van Fraassen’s Constructive Empiricism

Scientific Realism

- Scientific Realism is the conjunction of the following three claims.
  i) our scientific theories say things unobservables. (the semantic claim)
  ii) our scientific theories are true. (the metaphysical claim)
  iii) we know (should believe) that our theories are true. (the epistemic claim)

- The logical positivists and the instrumentalists object to the semantic claim (i). They claim that our scientific theories aren’t actually about unobservables at all. Rather, they are only about observable.
  - However, so interpreted, the logical positivists and the instrumentalists were happy to accept the metaphysical claim and the epistemic claim. They thought that our scientific theories did make correct predictions about observables; and that we could know that the observable predictions of our scientific theories would turn out true.

Constructive Empiricism

- van Fraassen endorses another form of anti-realism. According to him, theories are about unobservables; but we shouldn’t believe any of the claims that our theories make about unobservable entities. Rather, we should only accept the claims that they make about observables.
  - He thus denies the epistemic claim (iii), remains agnostic on the metaphysical claim (ii), but accepts the semantic claim (i).
  - This doesn’t commit van Fraassen to the claim that we shouldn’t accept our current best scientific theories, since, for van Fraassen, we can accept a theory without believing it.
    - What it is to accept a theory, on van Fraassen’s view, is to believe that it is empirically adequate—to believe that the claims that it makes about the observable realm are true. To accept a theory is not to believe that it is true.

- van Fraassen doesn’t just accept what our scientific theories have to say about what we actually do observe. Rather, he accepts what they have to say about anything we could in principle observe. He accepts all of their consequences about things which are observable.
The Aims of Science

- According to the Scientific Realist, part of the aim of science is to discover true theories.
- According to van Fraassen, the aim of science isn’t to discover true scientific theories, but rather to discover theories which are empirically adequate. The aim of science is to “save the phenomena.”

The No-Miracles Argument, Redux

- Recall the ‘no miracles’ argument for scientific realism, which makes an ‘inference to the best explanation.’ It argues that the best explanation of the success of science is the truth of science.

\[
P_1 \text{ Our scientific theories are wildly successful.} \\
P_2 \text{ The best explanation of our scientific theories’ success is their truth (or approximate truth).} \\
C \text{ Our best theories are true (or approximately true).}
\]

- van Fraassen objects to this argument by claiming that it is question-begging (it presupposes the falsity of constructive empiricism).
- That’s because he denies the validity of inference to the best explanation. According to van Fraassen, the only thing we can infer to is the empirical adequacy of the best explanation.
  - If we were allowed to use inference to the best explanation, then we could just infer straight-away to the truth of our scientific theories on the basis of the facts which they explain.
  - The constructive empiricist, however, only believes that we can infer that a theory which explains the facts is empirically adequate; that it captures the phenomena.
  - van Fraassen calls this style of inference inference to the empirical adequacy of the best explanation.

- If the no-miracles argument uses inference to the best explanation, then it begs the question against the constructive empiricist. If, on the other hand, it only uses inference to the empirical adequacy of the best explanation, then we only reach the conclusion

\[
P_1 \text{ Our scientific theories are wildly successful.} \\
P_2 \text{ The best explanation of our scientific theories’ success is their truth (or approximate truth).} \\
C \text{ Our best theories are empirically adequate (or approximately empirically adequate).}
\]

But van Fraassen is happy to accept this conclusion.
Objections to Constructive Empiricism

- The line between what is observable and what is unobservable is vague.
  - van Fraassen: the distinction may be vague, but this does not mean that we are not entitled to the distinction. The distinction between an acorn and an oak tree is vague, but this does not mean that an acorn is an oak tree. Similarly, just because the line between observables and unobservables is vague, this does not mean that a quark is observable.

- The line between what is observable and what is unobservable is dependent upon our current measurement devices; so we can’t say that observables are more real than unobservables, else we’ll have to say that what’s real depends upon our measurement devices.
  - van Fraassen: the point isn’t that unobservable entities are more real than observable entities; the point is rather that the, since we can’t observe them, the unobservables are epistemically different than the observables. The life forms on earth aren’t metaphysically different from the life forms on other planets, in the sense of being any more or less real, but they are epistemically different. We can know things about life on earth, but we can’t know things about life on other planets—not even whether it is there at all.

- Creatures with different sensory apparatus could observe the entities that we cannot; therefore, there is no distinction between entities which are observable and those which are unobservable.
  - van Fraassen: by ‘observable’, I mean ‘observable by those in our epistemic community.’

- The underdetermination argument is an instance of a more general skeptical argument against not only our knowledge of unobservables, but also our knowledge of observables as well. Why doesn’t the underdetermination argument overgenerate, and also get us the conclusion that we don’t know, and shouldn’t believe, that our theories are true on the unobserved? or that we don’t know and shouldn’t believe that our sense impressions are veridical?