

where  $m$  is the charge or mass,  
 $\vec{E}$  is the electrostatic field,  
 $\vec{v}$  is the velocity of the particle, and  
 $\vec{B}$  is the magnetic field

$$\left( \frac{1}{c^2} m\vec{v} \cdot \vec{E}, m\vec{E} + m\vec{v} \times \vec{B} \right) = \frac{\partial}{\partial t} (m, m\vec{v}) \quad (2)$$

$$\frac{1}{c^2} m\vec{v} \cdot \vec{E} = \frac{\partial}{\partial t} m \quad (3)$$

$$m\vec{v} \cdot \vec{E} = \frac{\partial E}{\partial t} = c^2 \frac{\partial m}{\partial t} \quad (4)$$

where  $E$  is the internal energy

$$\Delta E = c^2 \Delta m \quad (5)$$

$$E = mc^2 \quad (6)$$

# “The Unreasonable Effectiveness of Math”

“The miracle of the appropriateness of the language of mathematics for the formulation of the laws of physics is a wonderful gift which we neither understand nor deserve.”

(Physicist Eugene Wigner)

“Arithmetic must be discovered in just the same sense in which Columbus discovered the West Indies, and we no more create numbers than he created the Indians.”

**Bertrand Russell**, *The Principles of Mathematics* (1903), 451

“Geometry, which before the origin of things was coeternal with the divine mind and is God himself (for what could there be in God which would not be God himself?), supplied God with patterns for the creation of the world, and passed over to Man along with the image of God; and was not in fact taken in through the eyes.”

**Johannes Kepler** (*Harmonice Mundi, The Harmony of the World* (1619), book IV, ch. 1. Trans. E. J. Aiton, A. M. Duncan and J. V. Field (1997), 304)

(As you see, Kepler was a (neo) Platonist -- actually Copernicus was too.)

- “Philosophy is written in that great book which ever lies before our eyes – I mean the universe – but we cannot understand it if we do not first learn the language and grasp the symbols, in which it is written. **This book is written in the mathematical language,** and the symbols are triangles, circles and other geometrical figures, without whose help it is impossible to comprehend a single word of it; without which one wanders in vain through a dark labyrinth.”
- Galileo, *The Assayer* (1623)

It seems to be one of the fundamental features of nature that fundamental physical laws are described in terms of a mathematical theory of great beauty and power, needing quite a high standard of mathematics for one to understand it. You may wonder: Why is nature constructed along these lines? One can only answer that our present knowledge seems to show that nature is so constructed. We simply have to accept it. **One could perhaps describe the situation by saying that God is a mathematician of a very high order, and He used very advanced mathematics in constructing the universe.**

