Philosophy 203
History of Modern Western Philosophy

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Class #19
Berkeley on
Mathematics, Science,
Skepticism and Atheism

Three Main Berkeley Topics

✔1. Arguments for idealism, and against materialism
2. Arguments against abstract ideas
3. Accounts of mathematics and science

Idealism and Abstraction

- Berkeley's idealism is motivated both by his arguments against the reality of the primariy qualities and his objections Locke's doctrine of abstract ideas.
- Locke accounted for our knowledge of mathematics, science, and all general terms by appealing to our psychological powers of reflection.
- Prominent among those powers is our ability to abstract, to form ideas corresponding to general terms.
- Berkeley believes that this purported capacity is the source of an atheistic, skeptical materialism.

Two Kinds of Abstraction

- A1: Considering one property of an object independently of others.
  - We can consider the blueness of a chair, apart from its size, or shape, or texture.
  - We can think of the tart taste of an apple apart from its crunchiness, or color.
  - We just focus on one of the sensations that is bundled together with the others.
- A1 is unobjectionable.
  - Our ordinary ideas of objects are actually collections of particular sensations.
  - "A certain color, taste, smell, figure and consistency having been observed to go together, are accounted one distinct thing, signified by the name *apple*. Other collections of ideas constitute a stone, a tree, a book, and the like sensible things - which as they are pleasing or disagreeable excite the passions of love, hatred, joy, grief, and so forth" (*Principles* §1, AW 447a).
  - A1 is really not a process of abstraction at all, and will not lead to beliefs in a material world.
- A2: Forming an abstract, general idea.
  - Locke claims that we can form ideas of redness, color, apple-in-general, physical object, and thing by abstracting from our visual idea of a particular apple.

Against A2

A2: Forming an abstract, general idea.

- Berkeley insists that we have no ability A2.
  - "If any man has the faculty of framing in his mind such an idea of a triangle as is here described, it is in vain to pretend to dispute him out of it, nor would I go about it. All I desire is that the reader would fully and certainly inform himself whether he has such an idea or not. And this, methinks, can be no hard task for anyone to perform. What is more easy than for anyone to look a little into his own thoughts, and there try whether he has, or can attain to have, an idea that shall correspond with the description that is... given [by Locke] of the general idea of a triangle, which is *neither oblique nor rectangle, equilateral, equicrural nor scalenon, but all and none of these at once*?" (*Principles* Introduction §13).
- No idea, no picture in our minds, could have all of these properties at once.
  - An idea of chair would have to apply to all chairs.
  - Some chairs are black, others are blue, or green.
  - An idea which corresponds to all of these is impossible.
  - No image will do as the idea of man, for it would have to be an image of a short man and a tall man, of a hairy man, and of a bald man.

Two Misuses of Our Supposed Capacity A2

A2: Forming an abstract, general idea.

- "When we attempt to abstract extension and motion from all other qualities, and consider them by themselves, we presently lose sight of them, and run into great extravagances. All which depend on a twofold abstraction; first, it is supposed that extension, for example, may be abstracted from all other sensible qualities; and secondly, that the entity of extension may be abstracted from its being perceived" (*Principles* §99).
- M1: Abstracting extension from other properties of an object.
- M2: Abstracting the extension of an object from our perception of it.
- Sometimes, Berkeley phrases M2 as:
  - M2*: Abstracting *existence* from perception.
- Berkeley runs M1 and M2 together, though they seem distinct.
  - They each involve thinking that the so-called primary qualities are real properties of external, physical objects.
  - M1 is the creation of a new idea on the basis of existing ideas.
  - M2 is the acceptance of a material world independent of any perceivers.

No General Ideas

- *Philonous*: It is a universally received maxim that *everything which exists is particular*. How then can motion in general, or extension in general, exist in any corporeal substance?
- *Hylas*: I will take time to solve your difficulty.
- *Philonous*: But I think the point may be speedily decided. Without doubt you can tell whether you are able to frame this or that idea. Now I am content to put our dispute on this issue. If you can frame in your thoughts a distinct abstract idea of motion or extension, divested of all those sensible modes, as swift and slow, great and small, round and square, and the like, which are acknowledged to exist only in the mind, I will then yield the point you contend for. But if you cannot, it will be unreasonable on your side to insist any longer upon what you have no notion of.
- *Hylas*: To confess ingenuously, I cannot (First Dialogue, AW 467a-b).

