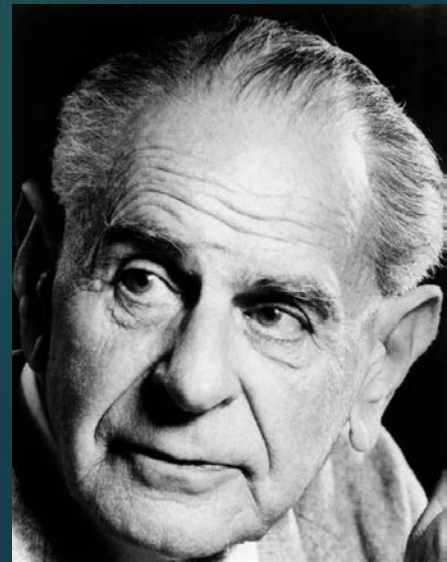


# Karl Popper Conjectures and Refutations

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Image from Wikipedia





# What is Science?

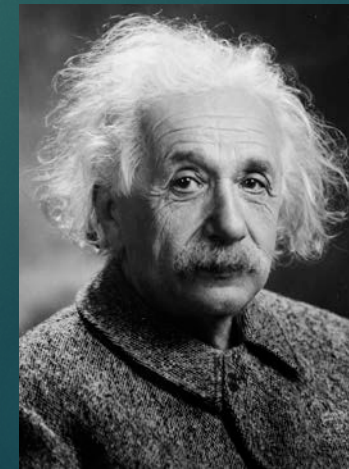
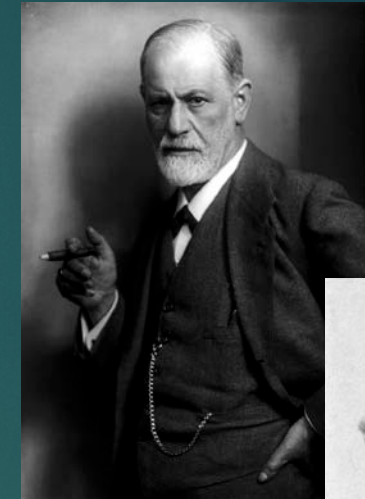
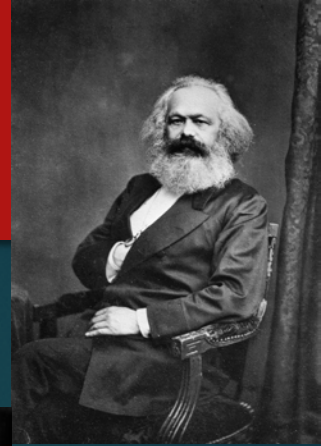
- ▶ The main thrust of the article is discussing what is and is *not* science.
- ▶ This is not inherently a value judgement of various theories, just determining what can be called scientific
- ▶ The crux of the argument can be called falsifiability.





# Theories of the time

- ▶ Marx's theory of history
  - ▶ The proletariat will rise!
- ▶ Freud's psycho-analysis
  - ▶ Sometime a tree is just a tree
- ▶ Alder's individual psychology
  - ▶ Feelings of inferiority
- ▶ Einstein's theory of relativity
  - ▶ (for our purposes) Gravity bends light