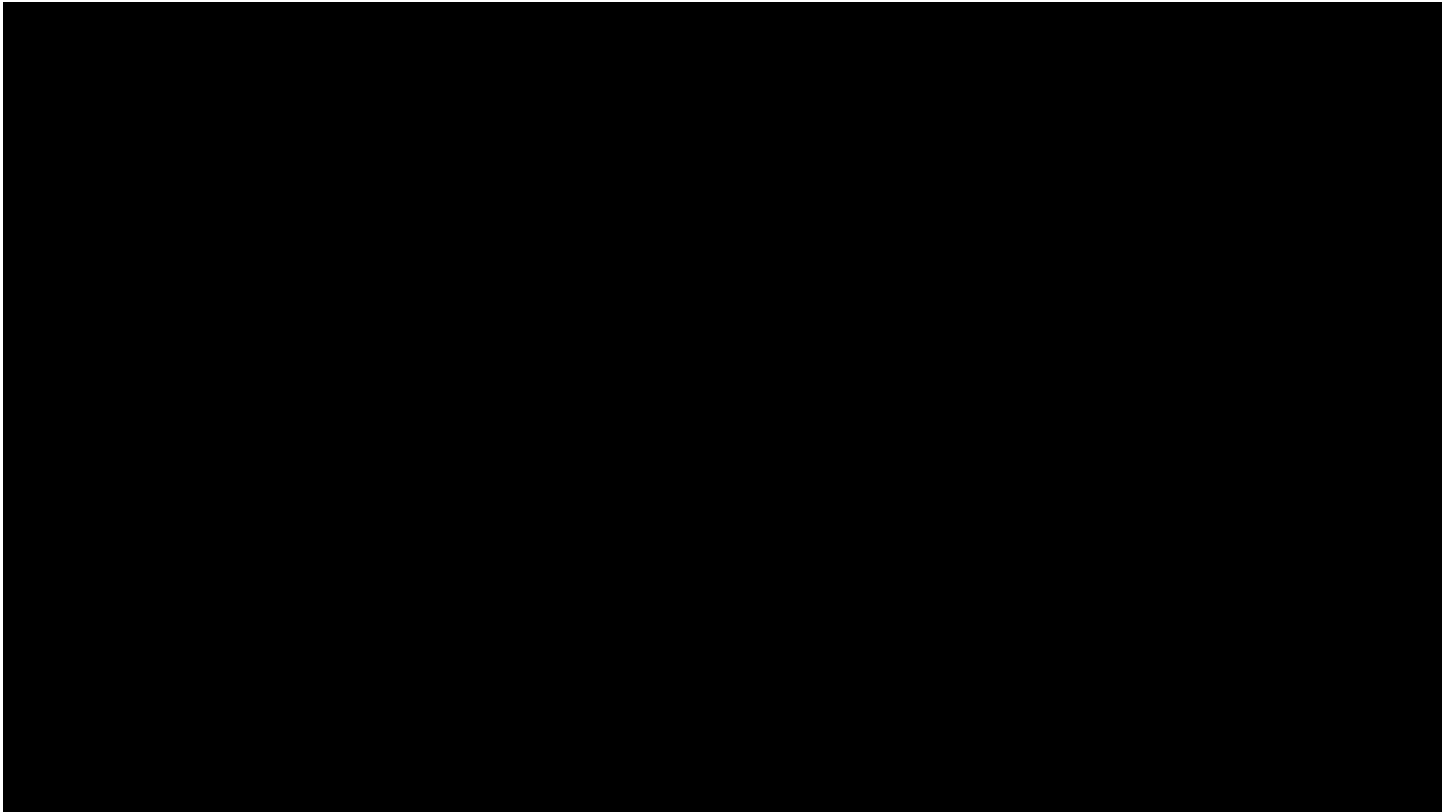
**Paul A. M. Dirac** (Quoted in Behram Kursunoglu and Eugene Paul Wigner, *Paul Adrien Maurice Dirac* (1990), Preface, xv.)

# Gregory Chaitin on math





# Roger Penrose on math



# Medieval Neoplatonism

“Even if there were no human intellects, there could be truths because of their relation to the divine intellect. But if, *per impossible*, there were no intellects at all, but things continued to exist, then there would be no such reality as truth.” (Aquinas, *De Veritate* Q. 1, Article II, Reply).

“the nature of a circle, and the fact that two and three make five, have eternity in the mind of God” (Aquinas, *Summa Theologiae* Ia, q. 16, a. 7, obj. 1 and reply).

# Innate concepts and knowledge

- Plato also had a theory of innate knowledge
  - (Innate knowledge = knowledge already present in some way when a person is born).
- Plato held that a person's non-material soul gazed on the Forms prior to incarnation.
  - (Incarnation = being joined with a material body and born as a baby).
- Generally speaking, theists also have a tendency to believe that some of our concepts and knowledge are innate, being part of the mind's basic architecture.

# Innate concepts and knowledge

- E.g. the astronomer Kepler (1571 – 1630) thought that God implanted geometrical concepts (square, circle, ellipse etc.) into human minds, as part of the process of making humans in his image.
- Such concepts, present at birth, “not in fact taken in through the eyes” are called *innate*.

# Teleology

- Plato and Aristotle believed in **teleology**, the view that the various parts of the world have *purposes*.

(Telos = τέλος = purpose, goal, end, function)

Plato believed that our cosmos was handiwork of a skilled and generous craftsman, a divine being called the *demiurge*.

E.g. the eye is *for* seeing, the ear *for* hearing, etc.

