At the Intersection of Faith and Science
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THE VATICAN OBSERVATORY
EVERY SUMMER, THE POPE LEAVES THE HEAT OF ROME AND HEADS TO HIS VACATION HOME AT CASTEL GANDOLFO, IN THE ALBAN HILLS, OVERLOOKING LAKE ALBANO. THE SIXTEENTH CENTURY MONASTERY SITS ON A HIGH RIDGE, A PERFECT SPOT TO VIEW AND REFLECT UPON THE HEAVENS.

CASTEL GANDOLFO is the main headquarters for the Vatican Observatory, one of the oldest astronomical institutes in the world. It is run by the pope and the Roman Catholic Church.

Since 1891, when the observatory was founded, the pope’s astronomers have used it to study the night sky. Equipped with one of the world’s oldest telescopes, they have applied their scientific expertise to fundamental questions that engage people of all faiths: How did this Universe come to be, and what is our place in it?

For more than a century, this research center has been a bridge between theology and science. Castel Gandolfo has a museum of meteorites and two large libraries containing more than 22,000 volumes, including historic works by Copernicus, Galileo, Newton, and Kepler. Every summer, the astronomers at the observatory update the pope about their work.

Father George Coyne was appointed director of the Vatican Observatory by Pope John Paul I in 1978. He recalls the satisfaction that comes from doing “good science” while serving the church.
“Science is an attempt to explain natural events by natural causes,” says Coyne. “The Church has a serious interest in understanding the Universe and everything in it.”

In his view, “True science, good science, does not conflict with religious belief.”

ROOTS IN CONTROVERSY
The relationship between the popes and astronomy has not always been so smooth.

In the sixteenth century, Pope Gregory XIII reformed the calendar and set up a committee to examine the implications for science.
Enter Italian astronomer Galileo Galilei, whom Albert Einstein called “the father of modern science.” Using observational evidence, Galileo challenged the teachings of the past.

In 1609 and 1610, Galileo used a telescope of his own design to see the surface of the Moon, the phases of Venus, and the moons of Jupiter. These were all strong evidence for Copernicus’s Sun-centered theory.

Galileo suggested that his studies supported the theories of Polish mathematician and scholar Nicolaus Copernicus. Copernicus had theorized — a century before Galileo — that the Earth moved around the Sun, and not vice versa.

But the Catholic Church, which backed the Earth-centered, geocentric teachings of Aristotle and Ptolemy, was not accepting of these new ideas.

The Church was already dealing with the Reformation, a movement that challenged the authority of the pope and the Catholic Church in Rome. In 1542, the Church began the Inquisition, an organization that made decisions on questions of morality and faith. It analyzed books and individuals to determine if what they said agreed with the Bible. Some people were sentenced to death for their beliefs.
The Inquisition found Galileo’s writings of an Earth in motion around the Sun heretical and incorrect, and banned the teaching of Copernicus’s theories. Galileo was forced to take back his approval of the Copernican heliocentric model.

Nevertheless, the Church has, since Galileo’s time, expressed an interest in astronomical research. Three different observatories were founded by popes in the eighteenth and nineteenth centuries.

Vatican astronomers made a major breakthrough in the mid-nineteenth century. Father Angelo Secchi was the first to classify stars according to their spectra, the color of light they emit. Modern spectroscopy is very important in astronomy today because scientists know that different elements have their own emission spectra, and can contribute to the “chemical signature” that a star’s light reveals.

Today’s Vatican Observatory traces its roots back to 1891 when Pope Leo XIII set up a small observatory on the Vatican grounds. In 1910, Pope Pius X gave the observatory a new, larger space.

From 1914 to 1928, the observatory contributed to the Astrographic Catalogue, an ambitious map of the sky that was undertaken in conjunction with 17 observatories around the world.

By the 1930s, light pollution from Rome prevented the study of the fainter stars and galaxies. Pope Pius XI moved the observatory to Castel Gandolfo. Three new telescopes were constructed, an astrophysical laboratory was installed, and research programs began on Cepheid variable stars.

The skies above Arizona are dark and clear, making the telescope even more useful.

The observatory’s 15 staff members work with astronomers around the world.

“The first priority of the Vatican Observatory is scientific research, and the VATT is our tool,” said VORG director Jose G. Funes. “We are priests and religious men, but we also are scientists. Astronomy is our main service to the Church.”
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NEW POINTS OF VIEW

The subject of Galileo has remained a tricky one for the Church throughout the years. In 1992, Pope John Paul II expressed regret at the way Galileo had been treated. He said, “The error of the theologians of the time, when they maintained the centrality of the Earth, was to think that our understanding of the physical world’s structure was, in some way, imposed by the literal sense of sacred Scripture.”

Father Coyne, who ran the Vatican Observatory says, “The Church is a human institution, and a human institution can make, and has made, mistakes.”

In the 1600s, Coyne says, the Church believed that Galileo contradicted Scripture. “We can’t judge by the modern day what happened 300 to 400 years ago,” Coyne continues. “We do have to say the Church was wrong in thinking Scripture teaches science. The Church now knows that.”

Such thinking didn’t change overnight. Each pope takes his own approach. In 1998, Pope John Paul II wrote in an official letter: “Faith and reason are like two wings on which the human spirit rises to the contemplation of truth.”

But the balance between faith and reason is sometimes difficult for popes to manage.

Pope Benedict XVI was criticized in 2008 for saying the Church’s verdict against Galileo had been “rational and just.”

However, in 2009, Pope Benedict XVI dedicated a plaque that attests to the “Church’s steadfast support for the work of the observatory at the nexus of faith and science.”

Father Coyne emphasizes that Galileo paved the way for a harmonious relationship between religious belief and scientific inquiry.

“Galileo anticipated by four centuries what the Church would finally say about the interpretation of Scripture,” he says. “Galileo said that Scripture was written to teach us how to go to heaven, not how the heavens go.”

And Galileo never turned away from the faith that had sentenced him.

“Galileo was a devout Catholic and was not trying to start a conflict between science and religion,” writes Rachel Hiliam in a book on Galileo. “He believed that the Bible was there to instruct people in how to get to heaven and was not meant to be a scientific book explaining how the Universe worked.”

Coyne believes faith and science complement each other. He says, “Faith is: ‘God loves me.’ I accept God’s love. I try to return that love to God each day.” At the same time, he notes, “We are human beings. Science is instrumental to improving our knowledge of the Universe. But we will never have the final answer.”


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