Handout #12

Popper and Putnam

Inductive strength

An argument is *inductively strong* iff it is (a) invalid and (b) its conclusion is probable on the assumption that its premises are true (so the premises give a reason, although not a *conclusive* reason, to believe the conclusion). Are there any inductively strong arguments? It would seem so. For instance:

1. We have examined many randomly selected samples of salt and found them to dissolve in water.

2. So, salt is soluble in water.

Note: we don't require of an inductively strong argument that the premises *are* true (cf. valid arguments): replacing `salt' by `lead' in the above argument would yield another (seemingly) inductively strong argument.

Hume's scepticism about induction (*A Treatise of Human Nature*, 1739)

Let *induction* be our everyday practice of reasoning on the basis of certain invalid arguments (e.g. the argument displayed above). How can induction be justified? Only by appeal to the principle that "nature is uniform", or something of the sort. But how is *that* justified?

The uniformity of nature is not *a priori* (justifiable independently of experience), nor is it observational (deducible from a finite series of observations). Therefore the justification must be inductive. Plainly, though, that would be circular. You can't justify induction in terms of the principle and the principle by appeal to induction. These are all the options, so induction cannot be justified.

Popper thinks that Hume's argument is correct: induction cannot be justified. As Putnam says (122), one might expect Popper to conclude that scientific enquiry is impossible or at least that one of its basic principles cannot be justified. Instead, Popper concludes that science does not use induction!

Falsificationism

According to Popper, science works (or, at any rate, should work) like this. From a scientific theory T, together with certain statements of "initial conditions", various "basic statements" are logically deduced. These basic statements are then compared with experimental results. If the two are consistent, then "the theory has, for the time being, passed its test: we have found no reason to discard it." But if the theory's consequences are found to conflict with experimental results, then those consequences are falsified, and their falsification also falsifies the theory from which they were deduced.

“Nothing resembling inductive logic appears in the procedure here outlined...I never assume that...theories can be established as `true', or even as merely probable" (100-1).

Here's a simple example of how this is supposed to work:

T: "All swans are white"

Initial condition: "There is a swan on the pond"

These two statements entail a

Basic statement: "There is something white on the pond" (this is *a singular existence statement*, which is the form all basic statements are supposed to have (115-6)).

Suppose we observe something white on the pond. Then T is "corroborated" in the sense that it has survived an empirical test. The important point is that, on Popper's view, such observations*, no matter how many of them there are*, do not increase the probability of T *at all*. Thus, according to Popper, *we have absolutely no reason to believe any scientific theory*--all we can reasonably say is that various theories have not yet been falsified. (Exercise: is even this concession correct, once we have rejected induction?)

<u>Putnam's criticisms</u>

1. Only by ignoring the practical use of scientific theories is Popper's rejection of induction at all plausible. "If there were no suggestion at all that a law which has to withstand severe tests is likely to withstand further tests, such as the tests involved in an application or attempted application, then Popper would be right; but then science would be a wholly unimportant activity" (122).

2. Scientific theories do not typically have observational consequences, even in conjunction with initial conditions in Popper's sense (which have to be singular statements).

3. Admittedly, a scientific theory T does have observational consequences in conjunction with certain "auxiliary statements" (AS). But

(a) it would "obscure profound methodological issues" to use `theory' to refer to the conjunction of T and AS: T is supposed to be a statement of *laws*, while AS is just a bunch of *accidental statements* (125).

And (b) in the face of a recalcitrant experimental result, AS is more likely to be rejected than T (e.g. the case of Neptune). Thus: "The Law of Universal Gravitation is not strongly falsifiable at all; yet it is surely a paradigm of a scientific theory" (126).