Using Particular Ideas to Stand for Other Ideas

- We have need of terms, like 'triangle', which stand as universals, so that they refer to various different objects.
- Berkeley claims that we can use particular terms generally, without forming abstract ideas.
- "A word becomes general by being made the sign, not of an abstract general idea, but of several particular ideas, any one of which it indifferently suggests to the mind. For example, when it is said *the change of motion is proportional to the impressed force*, or that *whatever has extension is divisible*, these propositions are to be understood of motion and extension in general, and nevertheless it will not follow that they suggest to my thoughts an idea of motion without a body moved, or any determinate direction and velocity, or that I must conceive an abstract general idea of extension, which is neither line, surface, nor solid, neither great nor small, black, white, nor red, nor of any other determinate color. It is only implied that whatever particular motion I consider, whether it is swift or slow, perpendicular, horizontal, or oblique, or in whatever object, the axiom concerning it holds equally true" (*Principles* Introduction §11, AW 442a).

Berkeley's Nominalism

- We can use general terms, if we wish.
  - We should not be misled into thinking that they correspond to some thing.
  - Only particulars, *single discrete sensations*, and their perceivers exist.
- Berkeley thus extends Locke's nominalism to all general properties, and even to terms which collect several sensations into an object.
  - We have a bundle of sensations which form an experience which we call a red chair, say, or apple.
  - We use the term 'apple' to refer to a collection of sensory ideas.
  - It does not correspond to any abstract idea of apple, or of red, or of sweet.
  - The names 'apple' and 'chair' and 'red' are just convenient labels, and should not indicate any existence of the apple or chair or color beyond my current experience of it.
- We can give a name to commonalities among particular sensations, but this is just a name.
  - "In such things we ought to *think with the learned, and speak with the vulgar*" (*Principles* §51).

Three Main Berkeley Topics

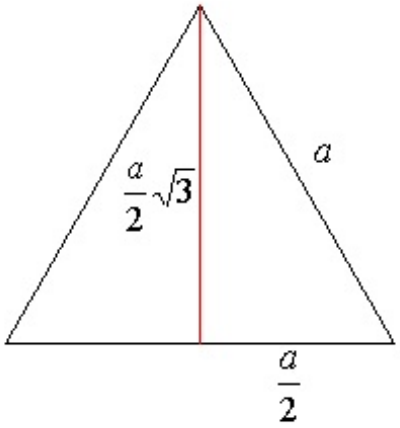
✔1. Arguments for idealism, and against materialism

✔2. Arguments against abstract ideas

3. Accounts of mathematics and science

Mathematical Truth and Truth-Makers

- Mathematics appears to be among the most certain of disciplines.
- The certainty of mathematics entails that mathematical theorems are true.
- Consider the claim that the height of an equilateral triangle is the length of one of its sides multiplied by the square root of three, and divided by two.
- True statements require truth makers.
  - For ‘snow is white’ to be true, there must be snow, and it must be white.
  - For our mathematical theorem to be true, we need its truth makers: a triangle, numbers like three, and functions like ‘the positive square root of x’.
- Thus, the certainty of mathematical theorems standardly entails the existence of mathematical objects.



Rationalism, Empiricism, Science and Mathematics

- The rationalists accounted for the certainty of mathematics on the basis of innate ideas.
  - Their account of our knowledge of the physical world may have seemed implausible, since it impugned the role of the senses.
  - See Leibniz on transeunt causation, for example.
  - But the rationalists supplied plausible accounts of our knowledge of mathematics.
- Locke rejected pure reason, and produced a more intuitively satisfying sensory account of our knowledge of the physical world.
- Locke's account of mathematics, which relied on abstraction, was less plausible.
  - Mathematics is certain, but does not concern real things.
  - Mathematical theorems are about our ideas and their relations.
- Locke defends the certainty of mathematics, but he makes mathematical objects individual, personal, and psychological rather than universal.

Locke's Psychologistic Mathematics

- Recall that Descartes parsed our ideas into three types
  A. Innate
  B. Acquired
  C. Produced by me.
- Locke rejects innate ideas.
- Mathematical theorems can not be acquired, for the same reasons that Descartes gave.
  - They have their own true and immutable natures.
- Our knowledge of mathematics must be produced by me.
  - We sense particulars, like doughnuts and frisbees.
  - Then, we generalize, forming an abstract idea, like that of a circle, and give it a general name.

