

Scepticism in Science Mannkal Scholar 2008

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Science is married to evidence; evidence is determined by experiment, observation, measurement or calculation. The normal process of science is to validate this evidence. This validation is carried out by repetition, observation, measurement and calculation. Once there is confidence with the validated data, it needs to be explained. This is called a scientific theory. This theory needs to be in accord with previous data from all disciplines and as soon as the scientific theory is coherent with other knowledge, then it is accepted. Once there is new validated data, then the theory can be refined or rejected. This is the methodology of science as outlined by Sir Karl Popper¹.

To define science it must be understood that it is an ever-evolving process as one idea is built upon the next. As a result, science is dynamic. Scientific theories have a short life before they are refined or rejected. For example, Charles Darwin's *Theory of Evolution* of 1859 has undergone many revisions. However, the basic theory has not been greatly modified. By contrast, other theories have a very short such as the theory of cold fusion. Furthermore, there are many hypotheses for which the evidence has not yet been found. For example, 96% of the universe is dark matter. As yet, there is no understanding of the nature of dark matter.

Scepticism is the basis of science. However, science suffers from dogma, personality cults, politics, racism, culture and prejudices². In more recent times science has suffered from mathematical models. For example, "*In other words the model outcomes had been determined before the model was run. Finding the truth according to a preconceived opinion or philosophy is a common flaw in applied mathematical modelling. And it is very similar to finding truth that matches one's religious faith*"³.

The combined ideology of science, religion and society has an enormous impact on the evolution of the scientific theory. An example of this as given by Sir Guy Green demonstrates the impact of science interacting with society with regard to the production of genetically modified food. A tabloid article released in England on the subject of GM crops titled "Frankenstein Food" has only served to invoke distrust and prejudice within the public on an emotional level⁴. As a result, any further development of genetically modified crops will unfairly inhibited by the pejorative title of the article.

¹ Popper, K.R. 2002: *Conjectures and Refutations: the Growth of Scientific Knowledge*. Routledge, 582p.

² Gould, S.J. 1996: *The Mismeasure of Man*. Norton.

³ Pilkey, O.H., Pilkey-Jarvis, L. 2007: *Useless Arithmetic: Why Environmental Scientists Can't Predict The Future*. Columbia University Press 230p.

⁴ Green, G. 2008: *The Skeptic* 28:1:8-13.

The methodology of science is not well understood by the public. A scientific paper is submitted to scientific journal. The editor of the journal then decides whether to reject the article or to circulate to referees. Referees write a report on the article and recommend rejection or publication with amendments. The editor then informs the author whether the paper is rejected or accepted with modification. The paper is then resubmitted in its amended form and the editor may accept or reject the amended paper. This is the mechanics of the peer review processes. However, the weakness is that in many disciplines of science many colleagues, co-authors, former students and friends referee the author's scientific paper. This may well inhibit the generation of radical new ideas. Therefore advances through such a conservative process are very slow. Notwithstanding, the peer review process is the best of all inadequate processes for the advancement of science.

The question every scientist must ask is: show me the evidence? In effect the scepticism of evidence and the theories constructed from the evidence make science an anarchistic process. Scientists work as individuals and in groups and the anarchism of science creates difficulties in group and democratic interaction, as resolution to scientific debate is not always easy to achieve. Most scientists undertake public-funded science as their hobby and disputes are exacerbated by conflicts of interest, powerful personalities and egos.

A significant threat to modern science has been postmodernism. Postmodernism deconstructs the process of evidence-based science and imputes that all ideas, whether valid or otherwise, are of equal value. This so incensed a physicist that he undertook a word-correlation analysis of postmodernist writings and then constructed a postmodernist deconstruction of physics using postmodernist language. This paper was a complete hoax and yet was published in a major postmodernist journal⁵. Postmodernism fails because it is not sceptical of its own processes.

At times there has been a conflict between religion and science. For example, Galileo's challenge to geocentrism. Galileo, with the power of the telescope, was able to offer a strong argument for the rotation of the Earth and other planets of the solar system around the Sun. This discovery was a challenge to both the religious and scientific dogma of that day, yet his concepts have been validated by science. This shows that science is strongly linked to testable evidence which deals with the world outside.

By contrast, religion is based on experience, and deals with the metaphysical world within and is therefore intestable. Myths are neither right nor wrong and are unable to be tested. However, some myths are underpinned by science, such as the mythical flood of Noah. This was actually the post-glacial flooding of the Black Sea basin⁶.

⁵ Sokal, A.D, Bricmont, J. 1997: *Impostures Intellectuelles*. O. Jacob 276p.

⁶ Ryan, W. Pitman, W. 1998: *Noah's Flood: The New Scientific Discoveries about the Event That Changed History*. Simon & Schuster 320p.

Accordingly, there can be no consensus in science. Healthy science is underpinned by scepticism, has constant argument and lies at the boundary between the known and the unknown where it thrives on scepticism to further the dynamic evolution of knowledge.