## E.g. Socrates' Design Argument

“With such signs of forethought in these arrangements, can you doubt whether they are the work of chance or design?”

(concerning sex organs being for the purposes of procreation, he concludes:

“Undoubtedly these too look like the contrivances of one who deliberately willed the existence of living creatures.”

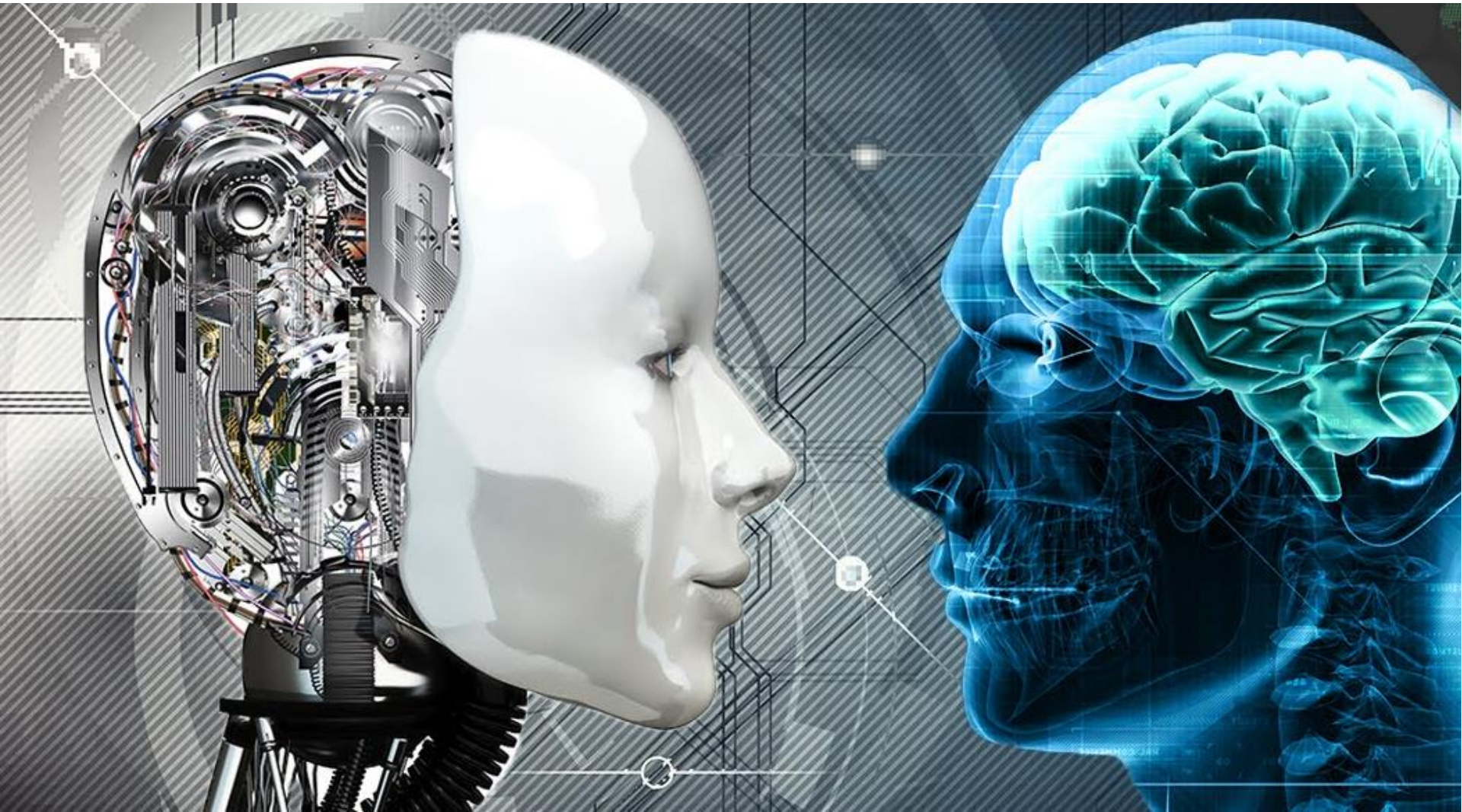
-- as reported by Xenophon in *Memorabilia* (I, iv, 6-7)