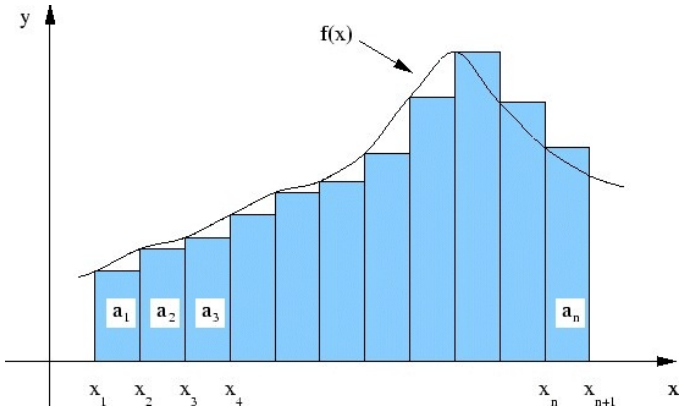
Berkeley, on Mathematics and Abstraction

- Berkeley denies that there is any mathematical knowledge.
  - He does not deny that mathematical proofs are valid.
  - He denies that they have any real content.
  - The posits of mathematical objects rely on the same process of abstraction which led us to the error of positing physical objects.
- "That the principles laid down by mathematicians are true, and their way of deduction from those principles clear and incontestible, we do not deny; but, we hold there may be certain erroneous maxims of greater extent than the object of mathematics, and for that reason not expressly mentioned, though tacitly supposed throughout the whole progress of that science; and that the ill effects of those secret unexamined errors are diffused through all the branches thereof. To be plain, we suspect the mathematicians are as well as other men concerned in the errors arising from the doctrine of abstract general ideas, and the existence of objects without the mind" (*Principles*, §118).

Berkeley, on Infinite Divisibility

The *infinite* divisibility of *finite* extension, though it is not expressly laid down either as an axiom or theorem in the elements of that science, yet is throughout the same everywhere supposed and thought to have so inseparable and essential a connexion with the principles and demonstrations in geometry, that mathematicians never admit it into doubt, or make the least question of it. And, as this notion is the source from whence do spring all those amusing geometrical paradoxes which have such a direct repugnancy to the plain common sense of mankind, and are admitted with so much reluctance into a mind not yet debauched by learning; so it is the principal occasion of all that nice and extreme subtilty which renders the study of *mathematics* so difficult and tedious. Hence, if we can make it appear that no finite extension contains innumerable parts, or is infinitely divisible, it follows that we shall at once clear the science of geometry from a great number of difficulties and contradictions which have ever been esteemed a reproach to human reason, and withal make the attainment thereof a business of much less time and pains than it hitherto has been (*Principles* §123).

Infinite Divisibility



- The calculus of Newton and Leibniz depended on extensions of infinitely small length.
  - The basic problem that the calculus solves is to calculate, precisely, the area under a curve.
  - We divide a finite segment into infinitely many infinitesimally small segments, and then add them up.
- Berkeley claims that there is a smallest perceivable extension.
  - The *minimum sensibilia*
  - Berkeley estimated that the size of a full moon is about thirty *minima sensibilia*.
  - The *minimum sensibilia* functions as an atom in Berkeley's metaphysics.
- Even large finite divisibility is illicit, according to Berkeley's account.
  - "There is no such thing as the ten-thousandth part of an *inch*; but there is of a *mile* or *diameter of the earth*, which may be signified by that inch" (*Principles* §127).
- Infinite divisibility, because of its use in the calculus, was a central element of the new science

Abstraction in Science

- The process of abstraction that Berkeley rejects serves not only to support our beliefs in mathematical claims, but also our knowledge of the laws of motion.
- If we were convinced that these laws were universally valid, then we might infer that they are true.
- If we think that we have knowledge of the laws of motion, and believe that our knowledge is justified by appeal to a process of abstraction, then we can argue for the legitimacy of that process.
- Thus, it is important for Berkeley to block the inference by denying that laws of motion are veridical.
- "Those who treat of mechanics employ certain abstract and general words, and imagine in bodies force, action, attraction, solicitation, etc., which are exceedingly useful for theories, enunciations, and computations concerning motion, although in actual truth and in bodies actually existing, they are sought in vain, as much as are those things imagined by mathematical abstraction" (*On Motion*, §39, AW 506b).

Laws of Nature

- Berkeley construes laws of nature as the regularities, or set rules, which guide our perceptions.
  - "We learn [laws of nature] by experience, which teaches us that such and such ideas are attended with such and such other ideas in the ordinary course of things" (*Principles* §30, AW 453a).
- These rules are useful, but they do not reveal the fundamental causal structure of the universe.
- The only true causal ascriptions apply to God.
- Thus, Berkeley separates two different aspects of scientific practice, which we have so far run together:
  - laws of nature
  - laws of efficient causation
- Scientists seek to describe uniformities in nature.
- When we find uniformities, we call them laws.
- But, not all uniformities are laws.

