Galileo: the real story

In 1616, a board of theologians for the Roman church discussed the new Copernican theory. The result of that deliberation was an official decree stating that to say the sun is at the centre of the world and immovable is 'foolish and absurd' and 'formally heretical'; and to say that the Earth moves is similarly foolish and 'erroneous in the faith'.

Sixteen years later Galileo Galilei faced the Inquisition on charges of heresy because of his belief in that same theory. He was ordered to renounce his heretical opinions - that is, to state that he firmly believed that the Earth did not move - and was sentenced to a prison term with penance.

Galileo's trial has for a long time been the archetype of the clash between science and Christianity. Galileo was the symbol of scientific freedom, the man who examined the facts and argued that the Earth moves around the sun instead of the other way around. The church stood for blind dogmatism, insisting on authority that such a thing was impossible and refusing to look at the evidence. Galileo was convicted of heresy, threatened with torture and forced to recant. This story has been told again and again to prove that Christianity, based on revelation not discovery, is blind, authoritarian and the enemy of progress. The problem is that this story is a caricature with little historical truth. The real story - the real history behind the myth - is coming to light these days as the relationship between science and religion is re-evaluated by modern scholars.

In fact, the relationship between science and religion is becoming so friendly, it's funded. The John Templeton Foundation, a secular institution, is offering up to $5000 at a time to support university courses in science and religion. Cambridge University has established a lectureship in theology and science. Berkeley and Princeton, two of America's most prestigious universities, have centres for studies into science and religion. All over the world, it seems that the long-standing war between science and religion has reached a truce. Leading academics are willing to explore the congruencies between the two fields rather than declare one or the other to be faulty.

Of course, it's not all rosy. There are plenty of prominent and vocal people who still voice loud objections to any accommodation between science and religion, from both sides. The English publication Evangelicals Now, when it ran a pro-science 'accommodation' article by historian of science Colin Russell, received several angry letters from Christians unwilling to be so positive to modern science. What's more, even in the friendly science-and-religion seminars, what is classified as 'religion' is often very vague and far from biblical Christianity.

Nevertheless, discussion about the relationship between science and

religion is now possible in camps where it was once unthinkable. The 'warfare' model, promoted so strongly by Darwin apologists such as Thomas Huxley and continued by angry 'freethinkers' early this century, is definitely on the wane in academic circles. Many of the caricatures and much unnecessary polemic have been exposed under re-examination. One such case is the examination of Galileo's trial by the Catholic Church in the sixteenth century. We can applaud recent historical research-carried out by professional and often secular historians-which has brought to light the real facts of the case.

The theory that shook the world?
Most people ask "Why was the church ever foolish enough to reject the earth's movement?". The short answer is, because the universities were so angry with Galileo. The real battle was not between Christianity and science; it was between old science and new science.

In 1543, in the last year of his life, a modest Polish astronomer named Nicholas Copernicus published a speculative astronomical theory. It was different from the old theory, because it placed the sun rather than the Earth at the centre of the universe.

Yet Copernicus was not declared a heretic; his theory did not cause shock and horror in theological circles; in fact, few people took much notice of it at all. Why? Contrary to our modern ideology of an overnight 'Copernican revolution', Copernicus' theory was not that big a deal. It was a contribution to technical astronomy, of interest to fellow astronomers but not many people beyond those circles. Even amongst astronomers there was only a luke-warm reaction. The theory helped explain certain astronomical anomalies, but it was by no means overwhelmingly convincing. One reason for this was that Copernicus still believed that the planets moved in circles-which does not fit what we see in the sky (it was not until the next century that it was discovered that the planets actually move in ellipses).

Basically, no physicists-or natural philosophers, as they were then known - were going to take this new astronomical theory seriously, because it clashed with all known ideas about physics. At the time, Aristotelian physics was accepted in the universities, and Aristotle had stated that the earth must be stationary and at the centre of the universe. It is hard for us now to realise just how immense a challenge Copernican theory was. If it were true, the entire body of received knowledge about physics-laws of motion, theories of matter, the most fundamental ideas about what the universe is made of and why it behaves the way it does - would have to change. It did not seem a likely option.

