

The Christian roots of modern science

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The cancellation of Pope Benedict XVI's address at La Sapienza University in Rome in January, 2008, has received a great deal of attention around the world. A particular comment by Andrea Sterbini, one of the 67 academics signatories who protested the Pope's visit, however, warrants special attention because it represents, in a nutshell, a pervasive ignorance concerning the sizeable debt modern science owes to its Judeo-Christian roots.

"I think the Pope's visit is not a good thing," said Professor Sterbini, "because science doesn't need religion." It should be noted here that he made this comment erroneously assuming that the Holy Father and religion are opposed to science. Nonetheless, his words may be fortuitous since they offer a golden opportunity for setting the historical record right and explaining how modern science actually has developed from conceptions of reality that were essentially religious.

The most comprehensive and detailed treatment of the history of science was given to posterity by a distinguished physicist and mathematician, Pierre Duhem, (1861-1916) in his 10-volume magnum opus, *Le Système du monde: les doctrines cosmologiques de Platon à Copernicus*. The first five volumes—each more than 500 pages in length—were published in consecutive years, from 1913-1917. Although another five volumes were ready for publication when Duhem passed away in 1916, they were not published until four decades later (1954-59) thanks, in great part, to the courage and determination of his daughter Hélène.

The reason for the long delay in publishing the last five volumes of this masterpiece, which is without parallel in its field, was the strong opposition by influential academics who did not want to consider the demonstrable fact that modern science cannot be divorced from its religious foundations.

In the intervening years between the publication of the first and second group of 5 volumes, many studies of medieval science were conducted -- by Anneliese Maier, Marshall Clagett, E. Grant, Alistair Crombie and others. These studies served to extend and confirm Duhem's work and add credibility to his central thesis concerning the continuity between medieval and modern science. As a result of Duhem's pioneering research and the contribution by other historians of science, the value of studying medieval science is now well established, and can no longer be dismissed by honest scholars.

Science historian A. C. Crombie, for example, comes to the conclusion that

"The natural philosophers of Latin Christendom in the thirteenth and fourteenth centuries created the experimental science characteristic of modern times."

Stanley Jaki, who holds doctorates in physics as well as theology, has this to say about Duhem's work:

“What Duhem unearthed among other things from long-buried manuscripts was that supernatural revelation played a crucial liberating role in putting scientific speculation on the right track. . . . It is in this terrifying prospect for secular humanism, for which science is the redeemer of mankind, that lies the explanation of that grim and secretive censorship which has worked against Duhem (and his few allies) by two principal means: . . .”

These two means that Jaki amplifies are: 1) An orchestrated censorship that existed on the part of prominent publishing companies against printing major scholarly evidence in favour of Duhem's perspective. 2) The practice of selective indignation in scholarly societies and their journals against Duhem's work.

Dr. Peter E. Hodgson, who is University Lecturer in Nuclear Physics at Oxford University, has this to say about Duhem's scholarly accomplishment:

“The work of Duhem is of great relevance today, for it shows clearly the Christian roots of modern science, thus decisively refuting the alleged incompatibility of science and Christianity still propagated by the secularist establishment. Science is an integral part of Christian culture, a lesson to be learned even within the Christian Church.”

Duhem's study and documentation of the Christian origin of modern science has been deliberately neglected because it is unwelcome both to the disciples of the French Enlightenment and those of the Reformation. For different reasons, they would like to paint the Middle Ages as darkly as possible.

Alfred North Whitehead, co-author with Bertrand Russell of *Mathematica Principia*, offers timely approbation of Duhem's research when he states, in *Science and the Modern World*, that

“the faith in the possibility of science, generated antecedently to the development of modern scientific theory, is an unconscious derivation from medieval theology.” And so does Norbert Wiener, the “Father of Cybernetics,” when he urges his fellow scientists to adopt an “Augustinian approach” to their enterprise

“Science is a way of life,” he states, “which can only flourish when men are free to have faith. . . . When we do not know whether a particular phenomenon we observe is the work of God or the work of Satan, the very roots of our faith are shaken.”

The faith factor that science presupposes is multifold and includes faith that similar causes will be followed by similar results, faith in the validity of extrapolation from conceptual models to the “real” world, and faith in the very existence of such a real world. For such reasons, Wade Rowland, author of *Galileo's Mistake* (2001) can say:

“To the extent that a foundation in faith defines religion, science is every bit as much a religion as Christianity.”

Both the Old and New Testaments provide views of the world as well as human capacities that are most congenial to the development of science. First, the notion that God’s creation is ordered means that the physical universe is organized in a rational manner that is consistent, unified, and free of contradiction. The notion that man is created in God’s image gives him the confidence that he is capable of discovering the orderly pattern of nature. Third, since every thing that God created is good, it is worthwhile to uncover and utilize the good wherever he finds it. The Commandment to love is a powerful incentive to utilize what one has discovered and developed for the practical benefit of others. The notion of the Incarnation means that matter has a certain dignity and is a suitable substance for celestial bodies, as opposed to the pagan belief that they were composed of a higher and imperishable element. As historians of science have noted, the idea that creation took place in time and came out of nothing, and the linearity of time, played important roles in the development of modern science.

The following passage from the Book of Wisdom (7:15-21) offers a frame of mind that is most conducive to the development of science:

“For He hath given me the true knowledge of the things that are: to know the disposition of the whole world, and the virtues of the elements, the beginning, and the ending, and midst of the times, the alterations of their courses, and the changes of the seasons, the revolutions of the year, and the disposition of the stars, the natures of living creatures, and rage of wild beasts, the force of the winds, and reasonings of men, the diversities of plants, and the virtues of roots, and all such things as are hid and not foreseen, I have learned: for wisdom, which is the worker of all things, taught me.”

St. Augustine, in his *City of God*, states that God is the Author of **“all measure, form and order; of all size, number and weight. He is the source of every nature . . . of the seed of every form and the form of every seed and the movement of both seeds and forms.”**

This view has been echoed by Kepler, Galileo and Newton. It is at the heart of Einstein’s famous remark that the most incomprehensible thing to him is that the universe is comprehensible. And this is why he concluded that:

“God does not play dice.”

The names of Jordanus Nemorarius, Jean Buridan, John Philoponus, Robert Grosseteste, Roger Bacon, Nicholas of Oresme, and Leon Battista Alberti may not be known to many, even to many contemporary scientists. Yet they are Christian pioneers of science and provided an indispensable bridge that connected the Medieval world of science to that of modernity. It is estimated that there are between 30,000 and 35,000 medieval Western scientific manuscripts scattered throughout the world. *Jordanus, An International Catalogue of Medieval Scientific Manuscripts* has now been made available by the Institute for the History of Science at the University of Munich and by the Max Planck Institute for the History of Science in Berlin. The database is accessible on the Internet for any current browser. It provides information about medieval manuscripts written in Western Europe between 500 and 1500 A. D.

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