Laws and Accidental Regularities

- If we discovered that every person in the room were an eldest child in a family of five, we would not think that we had discovered a law about people in the room.
- A law has a predictive aspect.
- We would not predict, on the basis of this uniformity, that the next person to enter the room is the eldest child in a family of five.
- In contrast, we would predict that the next person to enter the room has a heart, and a brain, since those features of human beings are lawlike.
- Ordinarily, we take the difference between lawlike and non-lawlike uniformities to be the presence of causal connections underlying those uniformities.
- Berkeley denies that an understanding of the uniformities in nature leads to ascribing causal powers to any objects other than God.
- Indeed, he calls gravity an occult phenomenon.
  - "Reason proves that there is some cause or principle of these phenomena, and this is generally called *gravity*. Since, however, the cause of the fall of heavy bodies is dark and unknown, gravity in that sense cannot be called a sensible quality; consequently, it is an occult quality. But we can scarcely conceive - and indeed not even scarcely - what an occult quality is, and how any quality can act or effect anything. It would be better then, if men would attend only to the sensible effects, putting the occult quality out of view. Abstract words - however useful they are in discussion - should be discarded in meditation, and the mind should be fixed on particular and concrete things, that is, on the things themselves" (*On Motion*, §4, AW 504b-505a).

Laws of Nature and Laws of Efficient Causation

- Thus Berkeley separates laws of nature, on the one hand, from laws of efficient causation, on the other.
- We can know the laws of nature, insofar as we understand them to be uniformities in our perceptions.
- But we can not know the causal connections, since they are not the objects of any perceptions.
- We will return to skepticism about our knowledge of causation when we read Hume, who argues that causal connections are beyond our reach.
- Berkeley anticipates Hume's concern, but believes that we can have knowledge of laws of nature, construed as regularities in our perceptions arising from God's goodness.

The Categoricity of Laws

- Taking the laws of nature to be mere regularities in our perceptions, and ascribing causation only to God, allows Berkeley to avoid committing to the categoricity of laws.
- Nature is in many ways uniform, and this uniformity allows us to predict and control nature.
- But Berkeley also leaves room for miracles, exceptions to the laws of nature.
- He argues that both uniformity in nature and these miraculous blemishes support our belief in God's existence.

Uniformity and Blemishes

- “If we attentively consider the constant regularity, order, and concatenation of natural things, the surprising magnificence, beauty, and perfection of the larger, and the exquisite contrivance of the smaller parts of creation, together with the exact harmony and correspondence of the whole, but above all the never-enough-admired laws of pain and pleasure, and the instincts or natural inclinations, appetites, and passions of animals; I say if we consider all these things, and at the same time attend to the meaning and import of the attributes One, Eternal, Infinitely Wise, Good, and Perfect, we shall clearly perceive that they belong to the aforesaid spirit, *who works all in all*, and *by whom all things consist*” (*Principles*, §146).
- “We should further consider that the very blemishes and defects of nature are not without their use, in that they make an agreeable sort of variety, and augment the beauty of the rest of the creation, as shades in a picture serve to set off the brighter and more enlightened parts... It is plain that the splendid profusion of natural things should not be interpreted weakness or prodigality in the agent who produces them, but rather be looked on as an argument of the riches of His power” (*Principles*, §152).
- The claim that both uniformity and irregularity each testify to the goodness of God is philosophically troubling.
- If an hypothesis is supported by any evidence whatsoever, it seems like an empty hypothesis.

The Idea of God

- Given Berkeley's strict empiricism, one might wonder how Berkeley could defend any knowledge of God.
- We have no idea (or image or impression) of God.
- Similarly, we have no ideas of our selves or of other persons.
- Still, Berkeley allows for beliefs in the existence of our selves, other persons, and God, despite having no ideas of any of them.
- Despite his opposition to Lockean abstraction and other psychological processes which would ground belief in the material world, Berkeley allows for some kinds of inferences beyond the evidence of our sense perception.
- Let's start with our beliefs in the existence of other persons.