# Atomism




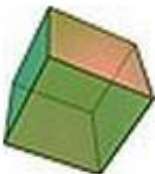
(Leucippus, Democritus, Epicurus, Lucretius)

- Atoms are eternal and unchanging, apart from their positions and motions. *Minds are a certain configuration of matter.*
- Atoms have only properties that can be described in mathematical terms, basically just shape, size and motion. (No “occult”, i.e. hidden, properties.)
- Atomism is a kind of materialism, the view that only matter exists (no spirits, etc.)

# Material minds





Element	Polyhedron		Number of Faces	Number of Triangles
Fire	Tetrahedron (Animation)		4	24
Air	Octahedron (Animation)		8	48
Water	Icosahedron (Animation)		20	120
Earth	Cube (Animation)		6	24
<b><i>Geometrical Simple Bodies According to Plato</i></b>				

Size, shape and motion.

Source: Wikipedia

- N.B. Plato believed in atoms, but wasn't an atomist. You don't have to be an atomist to believe in atoms!
- A dualist can believe that the world consists of atoms *and* souls, for example.

# Materialism and Innate Concepts

- Can a *materialist* believe in innate concepts and innate knowledge?
  - Perhaps, since our minds (as well as our bodies) have been shaped by evolution. But such knowledge should be limited to information useful to our hunter-gatherer ancestors.

# Perception reduced to material structure

“The atomists accounted for perception by means of films of atoms sloughed off from their surfaces by external objects, and entering and impacting the sense organs. They tried to account for all sensible effects by means of contact, and regarded all sense perceptions as caused by the properties of the atoms making up the films acting on the atoms of animals’ sense organs. Perceptions of color are caused by the ‘turning’ or position of the atoms; **tastes are caused by the texture of atoms on the tongue**, e.g., bitter tastes by the tearing caused by sharp atoms; feelings of heat are ascribed to friction.”

(Sylvia Berryman, SEP entry “ancient atomism”)

# Problems for Atomism

- Ancient atomism faced several objections from philosophers such as Plato and Aristotle.
- Trying to understand *all* of reality in terms of material atoms has its challenges.
- Similar objections were raised against materialism during the modern period, and even today against contemporary physicalism.

# Does atomism account for:

1. Free will
2. Logic/rationality/math
3. Knowledge
4. Consciousness
5. Intentionality
6. Morality
7. Personal identity



# Free will?

- Can a system of material particles have free will?
- If the particles are deterministic, following rigid mathematical laws, then whatever the system actually did, it could not have done otherwise.
- Alternatively, if the particles behave randomly, then how is the whole system in control of its actions?

# Consciousness?

- Can a system of atoms be conscious?
- By carefully studying a system of particles, is it possible to figure out what conscious experiences it's having? (Can physics tell us “what it is like to be” such a system?)
- Why should there be *any* such conscious experiences?



# Personal Identity?

- Can persons, as entities that persist over time, exist in a material universe?
- The atoms in our bodies are continually changing, so that every few years the matter is completely replaced.

# Modern Atomism

- “Modern” philosophy belongs to the period from around 1620 – 1920.
- Modern philosophy began when the Medieval world view based on Aristotle and the Bible was demolished.
- **Modern philosophers revived ancient atomism.** It was called “the mechanical (or corpuscular) philosophy”.

