

## Berkeley (*Principles*, pars. 87-88)

All this scepticism follows, from our supposing a difference between *things* and *ideas*, and that the former have a subsistence without the mind, or unperceived. It were easy to dilate on the subject; and show how the arguments urged by *sceptics* in all ages, depend on the supposition of external objects.

So long as we attribute real existence to unthinking things, distinct from their being perceived, it is not only impossible for us to know with evidence the nature of any real unthinking being, but even that it exists. Hence, it is, that we see philosophers distrust their senses, and doubt of the existence of heaven and earth, of everything they see or feel, even of their own bodies.

## Primary and secondary qualities

- Berkeley's contemporaries had already accepted this point with respect to secondary qualities. Berkeley extended it to all aspects of reality:  
In short, let anyone consider those arguments, which are thought manifestly to prove that colours and tastes exist only in the mind, and he shall find that they may with equal force, be brought to prove the same thing of extension, figure and motion. (*Principles*, par. 15)

# Kant's Copernican turn

- Kant's defence of transcendental idealism also follows this pattern.
- Geometrical facts are facts about space. Arithmetical facts are facts about time.
- If space and time were features of reality, as it is in itself, we wouldn't have knowledge of and arithmetical truths.
- Therefore space and time have to be features, not of reality, but of the way in which our mind is affected by reality.

# Logical positivism

- In the first decades of the 20<sup>th</sup> century, a group of scientifically-oriented philosophers based in Central Europe advocated the construal of various domains in terms of the facts that we treat as evidence for claims in those domains:
  - Phenomenalism
  - Behaviourism
  - Intuitionism
  - Operationalism

# Operationalism

- “we mean by any concept nothing more than a set of operations; the concept is synonymous with the corresponding set of operations” (Bridgman, *The Logic of Modern Physics*, p. 5)
- Facts concerning, e.g., mass, length, electrical charge are to be understood as facts concerning our methods for measuring these magnitudes

# Length

- You determine the length of an object by measuring it with a ruler.
- You determine whether the length of an object has changed from time  $t_1$  to time  $t_2$  by measuring it with a ruler at  $t_1$  and at  $t_2$ .
- That this procedure can determine whether a change in length has taken place presupposes that the length of the ruler hasn't changed from  $t_1$  to  $t_2$ .
- You could determine this with another ruler, but this process has to stop at some point. There will have to be a ruler whose rigidity is taken for granted.

## Relative and absolute length

- **Relative-length facts:** Have the lengths of two objects changed relative to one another from  $t_1$  to  $t_2$ ?
- **Absolute-length facts:** Has the length of an object changed from  $t_1$  to  $t_2$ ?
- Our judgments about absolute length are based on relative-length evidence.
- This circumstance threatens to make absolute length unknowable.
- We can avoid this problem by defining absolute length in terms of relative length.

## The standard metre in Paris

- Define a change in absolute length as a change in relative length with respect to a standard.
- This can't be right. We want to treat some changes in the relative length of the standard metre in Paris with respect to other objects as changes in the absolute length of the Paris rod.



## Interposition of theories

- Define a change in absolute length as a change in relative length with respect to a standard once corrections have been made to eliminate the influence on the length of the standard of differential forces. (Hans Reichenbach, *The Philosophy of Space & Time*)
- If this is right, the idea that the absolute length of an object might change without a force acting upon it would involve a contradiction.
- But the reason why this can't happen is not logical or conceptual. It is an empirical claim about the way bodies behave in the world: changes in absolute length involve acceleration, and according to Newton's second law accelerations require forces to produce them. (Hilary Putnam, "An Examination of Grünbaum's Philosophy of Geometry").

## Has the Paris rod grown, or has everything else shrunk?

1. We invent a force.
2. Everything else has shrunk.
3. The Paris rod has grown without a force acting upon it.

## References

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