Other Persons

- There is no universally accepted argument for the existence of other minds.
- Berkeley claims that we can infer the existence of other minds from their effects on us.
  - "From what has been said, it is plain that we cannot know the existence of other spirits otherwise than by their operations, or the ideas by them excited in us. I perceive several motions, changes, and combinations of ideas, that inform me there are certain particular agents, like myself, which accompany them and concur in their production. Hence, the knowledge I have of other spirits is not immediate, as is the knowledge of my ideas; but depending on the intervention of ideas, by me referred to agents or spirits distinct from myself, as effects or concomitant signs" (*Principles* §145).
- The problem of other minds is perennially troubling, and nothing Berkeley says here resolves it.
  - How do we know that the things we call other people are not craftily constructed robots?
  - How do we know that the effects Berkeley mentions are really originating in a thinking thing?

The Self

- Even our own existence is an illegitimate inference.
- “A spirit is one simple, undivided, active being; as it perceives ideas it is called the *understanding*, and as it produces or otherwise operates about them it is called the *will*. Hence there can be no idea formed of a soul or spirit; for all ideas whatever, being passive and inert...they cannot represent unto us, by way of image or likeness, that which acts... The words *will*, *soul*, *spirit* do not stand for different ideas or, in truth, for any idea at all, but for something which is very different from ideas, and which, being an agent, cannot be like or represented by any idea whatsoever - though it must be admitted at the same time that we have some notion of soul, spirit, and the operations of the mind, such as willing, loving, hating, inasmuch as we know or understand the meaning of those words” (*Principles* §27, AW 452b).

Ideas and Notions

- Thus Berkeley distinguishes ideas, which are images, from notions, which can be conceptual, if not abstract.
- Notions can be devised by inference, as Locke claimed that ideas of reflection were formed.
- From such notions, we can infer the existence of other persons.
- “In a large sense, indeed, we may be said to have an idea or rather a notion of *spirit*; that is, we understand the meaning of the word, otherwise we could not affirm or deny anything of it. Moreover, as we conceive the ideas that are in the minds of other spirits by means of our own, which we suppose to be resemblances of them; so we know other spirits by means of our own soul, which in that sense is the image or idea of them; it having a like respect to other spirits that blueness or heat by me perceived has to those ideas perceived by another” (*Principles* §140).

Berkeley on the Resemblance Hypothesis

- RH1. My ideas resemble material objects.
- RH2. My ideas resemble their causes.
  - Berkeley rejects RH1, but accepts RH2.
  - Ideas can only resemble other ideas.
- "But, you say, though the ideas themselves do not exist without the mind, yet there may be things like them of which they are copies or resemblances, which things exist without the mind in an unthinking substance. I answer, an idea can be like nothing but an idea; a color or figure can be like nothing but another color or figure" (*Principles*, §8, AW 448b).
- My ideas resemble, we presume, the ideas in the minds of other persons.
- And, they resemble their causes, which are ideas in the mind of God.

Berkeley on God

an inference, not a presumption

- "When in broad daylight I open my eyes, it is not in my power to choose whether I shall see or not, or to determine what particular objects shall present themselves to my view; and so likewise as to the hearing and other senses - the ideas imprinted on them are not creatures of my will. There is, therefore, some other will or spirit that produces them" (*Principles* §29, AW 453a).
- "*Philonous*: Men commonly believe that all things are known or perceived by God because they believe the being of a God, whereas I, on the other side, immediately and necessarily conclude the being of a God because all sensible things must be perceived by him" (Second Dialogue, AW 477a).
- "A human spirit or person is not perceived by sense, as not being an idea; when therefore we see the color, size, figure, and motions of a man, we perceive only certain sensations or ideas excited in our own minds; and these being exhibited to our view in sundry distinct collections, serve to mark out unto us the existence of finite and created spirits like ourselves. Hence it is plain we do not see a man, if by *man* is meant that which lives, moves, perceives, and thinks as we do, but only such a certain collection of ideas as directs us to think there is a distinct principle of thought and motion, like to ourselves, accompanying and represented by it. And after the same manner we see God; all the difference is that, whereas some one finite and narrow assemblage of ideas denotes a particular human mind, whithersoever we direct our view, we do at all times and in all places perceive manifest tokens of the divinity: everything we see, hear, feel, or anywise perceive by sense, being a sign or effect of the power of God; as is our perception of those very motions which are produced by men" (*Principles* §148).

Inference

- Our ability to infer affords us knowledge of the existence of God.
- Yet, according to Berkeley, inference cannot yield knowledge of a material world.
- One might reasonably worry that Berkeley chooses arbitrarily between legitimate and illegitimate invocations of an ability to infer.
- If we can infer our selves, other persons, and God, why can't we infer material objects or abstract ideas?
- I'll put this question aside to return to a methodological concern with which we began.
- Locke, seeing the limits of sense experience to yield knowledge, accepted some skepticism, some humility.
- Berkeley prefers to reject Locke's materialism to combat skepticism and what he sees as a consequent atheism.