Galileo's battle with the academics
About half a century later, a mathematician called Galileo Galilei began to earn some small fame for himself for his contributions to mechanics and astronomy. He was a memorable character; his technical expertise was

matched by his wit and skill in sarcastic repartee, and he knew how to publicise his own discoveries. As one who appreciated the mathematical advantages in Copernicus' theory (unlike many laymen), Galileo became convinced that the theory was true. At the same time, he saw flaws in the traditional Aristotelian theories of the universe. Never afraid to take on a challenge, the fact that he was criticising a dogma that had dominated intellectual life for centuries did not deter him. Galileo became an outspoken critic of Aristotelian ideas (in many fields, not just astronomy) and also became known for his support of the innovative Copernican theory. Not surprisingly, the bulk of the academic world did not take him terribly seriously.

They were not without reason. It is often quoted as a laughable example of blind dogmatism that some Aristotelian scholars refused to look through Galileo's telescope to see the moons of Jupiter. They insisted that even if they saw something, it had to be a trick, and so refused even to look. Yet from a scientific point of view they had a point. They knew, from their knowledge of the established body of physics, that there could be no moons of Jupiter. What is more, Galileo was unable to explain satisfactorily how the telescope worked. Yet he expected the philosophers to overturn centuries of knowledge on the basis of this mysterious metal tube. There was some justification in their refusal to play his games. In their eyes it was Galileo who was ridiculous - even pitiable - for thinking he could teach anything to Aristotle.

People being people, it was not just Galileo's philosophical ideas that annoyed his opponents. Galileo was just not playing the academic game by the rules. Galileo was a mathematical astronomer, and in the university pecking order of the time, mathematicians were at the bottom. They certainly were not allowed to challenge the natural philosophers, who were at the top. At the time, physics was not based on mathematics as it is now, and (as we can see above) natural philosophers did not think a mathematician could tell them anything. Consider what a fellow academic had to say of him:

"Before we consider Galileo's demonstrations, it seems necessary to prove how far from the truth are those who wish to prove natural facts by means of mathematical reasoning, among whom, if I am not mistaken, is Galileo...anyone who thinks he can prove natural properties with mathematical arguments is simply demented, for the two sciences are very different." (Vincenzo di Grazia, a professor in philosophy at Pisa.)

This was written by a natural philosopher. He was not about to listen seriously to any mere mathematician. This was intensely irritating to Galileo, who thought he had good evidence for his theories. He wanted to be taken seriously as a theorist and an intellectual, but to do so he had to challenge disciplinary boundaries.

Normally, this kind of academic battle would be dealt with internally, in

the academic environment, through debate, publication, and so on. Galileo, however, refused to play on the establishment's terms. He was not going to let a stagnant academic network stifle him. He moved out of the university system altogether and discovered another setting in which he could work. Resigning from his university position, he managed to persuade the Medici Grand-Duke Cosimo II to employ him as court philosopher. Galileo was now in a position to be highly offensive to university philosophers. He had deliberately rejected the university system and its status rankings. He had taken the title 'philosopher' even though he was 'only' an astronomer. He bypassed the academic subtleties and niceties, and in his professional publications he was frequently highly sarcastic and insulting to his university opponents.

Galileo's battle with the church
Galileo was by this time 48 years old, a highly paid and important court personage, and a world-famous astronomer whose telescopes were in demand from nobles all over Europe. Not many Aristotelians had been convinced by his arguments, but they had been unable to silence him. At this stage, he had had no trouble with church authorities; if anything, they respected him as a talented astronomer. This raises an important question. Why did the church get involved at all?

