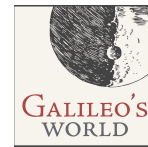


STARTING POINT: The Trial of Galileo

EXHIBIT: *Galileo's World*
GALLERY: The Galileo Affair
OBJECT: Galileo, *Dialogo* (1632); "Dialogue on the Two Chief Systems of the World"



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The story of Galileo's trial in 1633 intertwines two crucial earlier episodes:

1. Galileo's encounter with the Inquisition in 1616; and
2. Publication of Galileo's *Dialogue on the Two Chief Systems of the World* in 1632.

In the Inquisition's decree of 1616, Foscarini's *Letter* was prohibited and condemned outright; while Copernicus' *On the Revolutions* and Zúñiga's *Commentary on Job* were only suspended until they could be corrected (see STARTING POINT: BANNED BOOKS). Galileo escaped unmentioned. However, he was instructed to remain within the conventional boundaries of mathematics and hold that Copernicanism was merely hypothetical, rather than physically true, scientifically certain, or theologically acceptable.

Two key documents from 1616 would later play a critical role in Galileo's trial: an unsigned notary document (the Segizzi report), and an affidavit given to Galileo from Cardinal Bellarmine. Any interpretation of Galileo's trial depends upon how one reconstructs the circumstances of these two documents. (See Stillman Drake, *Galileo: A Very Short Introduction*, chs. 5 and 6, and the Drake Discussion Guide.)

Galileo's *Dialogue* (1632) attempted to prove Copernicanism with an argument based upon the tides. This was regarded as a **causal** argument, which attempted to lead to a true and certain **demonstration** appropriate to a physicist, rather than a hypothetical mode of argument appropriate to a mathematician. Galileo's *Dialogue on the Two Chief Systems of the World* overstepped the expected boundaries for a mathematician by arguing that Copernicanism was **physically true and certain** rather than merely hypothetical.

In August 1632, sales were halted and copies were confiscated by the Inquisition. In October Galileo was summoned to Rome. He arrived early in 1633, staying at the Tuscan embassy in Rome until April.

On April 12 the trial began, which continued for several weeks. Galileo moved to quarters in the Inquisition building, accompanied by servants. He was questioned by the Inquisition. The chief issue was a legal technicality: Despite having received a private papal permission and a public official license to print the *Dialogue*, Galileo was accused of violating a 1616 injunction not to hold, defend, or teach in any way the Copernician theory. That such an injunction had indeed been issued to Galileo in 1616 was documented only by the anomalous and unsigned Segizzi report. The case became complicated when Galileo produced a letter from Bellarmine

stating that in 1616 Galileo had *not* been asked to abjure. Galileo's new evidence implied that Bellarmine had not officially issued the alleged injunction of the Segizzi report after all.

Nevertheless, on April 17, 1633, a panel of Cardinals concluded that the *Dialogue* did indeed teach Copernicanism as physically true, not just hypothetically, contrary to Bellarmine's 1616 instruction and Galileo's own testimony of his intentions.

Around April 27-30, unofficial negotiations (instigated by Cardinal Francesco Barberini, likely with approval of Urban VIII) resulted in a compromise where Galileo formally confessed that in writing the *Dialogue* he was "carried away by enthusiasm and vainglorious ambition." The compromise seemed to assure Galileo of leniency, and to leave open the possibility that the *Dialogue* might be corrected rather than prohibited. There was never any credible threat of torture. Galileo returned to the Tuscan embassy to await the final disposition.

In May, a summary of the *Dialogue* was prepared, heavily tilted against Galileo, with out-of-context quotations.

By June 16, the compromise had fallen through. Urban VIII and the Inquisition decreed that the *Dialogue* should be prohibited, and that Galileo must abjure Copernicanism as an error of the faith. Galileo was sentenced as one "vehemently suspected of heresy," as if he had in fact violated an injunction presented to him in 1616. This verdict, one step short of being charged with heresy, required the humiliating act of public abjuration. Galileo's condemnation was signed by 7 of the 10 Inquisitors, with Francesco Barberini among those abstaining. The *Dialogue* was prohibited. Galileo's sentence was distributed widely, and read aloud to mathematicians in Florence.

On June 22, Galileo knelt before a plenary session of Cardinals at the Dominican convent of Minerva in Rome, and recited from the prescribed statement: "*with sincere heart and unfeigned faith I abjure, curse and detest the aforesaid errors and heresies....*" There is no reliable historical evidence that he muttered under his breath, "*and yet it moves.*" Galileo was then released into the custody of the Archbishop of Siena. In December, he returned to his villa at Arcetri, near Florence, where he lived under house arrest.

At the time, physicists were trained in logic rather than mathematics, yet physicists were granted more authority and credibility than astronomers in their mathematical statements about the universe. Causal arguments about the tides were the province of physicists, not mathematicians. The greatest resistance to Copernicus came from those who underestimated the power of new mathematical methodologies. Both physicists and theologians were similarly unprepared to recognize the potential of mathematical arguments for the motion of the Earth. So Galileo and the *Dialogue* were a challenge from mathematics to the established and reputable domains of physics and theology, both of which had to learn to adapt to the knowledge claims of the new mathematical science. Galileo's trial represents the inadequacy of rigid disciplinary boundaries, as he championed the unexpected reach of emerging mathematical investigations compared with traditional methodologies.