

SCIENCE AND CHRISTIAN THEOLOGY

REMEMBERING GIORDANO BRUNO

High schools students all know about the troubles that Galileo had with the Catholic Church, but few have ever heard of Giordano Bruno, who died at the stake. The *New Yorker* has a fascinating review of a new book about Bruno:

In 1600, Rome's Campo de' Fiori, now a nice plaza lined with cafés, was one of the city's execution grounds, and on Ash Wednesday of that year Giordano Bruno, a philosopher and former priest accused of heresy by the Inquisition, was taken there and burned. The event was carefully timed. Ash Wednesday is the primary day of Christian penance. As for the year, Pope Clement VIII chose it because 1600 was a jubilee for the Church—a festivity that would be enhanced by the execution of an important heretic. Bruno rode to the Campo on a mule, the traditional means of transport for people going to their death. (It was also a practical means. After years in the Inquisition's prisons, many of the condemned could not walk.) Once he arrived and mounted the pyre, a crucifix was held up to his face. According to a witness, he turned away angrily. He could not speak; he had been gagged with a leather bridle. (Or, some say, an iron spike had been driven through his tongue.) He was tied to the stake, and the pyre was lit. When it had burned out, his remains were dumped into the Tiber. As Ingrid Rowland writes in "Giordano Bruno: Philosopher/Heretic" (Farrar, Straus & Giroux; \$27), the Church thereby made Bruno a martyr. But "a martyr to what?" she asks. That is the question that her book, the first full-scale biography of Bruno in English, tries, with difficulty, to answer.

So why was Bruno burned at the stake? He was an original thinker with often provocatively modern ideas:

In this system, there were three main ideas. One was heliocentrism, the notion that the sun, not the Earth, was the center of the universe. This revision of the standard, Ptolemaic cosmos was, of course, not original to him. It had been made by the Polish astronomer Nicolaus Copernicus in 1543, five years before Bruno was born. But while Copernicus's repositioning of the earth and the sun was a radical proposal—indeed, a heresy (the Church needed the Earth, the arena of salvation, to be the center of the universe)—in other respects his cosmos was quite orthodox: a finite structure consisting of fixed spheres that revolved in concentric circles, just as in Ptolemy. Bruno, on the other hand, proposed an infinite cosmos, consisting of innumerable heliocentric worlds. This, his second and most important idea, was also not new. It had been put forth by Nicholas of Cusa, a German cardinal, in the fifteenth century. But here, too, Bruno went further, claiming that the universe was a vast, wheeling, unknowable thing, and that all theories about it, including his own, were not descriptions but merely approaches—"models," as we would call them today.

Finally, Bruno developed an atomic theory, whereby everything that existed was made up of identical particles—"seeds," in his terminology. Other people, notably Lucretius, had had this idea, but, again, Bruno expanded it. Not only were all parts of the cosmos constituted of the same elements, but God, whom the Church strictly set apart from the material world, resided in these elements. It was his love, informing every "seed," that unified the world.

THE POPE'S SCIENTISTS

Well, much has changed since Bruno has burned at the stake. The Vatican now operates a premier observatory. As *Discover* reports, the Vatican also operates a well regarded, but little known science academy that explores a wide variety of scientific issues:

The lessons learned from the trial and condemnation of Galileo in the 1600s have guided an era of scientific caution and hesitancy within the Vatican. Today the Vatican's approach to science is a complex undertaking involving nearly every facet of Church life. The Roman Curia—the Church's governing body—includes a network of 5 pontifical academies and 11 pontifical councils, each of them charged with tasks ranging from the promotion of Christian unity to the cataloging of martyrs. To varying degrees, each of the 16 offices—and, of course, the independent Vatican Observatory—intersects with scientific issues, and they tend to rely on the efforts of one academy to provide clarity and consultation: the Pontifical Academy of Sciences. Housed in a building several centuries old deep inside Vatican City, the Pontifical Academy of Sciences is a surprisingly nonreligious institution as well as one of the Vatican's least understood.

Though it is virtually unknown among laypeople, the Pontifical Academy of Sciences is an independent and remarkably influential body within the Holy See. Over the years its membership roster has read like a who's who of 20th-century scientists (including Max Planck, Niels Bohr, and Erwin Schrödinger, to name a few), and it currently boasts more than 80 international academicians, many of them Nobel laureates and not all of them Catholic—including the playfully irreligious physicist Stephen Hawking.

Academy members are elected by the current membership. There are no religious, racial, or gender criteria. Candidates are chosen on the basis of their scientific achievements and their high moral standards. When a nomination for membership is made, the Vatican Secretariat of State is consulted in order to prevent the appointment of someone with a questionable history.

“We're a group of people from all over the world—many religions and attitudes,” says physicist Charles Hard Townes, a Nobel laureate and an inventor of the laser. “It is essential for scientists to participate in this and try to help the Catholic Church, advise them on their policies. Many civilizations in the world are not directly affected by science and technology decision making, but they are affected by mandates and decisions of the Catholic Church.”

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Today the academy's mandate involves promoting the progress of mathematical, physical, and natural sciences and participating in the study of related epistemological questions and issues. The academy convenes plenary sessions in which its members offer presentations addressing a certain theme. Held every two years, the meetings highlight the most recent advances in the sciences. The next session is slated for October.

Although the academy's mission seems as benign as that of any other scientific body, its presence within the Vatican invites controversy. During the early 1990s, at a time of alarm about population problems, the academy issued a report saying that there was an “unavoidable need to contain births globally,” a position that supposedly infuriated Pope John Paul II.

A pope, more than anyone else, knows the exact reason for the Pontifical Academy of Sciences. In 1992 John Paul II told the members that “the purpose of your academy is precisely to discern and to make known, in the present state of science and within its proper limits, what can be regarded as an acquired truth or at least as enjoying such a degree of probability that it would be imprudent and unreasonable to reject it.” In the pope's eyes, the academy is an instrument that teases scientific fact from fiction.