

Science, Uncertainty and The Unscientific World

Asad Noman

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This document is some points picked and organized from three lectures of Richard Feynman in The Meaning Of It All..

Three meanings of science

Science is three things; a method, a body of knowledge and application of that knowledge. Each of these is described below.

- Science is a special method of finding things out. It is based on the principle that observation is the judge of whether something is so or not.
- Science is also the body of knowledge arising from the things found out. This knowledge is the yield. This is what drives the third meaning of science, that is its application.
- The obvious characteristic of science is its application, formerly called technology.

Doubting scientific method

Scientific method relies totally on observations. The principle of this method ‘observation is the judge’ says it all. In scientific method, observation is the judge of truth. Though number of observations made is always finite there always exists Uncertainty and doubt in scientific laws. This uncertainty will be thoroughly explained through the document.

Authority in science

One point to note is that there is no authority in science. It does not matter where the idea came from because it does not make any difference. We have a method of checking whether an idea is correct or not that has nothing to do with where it came from. There is no authority who decides what is a good idea. We have lost need of it.

Uncertainty in science

Finite set of observations, inaccuracies in experiments, put limitation to the conclusions. Therefore laws are not something that observations insist upon, they are guessed and extrapolated. Every scientific law or principle is some kind of a summary which leaves out details, because nothing can be stated precisely.

This uncertainty opens door to further investigations in science. The laws in science are perfected over time but they cannot be perfected completely because of the reasons described above. This experience with doubt and uncertainty is completely remarkable and it extends beyond the sciences. To solve any problem that has never been solved you have to leave the door open to the possibility that you do not have it exactly right. Otherwise, if you have made up your mind already, you might not solve it.

Imagination in science

Surprisingly people do not believe that there is imagination in science. Unlike that of an artist, imagination in science is of very interesting kind. The great difficulty is in trying to imagine a definitive preposition, something that you have never seen, that is consistent in every detail with what has already been seen, and that is different from what has been thought of.

Judging an idea scientifically

How does one handle change in certainty with experience? How does one judge the ideas of the unscientific and scientific world, scientifically? Here are a couple tricks that might come in handy.

- The only way that you can never be convinced that a theory, opposite the the one you prejudice, is correct is one of two things. Either you are limited to a finite number of experiments, or you are infinitely prejudiced at the beginning that it is impossible.
- The effect of an idea stands out more obviously if you continue observations and improve the effectiveness of observations.

- Described effect has to have a certain permanance or constancy of some kind. That is if a phenomena is difficult to experiment with, if seen from many sides, it has to have some aspects which are more or less the same.
- The problem is not what is possible, rather what is probable. An average idividual simply cannot fully appreciate the number of things that are possible.
- There is no sense in calculating the chance or probability that something happen after it happens.