# The Mechanical Philosophy

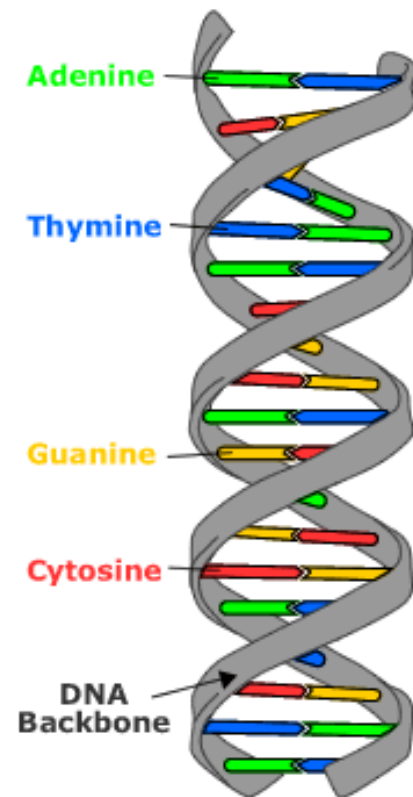
- For early modern philosophers (e.g. Descartes, Locke) the mechanical philosophy was a useful approach to most of nature, **but not to the human mind**. These dualists considered the mind to be a separate, non-material thing.
- Later modern philosophers became sceptical about the mind existing as a separate substance. Some argued that **the mind is also a mechanical device**, called the brain.

# Physicalism

- The doctrine of physicalism (“everything is physical”) results from applying the mechanical philosophy to *everything*, including the human mind.
- Physicalism is basically the same as materialism, but sounds more up to date.
  - (For example, photons are in some sense non-material, since they have no mass. But they are still physical.)

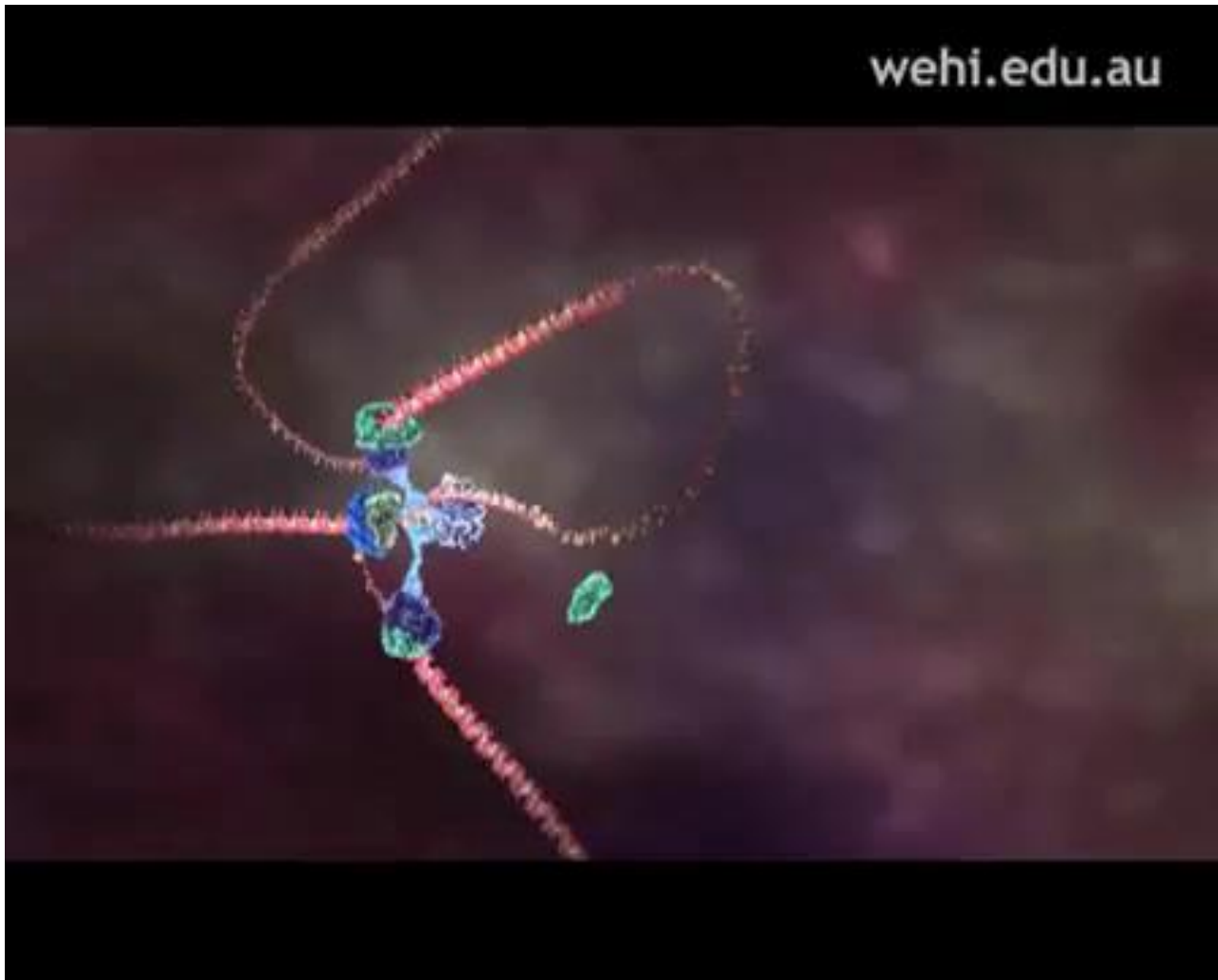
- Physicalism is supported by its explanatory successes.
- Starting in the 17<sup>th</sup> century, chemical reactions became well understood in terms of atoms and molecules.

