

Seminar # 2 Readings for Epistemology, May 2012

Essay Concerning Human Understanding – John Locke [1690 "All ideas come from sensation or reflection".]

Let us suppose the mind to be, as we say, white paper, void of all characters, without any ideas; how comes it to be furnished? Whence has it all the materials of reason and knowledge? To this I answer, in one word, from experience. Our observation, employed either about external sensible objects, or about the internal operations of our minds is that which supplies our understandings with all the materials of thinking. These two are the fountains of knowledge, from which all the ideas we have, or can naturally have, do spring.

The object of sensation is one source of ideas. First, our senses do convey into the mind several distinct perceptions of things, according to those various ways wherein those objects do affect them; and thus we come by those ideas we have of yellow, white, heat, cold, soft, hard, bitter, sweet, and all those which we call sensible qualities. This great source of most of the ideas we have, depending wholly upon our senses, and derived by them to the understanding, I call **sensation**.

The operation of our minds is the other source of them. Secondly, the other fountain, from which experience furnishes the understanding with ideas, is the perception of the operations of our own mind within us, as it is employed about the ideas it has got; which operations do furnish the understanding with another set of ideas which could not be had from things without; and such are perception, thinking, doubting, believing, reasoning, knowing, willing, and all the different actings of our own minds; which we, being conscious of, and observing in ourselves, do from these receive into our understandings as distinct ideas. I call this **reflection**, understood to mean that notice which the mind takes of its own operations.

All our ideas are of the one or the other of these. The understanding seems to me not to have the least glimmering of any ideas which it does not receive from one of these two. External objects furnish the mind with the ideas of sensible qualities, which are all those different perceptions they produce in us; and the mind furnishes the understanding with ideas of its own operations.

Observable in children. He that attentively considers that the state of a child at his first coming into the world will have little reason to think him stored with plenty of ideas that are to be the matter of his future knowledge. It is by degrees he comes to be furnished with them.

Men are differently furnished with these according to the different objects they converse with. Men then come to be furnished with fewer or more simple ideas from without, according as the objects they converse with afford greater or less variety; and from the operations of their minds within, according as they more or less reflect on them.

As all the sciences we now have do not help us in finding out new works, so neither does the logic we now have help us in finding out new sciences. The logic now in use serves rather to fix and give stability to the errors which have their foundations in commonly received notions. So it does more harm than good.

The discoveries which have hitherto been made in the sciences are such as lie close to vulgar [everyday, commonplace] notions, scarcely beneath the surface. In order to penetrate into the more and further recesses of nature it is necessary to determine a more sure and guarded way; and that a method of intellectual operation be introduced altogether better and more certain.

It is idle [pointless] to expect any great advancement in science from the engraving of new things upon old. We must begin anew from the very foundations, unless we would revolve forever in a circle with contemptible [useless] progress.

One method of discovery alone remains to us, which is simply this: we must lead men to the particulars themselves while men on their side must force themselves for a while to lay their notions aside and begin to familiarize themselves with facts.

The idols and false notions which are now in possession of the human understanding, and have taken deep root therein, so beset men's minds that truth can hardly find entrance.

Science and Falsifiability - Karl Popper ["Science: Conjectures and Refutation." In *British Philosophy in Mid-Century*, ed. By C.A. Mace, 1957. London: Routledge, 1963 (3rd ed. 1969), chap 1.]

The problem which troubled me was that I wished to distinguish between science and pseudo-science ["pseudo-science" means "non-science" or "false science" in this context], knowing very well that science often errs, and that pseudo-science may happen to stumble on the truth.

I know, of course, the most widely accepted answer to my problem: that science is distinguished from pseudo-science by its empirical method, which is essentially inductive, proceeding from observation or experiment. But this did not satisfy me. I often formulated my problem as one of distinguishing between a genuinely empirical method and a non-empirical or even a pseudo-empirical method – that is to say, a method which although it appeals to observation and experiment, nevertheless does not come up to scientific standards. The latter method may be exemplified by astrology, with its stupendous mass of empirical evidence based on observation – on horoscopes and on biographies.

I found those of my friends who were admirers of Marx, Freud and Adler, were impressed by a number of points common to these theories, and especially by their apparent explanatory power. These theories appeared to be able to explain practically everything that happened within the fields to which they referred. The world was full of verification of the theory. Whatever happened always confirmed it.

A Marxist could not open a newspaper without finding on every page confirming evidence for his interpretation of history. The Freudian analysts emphasized that their theories were constantly verified by their "clinical observations."

With Einstein's theory the situation was strikingly different. Take one typical instance – Einstein's prediction that light must be attracted by heavy bodies. [This was confirmed by Eddington's expedition which measured the shift in the light coming from a star.]

Now the impressive thing about this case is the risk involved in a prediction of this kind.

These considerations led me in the winter of 1919-20 to conclusions which I may now reformulate as follows:

1. It is easy to obtain confirmations, or verification, for nearly every theory – if we look for confirmations.
2. Confirmations should count only if they are the result of risky predictions.
3. Every “good” scientific theory is a prohibition: it forbids certain things to happen. The more a theory forbids, the better it is.
4. A theory which is not refutable by any conceivable event is non-scientific.
5. Every genuine test of a theory is an attempt to falsify it.
6. Confirming evidence should not count except when it is the result of a genuine test of the theory.
7. The belief that science proceeds from observation to theory is still so widely and so firmly held that my denial of it is often met with incredulity.

But in fact the belief that we can start with pure observations alone, without anything in the nature of a theory, is absurd; as many be illustrated by the story of the man who dedicated his life to natural science, wrote down everything he could observe, and bequeathed his priceless collection of observations to the Royal Society to be used as inductive evidence. This story should show us that though beetles may profitably be collected, observations may not.

I tried to bring home the same point to a group of physics students in Vienna by beginning a lecture with the following instructions: “Take pencil and paper, carefully observe, and write down what you have observed!” They asked, of course, what I wanted them to observe. Clearly the instruction, “Observe!” is absurd. Observation is always selective. It needs a chosen object, a definite task, an interest, a point of view, and a problem.