

In Defense of a Medieval Scholar

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Roger Bacon, a thirteenth-century Franciscan monk, should be honored as one of the founding fathers of the scientific method. While most scientists of his time emphasized superstition, ritual, and authority, he insisted on observing the natural world for himself. He criticized the deductive method of his contemporaries and their dependence on past authority, and called for a new scientific method of learning, one that stressed the importance of observation and experimentation. Bacon argued that individual experience and experimental confirmation were more important than deference to authority or tradition. In future generations, this reliance upon experimental methods would become a central theme in the development of modern science.

In his *Opus Maius* (1268), Bacon wrote, “There are two ways of acquiring knowledge, one through reason, and the other by experiment. Argument reaches a conclusion and compels us to admit it, but it neither makes us certain nor so annihilates doubt that the mind rests calm in the intuition of truth, unless it finds this certitude by way of experience.” Bacon believed that as a consequence of this, we were in danger of not fully understanding the workings of nature, thereby making us vulnerable to its dangers. As an example of this, he cites the experience of touching fire and getting burned. A warning that fire burns is not enough; you need to see the result of combustion to appreciate the warning. “Hence argument is not enough, but experience is.” This was a revolutionary idea, and to this day it stands as the cornerstone of the modern scientific method.

This new approach to natural science introduced critical experimentation based on the principles of verification through experimentation and observation. This meant that for Bacon, experience is the only place where the individual can identify and discover general concepts and their causes. It also allows us to examine previous knowledge and confirm the truth of key deductions. This approach is still being taught today. The essential elements of the scientific method now in use—observe, hypothesize, test, and conclude—are the very same concepts that Bacon advocated over seven hundred years ago.

Even though Bacon reoriented medieval science toward experimental methods, he never abandoned its traditional theological premises. Bacon went on

to clarify his theories about experience. He states that there are two kinds of experience; one is performed with the help of external senses and the other with the help of internal illuminations. By external senses, Bacon meant using our five senses, as well as instruments created for observation. Conversely, internal illuminations referred to mysticism and theology. Bacon also believed that these inner experiences could be broken down into seven degrees. These inward experiences were suffused at every phase with some degree of divine illumination. Those who achieved the highest degree arrived at ecstatic knowledge, or rapture.

While some people may not agree with Bacon's ideas on internal illuminations, it must be remembered that he was, despite his many remarkably progressive ideas, a devout Christian. Bacon believed in glorifying God through the study of the natural world. His perspective is of one who believes that each revelation about nature brings him closer to understanding God. He believed that nature was one with God. Therefore, science would enable people to have a fuller communion with God. To understand better the persistence of the theological impulse, consider the opinion written by a famous biostatistician, Karl Pearson (1857-1936): "It is impossible to understand a man's work unless you understand something of his environment. And his environment means the state of affairs, social and political, of his own age."

Religious faith is the belief in some tenets without question, and can be seen as being in direct conflict with the scientific methods we now employ. Many people find that their own religious beliefs are still a very important part of their lives. The struggle to reach a balance between religion and science is one that must be arrived at individually. Bacon actually was persecuted for his belief in the scientific method. He may not have foreseen that over seven hundred years later this conflict would still be raging on. Bacon reconciled these two forms of experience, the outer objective natural law and the inner mystical experience, by believing that all knowledge leads to understanding the mind of God.

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