E.g. in 1953 Watson and Crick published their model for the structure of DNA, a key element of living organisms.



# A Success Story for Physicalism

(DNA replication shown below in computer graphics)



# Problems for Physicalism

- Even today physicalism is attacked on the basis of the things that *have not been* explained in physical terms. (Basically the same challenges as ancient atomism:
  - Consciousness
  - Free will
  - Personal identity
  - Origin of life, and evolution of life

# A criticism of physicalism

“There are some casts of mind that want to regard anything that they don’t know how to understand in their favorite way as an illusion.”

- Ned Block, *Closer to Truth* (TV show)
  - Talking about physicalists who say that consciousness is an illusion.



# Challenges to religion

- During the middle ages, the view that God exists, and created the world, were taken as unquestionably true. All the philosophers of that period were Muslims, Jews and Christians.
- Some early modern thinkers, such as Hobbes and Spinoza, started to attack *certain* religious views as irrational (e.g. “superstition” -- the reality of miracles). Deism gradually became more respectable than theism.
- These attacks on religion became more aggressive in the Enlightenment (18<sup>th</sup> century) with writers like Hume and d’Holbach. Even outright atheism became possible.

# Challenges to Reason

- The philosopher Kant, a deeply religious man, was very troubled by Enlightenment attacks on religion as irrational. Kant set strict a strict limit to applicability of reason, “in order to make room for faith”.
- According to Kant, reason cannot be used to either prove or disprove such matters as the existence of God, human free will, the immortality of the soul, etc. Such things we believe by faith (which roughly means that we need to presuppose them in order to act morally).

# Challenges to Reason

- Even before Kant, David Hume had already argued that reasoning is incapable of giving us knowledge about a variety of topics, including mathematics, science and ethics.
- Hume's argument that scientific knowledge cannot be achieved through reasoning was based on his view that there is no innate ('a priori') knowledge.
- In response to this, Kant argued that we *do* have *a priori* knowledge, but *not of the real world* ("thing in itself"). We have scientific knowledge only of the phenomenal or sensible world, *which is partly a construct of our minds*. (Say goodbye to the realism of Plato and Augustine!)

# Anti-realism

- After Kant, western ‘philosophy’ took an anti-realist turn, producing such thinkers as Hegel, Kierkegaard, Nietzsche and Heidegger. (Scientists and mathematicians remained committed to realism, however.)
- Anti-realist philosophy rejects:
  - The appearance/reality distinction (objective truth)
  - The view that reality itself conforms to logical laws
  - The view of reason as an innate guide to reality
  - Essentialism (especially the view that *humans* have a fixed set of natural properties)

# Analytic Philosophy

- By the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, however, some philosophers (initially mostly British) broke from this tradition and started a new one, which came to be called ‘analytic philosophy’.
- Analytic philosophy is generally realist in its outlook, and aims for scientific rigour in its arguments. To encourage precision, all analytic philosophers are required to know the predicate logic of Frege. (See you in Phil 1102?)
- Analytic philosophy today is very eclectic, encompassing a huge variety of views.