

ON THE NATURE OF SCIENTIFIC INVESTIGATION

by

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What is the difference between scientific knowledge and religious belief, philosophical systems (e.g. stoicism, logical atomism) or pseudoscientific views (e.g. scientific creationism)? All efforts of 20<sup>th</sup> century philosophers of science to answer this question – to formulate a demarcation criterion – have failed. I will try to give my own criterion, based to some extent on remarks by Paul Hoyningen-Huene.

Scientific knowledge is value-free, whereas values are involved in all religious and most philosophical and pseudoscientific systems. But what about factual beliefs involved in all those systems and also common sense views of the world?

My answer is: systems of beliefs *systematically interconnected* and *arrived at in a systematic way* are scientific. But what does this double systematicity mean?

The first one is theoretical systematicity. In physics, which is the only scientific discipline that formulates its own laws, it has double character. It consists in applying the same set of laws to build theoretical models of more and more phenomena. The second aspect is that the same objects or kinds of objects occur in different models and then the same theoretical properties must be ascribed to them – unless it is known that in particular circumstances some properties can change.

The second is empirical systematicity. Scientists should devise their observations and experiments using all available knowledge about phenomena they study. They should make as many different experiments on the subject of their research as it is made possible by what they already know. As there are always systematic errors, and our ability of taking them into account depends on complete knowledge about phenomena of a given kind, every new discovery forces scientists to reinterpret some results of experiments performed previously.