Galileo's enemies, unable to defeat him in logical argument or by academic pressure, took the battleground to the church. Galileo had not allowed his opponents to silence him in the normal ways, so they looked to silence him through creating theological trouble. These men openly accused Galileo of contradicting the Bible, and set about creating popular suspicion against Galileo in order to catch the attention of the church authorities.

It was an unfair move. Theologians had traditionally allowed philosophers space in which to develop ideas; the medieval church was not Orwell's Big Brother. Philosophical speculation and discussion was the province, and lifeblood, of the universities, and though the church secured the boundaries of admissible doctrine it did not normally dictate what could be discussed. The church was not out to silence Galileo. Indeed, Galileo's telescopic discoveries had been accepted and endorsed by Jesuit astronomers when he travelled to Rome in 1611: he was not without church support. In other words, the church was not at warfare with science; on the contrary, Jesuit brothers were some of the leading scientific teachers and researchers of the time. What the church did not like was a challenge to its authority.

That was how Galileo's opponents, led by the Aristotelian academic Ludovico delle Colombe (who had suffered under Galileo's sarcastic criticisms), presented the case. Galileo was openly accused of believing theories that contradicted the Bible; that is what caught the attention of the church authorities. In particular one Cardinal Bellarmine took notice. He had for most of his adult life been the principle spokesman for Catholicism against the Protestants (remember the Reformation had begun only a hundred years

before). He was not at all pleased to hear of a Catholic who was potentially challenging the church's official interpretation of the Bible. Even though Galileo had some reasonable arguments in his defence, Bellarmine was not about to let trouble be stirred up over the relatively unimportant matter of a technical astronomical theory. What is more, Galileo did not help his case at all by continuing in his usual brash, sarcastic manner. In other words, though Galileo's argument (actually based on Augustine) that the Bible can at times be interpreted figuratively was quite reasonable, Bellarmine would not have appreciated Galileo's quips about 'narrow-minded theologians'. It was not the time for such a tone.

The matter had become official, and was dealt with quickly. Galileo came to Rome, and the matter of Copernican theory was considered by a panel of theologians for a brief three days. This is hardly long enough to consider a question of such importance, we would think; but the question is of far more importance to us than it would have been to the church at the time. All that the theologians saw, it seems, was yet another challenge to church authority by an isolated troublemaker. It would be nipped in the bud. Copernicus' book was condemned, and Galileo was told not to hold or defend the theory. Galileo himself was not officially mentioned in any condemnation, nor was he disciplined, probably due to his powerful court connections.

There is more to tell about the Galileo story before Galileo finally found himself in front of the Inquisition in 1632. There is the way he infuriated the powerful Jesuit astronomers with his insulting rebuttals of their research; how he personally offended the Pope in his overconfidence; how he was used as a pawn in a political struggle between factions in Rome who had no concern with astronomy at all. There is also another story to tell in the Protestant reaction to Galileo, which was significantly different from the Catholic one.

Yet the intellectual background to Galileo's story is found in the clash between Aristotelian physics and the new science. It is unfortunate that the church let itself be drawn in to defending an Aristotelian universe, which was never necessary to the Bible: unfortunate for Galileo, and for the Catholic church's reputation ever since. The important thing that has been revealed by historical research, however, is that Galileo's trial was not an instance of a battle between 'Christianity' and 'science'. It was a battle between old, Aristotelian science and new, mathematical science, a battle in which the church became entangled.

The relationship between science and religion is still a delicate one, with many issues yet to be resolved and high emotions on both sides. We can hope, however, that as discussion continues we will push aside the polemical misinformation that distorts the relationship. Solid historical research into Galileo's trial has achieved that; we look forward to other instances.

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This is an abridged version of an article published in the first issue of a new journal called "kategoria - a critical review of modern life".
['Kategoria' is the other side of 'apologia'. It is 'speaking against'; going on the offensive; the prosecution rather than the defense. It is asking the questions, querying the suppositions, and critiquing the philosophies and ideas that pervade our modern media, unchallenged.]

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