Berkeley is a Hater

of Skeptics and Atheists

As we have shown the doctrine of matter or corporeal substance to have been the main pillar and support of *skepticism*, so likewise upon the same foundation have been raised all the impious schemes of *atheism* and irreligion... How great a friend material substance has been to *atheists* in all ages were needless to relate. All their monstrous systems have so visible and necessary a dependence on it that, when this corner-stone is once removed, the whole fabric cannot choose but fall to the ground, insomuch that it is no longer worth while to bestow a particular consideration on the absurdities of every wretched sect of *atheists* (*Principles*, §92).

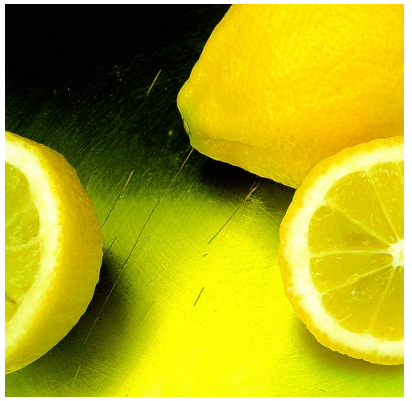
On Atheism and Skepticism

- Materialism posits a world which is independent of God.
  - If our sensations depend on a world of objects, we at best push God out of our explanations, and at worst dismiss God from our natural science.
  - Berkeley thus sees natural scientific explanations as evidence of atheism.
- Materialism entails that we do not experience the objects in themselves.
  - We can not get out of our minds into those objects, so we are forced into skepticism.
  - All the properties we experience are sensible, and so in us.
  - If we posit matter in addition, we can have no knowledge of it.
- "So long as men thought that real things subsisted without the mind, and that their knowledge was only so far forth *real* as it was conformable to *real things*, it follows they could not be certain they had any real knowledge at all. For how can it be known that the things which are perceived are conformable to those which are not perceived, or exist without the mind?" (*Principles* §86).

The Defender of Common Sense

advantages of Berkeley's idealism

- On the materialist view, secondary qualities are denigrated.
  - no yellow lemons
  - no sweet maple syrup
  - terms for secondary qualities are mere names.
- Berkeley interprets terms for secondary qualities as referring to our mental states.
  - The lemon is yellow, since I really have a yellow sensory experience.
- Berkeley's account solves the problem of error for our beliefs based on the senses.
  - Descartes's wax example
  - Locke's water experiment
  - All ideas are independent.



Intersubjectivity and Persistence

disadvantages of Berkeley's idealism

- How do we account for different people having similar experiences?
- How do we account for the fact that objects do not seem to go in and out of existence, that they persist?
- Berkeley posits God.
- "For, though we hold indeed the objects of sense to be nothing else but ideas which cannot exist unperceived; yet we may not hence conclude they have no existence except only while they are perceived by us, since there may be some other spirit that perceives them though we do not. Wherever bodies are said to have no existence without the mind, I would not be understood to mean this or that particular mind, but all minds whatsoever. It does not therefore follow from the foregoing principles that bodies are annihilated and created every moment, or exist not at all during the intervals between our perception of them" (*Principles*, §48).

The Limerick

There was a young man who said, “God
Must think it exceedingly odd
When he finds that this tree
Continues to be
When there’s no one about in the quad.”
“Dear Sir, your confusion is odd.
I am always about in the quad.
And that’s why this tree
will continue to be
Since observed by, yours faithfully,
God.”

Berkeley's World

- There is a real world.
- There are colors, sounds, and smells.
- The apple is just how I experience it.
- The mental world, while not a material world, is not a world of imagination.
- "The ideas imprinted on the senses by the author of nature are called *real things*; and those excited in the imagination, being less regular, vivid, and constant, are more properly termed *ideas*, or *images of things* which they copy and represent" (*Principles* §33).
- It's a purely psychological world.

On To Hume

- The big question for Berkeley is whether we can transcend our mental states to refer to, or understand, a world external to us, even if it is not a physical world.
- Berkeley could appeal, like Descartes, to the benevolence of God to ensure persistence and intersubjectivity, but such an appeal would amount to an abandonment of empiricism.
- The solipsistic picture of Descartes returns.
- Hume shows that the prospects are even worse for empiricism, even if we reject Berkeley's idealism.