Locke’s Empiricism
Getting to Know the External World
Knowing the External World

It’s not as straight-forward as it sounds.
Rationalism and Empiricism
Epistemology as the study of...

• The nature of knowledge (especially: how propositions are justified).
  Foundationalism vs Coherentism

• The **source** of our knowledge.
  Empiricism vs Rationalism

• The limits of our knowledge.
  For any proposition that I can think, can I *know* whether it is true or false?
What is the Source of Knowledge?

Plato
427-347 BCE

Reason!

The Senses!

Aristotle
384-322 BCE
Continental Rationalists

Knowledge is innate in the soul.

"There is no teaching but recollection."
(\textit{Meno})

Rene Descartes
1596-1650

Baruch Spinoza
1632-1677

Gottfried Leibniz
1646-1716
British Empiricists

There is nothing in the mind that is not first in the senses.

Nihil in intellectu quod non prius fuerit in sensu.

Thomas Hobbes
1588-1679

George Berkeley
1685-1753

John Locke
1632-1704

David Hume
1711-1776
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The mind, at birth, is a blank slate.
For / Against Innate Ideas

(1) Necessary “general truths” (e.g., mathematical truths) cannot stem from experience.
(2) It is incoherent how ideas from the physical world enter the soul (“matter cannot think”).
(3) We have good reasons for believing in “subconscious ideas.”

(1) No idea enjoys universal consent.
(2) An idea of which we are unaware is nonsensical.
(3) Empiricist accounts can be given of all our ideas.
Atomism
The world consists of atoms. They are very small. And uncuttable.

Distinguishable only by their size and shape!

Too small to see! (not drawn to scale!)

Greek
a-: not
temnein: to cut
Atomism

Greek
-: not
temnein: to cut

Atoms are solid, massy, hard, impenetrable movable Particles ... so very hard, as never to wear or break in pieces.

As my friend Newton wrote in his Optics...

Isaac Newton
1642-1727
Atomism and Perception

You could see atoms, if you had a strong enough microscope, …

… and what you would see would be color-less solids of various sizes and shapes, moving or at rest.
Atomism and Perception

Everything in the physical universe is made up of various combinations of these tiny atoms. Even this banana floating above my head.

But unlike that banana, the atoms making it up have neither color, taste, nor scent.
Atomism and Perception

My color, taste, and smell exist only in your mind?

If you disassembled that pesky banana into its separate atoms, you would no longer see yellow, nor experience that familiar banana scent and flavor. (Nor would the pile of atoms look much like a banana.)
Atomism and Perception

That shouldn’t surprise you 21st century folks. Decompose a sugar molecule into its atoms of carbon, hydrogen, and oxygen, and the sweetness disappears altogether.

We had the same idea in the 17th century; we just didn’t know as much chemistry.
That shouldn’t surprise you 21st century folks. Decompose a sugar molecule into its atoms of carbon, hydrogen, and oxygen, and the sweetness disappears altogether. We had the same idea in the 17th century; we just didn’t know as much chemistry.

But my point is more serious than that. I am arguing that the sugar molecules themselves — even if there are enough to fill a teaspoon — lack sweetness. Sugar has the power to cause within a mind an idea of sweetness (assuming that the tongue is not scalded, and so on), but it is not itself sweet.
Discuss with your Neighbor

Is the folder that appears yellow to us actually yellow? Why or why not?
Ideas and their Causes
An idea is “the object of thinking.” (II.2.1)
It is “the immediate object of perception.” (II.8.8)
And the cause of the idea is some quality in the bodies making up the physical world (II.8.7)
Ideas and Qualities

The idea might not resemble its cause. The cause of my idea of yellow, for instance, is not itself yellow. (II.8.10)
“A violet, by the impulse of such insensible particles of matter, of peculiar figures and bulks, and in different degrees and modifications of their motions, causes the ideas of the blue color, and sweet scent of that flower to be produced in our minds.” (II.8.13)
This is called the **representational theory of ideas**. Nearly everyone believes this theory, although it involves a doubling of the world into the **internal world of ideas** and the **external world of material bodies**.
Light bounces off the banana, some of that light is reflected into my eye, absorbed by pigments in the cones of my retina, which send nervous impulses down the optic nerve to the optic lobe of my brain, and …
Ideas and Qualities

Mental World

Material World

… Poof! A representation of the banana appears in my mind.
The material (or “real”) banana is the cause of the perceived banana (the “ideal banana”) in my mind.
And the ideal banana represents the real banana. Thus the name “representational theory of ideas.” It seems like it should work.
Physiology of Perception
Where Self and World Meet (2/3)

Three routes for sensory information:

- **Proprioception** — body position and motion
- **Interoception** — internal organs
- **Exteroception** — events outside the body
Where Self and World Meet (3/3)
Four types of photo-pigment have been identified in the European starling; these have peak sensitivities over a much broader range than those of humans.
Other Animals, Other Worlds

The Dog's View

The Human's View

Wavelength (nm)
Other Animals, Other Worlds

Comparison of wavelengths visible to humans and bees. Four of the visual cells in each ommatidium respond best to yellow-green light (530 nm); two respond maximally to blue light (430 nm); and the remaining two respond best to ultraviolet light (340 nm), allowing the honeybee to distinguish colors (except red).
Other Animals, Other Worlds
Sensation and Perception (1/4)
Sensation and Perception (2/4)
Sensation and Perception (3/4)
Sensation and Perception (4/4)
Penfield’s Homunculi

(a) Somatosensory cortex in right cerebral hemisphere
(b) Motor cortex in right cerebral hemisphere