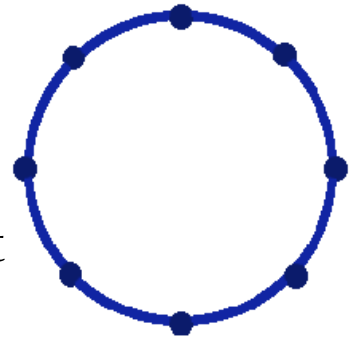


## 4:2a Induction

### *Induction and its Importance to Science*

- Induction is making predictions about future events based on past experiences
- This is exactly what science does.
- Science would not work at all if what was expected to happen never did happen



### *The problem with inductive reasoning*

- The problem with inductive reasoning is that there really is no way to tell the future and just because something has happened many times in the past does not mean it **MUST** happen again in the future
- There is no physical law which forces events to take place on account that they have taken place before

## 4:2b Induction

- The paradox of science is that science is totally based on making predictions about future events based on past experience, but there are no grounds for assuming that because something has happened in the past that it must happen again in the future
- Can anyone claim to really know anything scientifically?



David Hume 1711-1776

*David Hume: Inductive reasoning is irrational*

- Science falls into the category of *expectational knowledge*
- Hume asserted is that it is irrational for us to believe
  - these things will happen again in the future (*unobserved instances*) just because they have happened in the past.
- Hume had two main problems with induction

## 4:2c Induction

*Hume's first problem with induction: The Logical problem*

- *The Logical Problem.* Hume asks the question: Are we logically justified in reasoning from instances we have experienced repeatedly (i.e. success with a vaccine, (to give a modern example)) to instances of which we have no experience (i.e. that the vaccine will work next time)?
- His answer to this is a definite “No!” There is no logical justification whatsoever.

*Hume's second problem with induction: The Psychological Problem*

- *The Psychological Problem.* The question here is: Given the fact that induction is so illogical, why do all people, even reasonable people, like scientists, believe that unobservable events (future outcomes or other instances which they have not experienced directly) will conform to past events of which they have experienced?

## 4:2d Induction

### *Hume's answer to: The Psychological Problem*

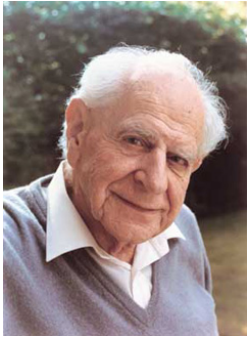
- We think this way because we have been conditioned to think this way through association.
- We are conditioned through repetition
- It may not be rational, but inductive reasoning is necessary for survival

### *Hume's assertion*

What Hume argues is that we have no rational reason to believe that induction actually gives us knowledge. Since science is based on induction, Hume argues that there is no rational reason to believe that science actually gives us “real” knowledge. We simply believe it because we are habitually used to living our lives by way of inductive reasoning.

## 4:2e Induction

### *Popper and falsification*



Karl Popper 1902-1994

- Agrees with Hume that induction is irrational
- Asserts science is about regularities.
- Knowledge comes from finding counter-instances.
- A counter-instance is an instance in which disproves the regularity

### *Knowledge through falsification*

- Popper asserts “Logic forces us to reject even the most successful law the moment we accept one single counter instance”
- To find knowledge in science Popper argues that we must instead look for counter instances, or, in other words, instances which disprove the law or regularity

## 4:2f Induction

*What this implies is...*

- Nothing can actually be proven true and the strength of science lies in its meticulous ability to falsify assumptions
- A scientist tries to find instances where his hypothesis does not hold true
- The more he tries to falsify it, and the more he and other people fail to falsify it, the sounder and more probable the claim becomes
- Eventually when enough people have failed to falsify the claim, the claim becomes accepted as knowledge
- Science hopes to find theories that are true.
- While actual “truth” may not be fully possible to determine, it is possible to eliminate the false theories, and the more the theory in question holds up to the process of falsification, the more likely it is to be true.
- At least any belief in the theory will be a more firmly founded belief.