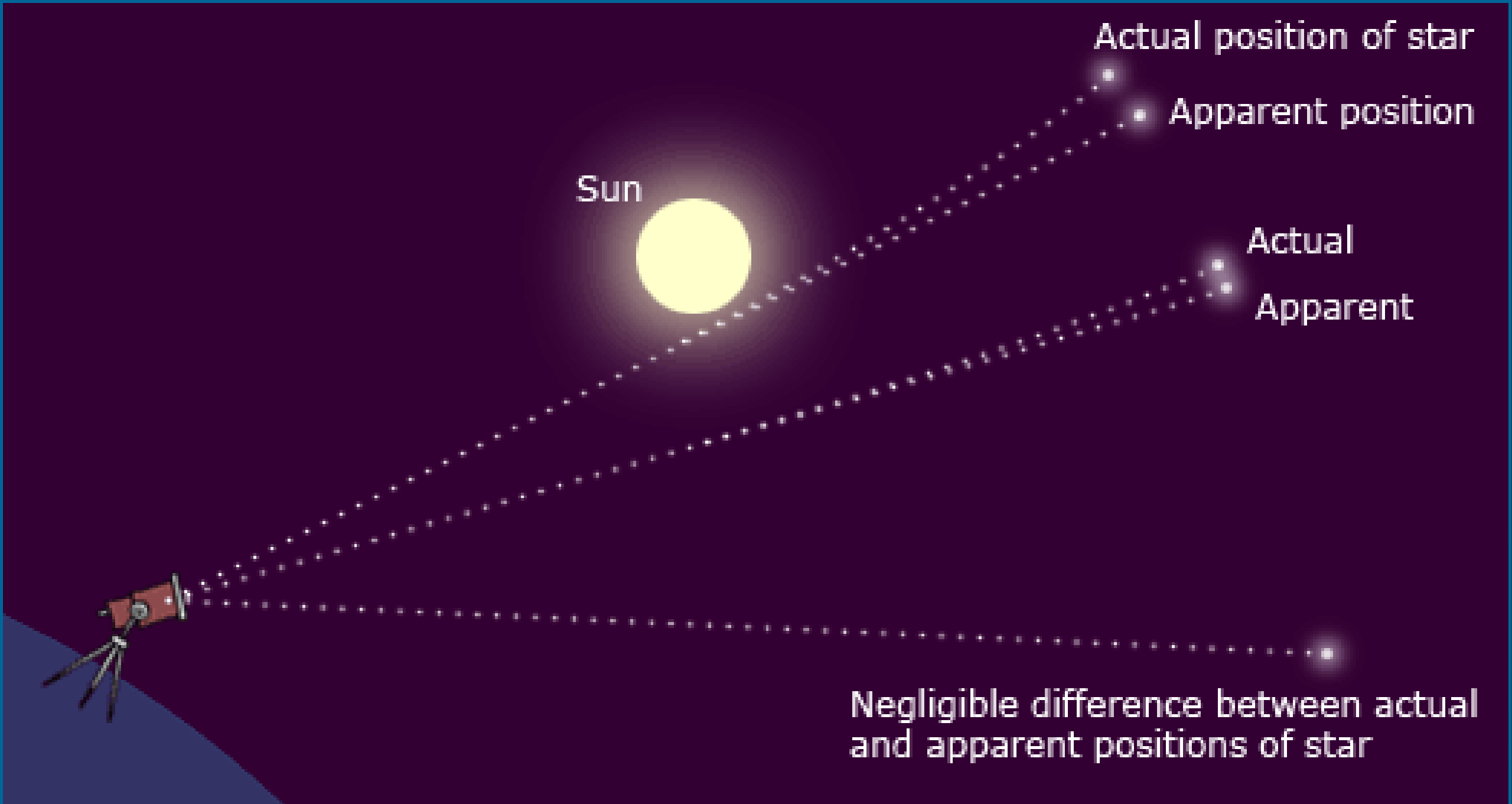
# Verifications

- ▶ Marx, Freud, and Adler's theories all had a ton of verifications of their theories.
- ▶ Almost anything can be a verification, as it can be justified after the fact (hence the phrase "Sometimes a tree is just a tree")
- ▶ For Popper this is not science

# Predictions

- ▶ Popper asserts that for something to be science, it must make a prediction that can be verified
- ▶ In other words a risky prediction
- ▶ Example: Einstein said that gravity bent light. Based on this he predicted that during an eclipse the position of distant stars that would normally be seen near the sun would be shifted slightly away.
- ▶ This could be tested with photography and a refutation of this prediction could lead to a refutation of the entire theory.





# Popper's conclusions - confirmation

- ▶ 1) Confirmations are easy to find, if you look for them
- ▶ 2) They should only count if they are a risky prediction
- ▶ 3) "Good" scientific theories prohibit certain things. The more it forbids, the better.
- ▶ 4) A theory that is non-refutable is not scientific
- ▶ 5) Every genuine test of a theory is one trying to refute it.
- ▶ 6) Confirming evidence doesn't count unless it is a result of a genuine test.
- ▶ 7) Some theories, when found false, are still upheld by an ad hoc assumption or reinterpretation. This rescuing of a theory works, but lowers its "scientificness"



# Science is a series of observations

- ▶ Popper continues and discusses that pure observation is both absurd and incomplete
  - ▶ Simply saying “Observe” is meaningless. We need to have some direction and object of observations
- ▶ Science is not only observation, but also refinement of hypotheses
- ▶ Which came first the hypothesis or the observation?
  - ▶ An earlier hypothesis!
- ▶ Popper goes onto state that in science we often jump to conclusions and then repeatedly test and try to refute those conclusions.



# Discussion Questions

- ▶ If we applied Popper's definition of science to the work that we do, how much of it can be called science?
- ▶ Popper is not making value judgements about non-scientific theories, he is just calling them not science. What can we gain from things that are not scientific?
- ▶ In my previous field there is a trend towards less scientific theories over time; Behaviorism is quite scientific whereas Social constructionism is much less so. Are there similar trends in other fields? Is this an issue?