

GALILEO
2 December 2002
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Nicholas Copernicus and Galileo Galilei, sixteenth century astronomers who investigated the movement of celestial bodies, revolutionized the world by stating that the sun was stationary and the earth orbited around it, rather than vice versa. The two scientists were alike in that they based their hypotheses only on the information they observed in the sky, rather than relying on theory and philosophization for portions of their data, as had their predecessors. Each of these men took a different approach to doing the actual research, however; Copernicus used geometry to observe and predict the movements in the sky, and Galileo used a telescope which he himself constructed. Their research was controversial, especially within the church, but both the men held that rational scientific inquiry and the Christian faith could coexist without contradicting one another.

The methods which the two scientists used were new to the field of astronomy. Galileo built a telescope to observe the sky with, and after many imperfect attempts, he finally succeeded in creating a spyglass which made things appear “over one thousand times larger and over thirty times closer” (p. 515, line 13) than when seen with normal vision. Copernicus calculated the movements of the stars using geometry, and he always took the simplest answer to any problem, as he himself said: “the astronomer much prefers to take the... [answer] which is easiest to grasp” (p. 506, line 30-31). He discusses the differences between his method and that of the traditional philosopher-astronomer in his introduction to *De Revolutionibus Orbium Coelestium*.

Copernicus says that while his method of observing nature seems to be superior to the traditional way of reaching a conclusion, neither the philosopher nor the astronomer “will grasp anything

certain..., unless it has been divinely revealed” (p. 506, line 32-33). While Galileo asserts that the truth of his ideas will reveal itself, Copernicus says that there is no absolute way of gaining scientific knowledge, and that his ideas are merely hypotheses.

Copernicus showed his respect for church doctrine and opinion by dedicating the introduction to his *De Revolutionibus Orbium Coelestium* to Pope Paul III. In this introduction he tells the Pope, and thereby the church, that he is not presenting his work as unchangeable truth. He states that “the author of this work has done nothing which merits blame” (p. 506, line 6-7) by fulfilling the duties of an impartial scientist. He goes on to define what an astronomer’s duty is; “for it is the job of the astronomer to use painstaking and skilled observation in gathering together the history of the celestial movements, and then... to think up or construct whatever causes or hypotheses he pleases such that... those same movements can be calculated from the principles of geometry...” (p. 506, line 7-9) He points out with this statement that a scientist’s job is to observe, and to theorize about the correct explanation for something. Not every hypotheses will be correct, and he realizes this. Therefore, he says, he does not deserve to be punished for his work, since he is merely doing what a scientist should by observing phenomena and creating hypotheses to explain them, and he does not defend his ideas as absolute truth.

Galileo takes a slightly different approach when defending his work to the church. Unlike Copernicus, he does defend his ideas as being completely valid. In his *Letter to Grand Duchess Christina*, he quotes St. Augustine, who wrote that “we ought not to believe anything inadvisedly... lest in favor to our error we conceive a prejudice against something that truth hereafter may reveal to be not contrary in any way to the sacred books of either the Old or New Testament” (p. 518, line 19-22). He uses this statement to back up his own opinion that the

church should not be so vehement about holding to a geocentric view, since there is nothing in the Scripture for or against it. The church has become prejudiced, he says, and there is no doctrinal or scriptural reason to believe that the sun revolves around the earth - indeed, physical evidence is to the contrary. Galileo shows little regard for the opinions of the men who slander him. He says he is “assured of the eventual outcome” (p. 518, line 40-41) of the argument, because he is certain of the truth of his work. Galileo relies on the inherent validity of his research for his defense.

Galileo also points out that he is not the first man to believe that the earth revolves around the sun. Copernicus, he reminds the reader, “was not only a Catholic, but a priest and a canon” (p. 519, line 40-41). Copernicus was a faithful member of the church, and yet he held to the same scientific viewpoint as Galileo. Not only did the church not condemn Copernicus, but the Bishop of Fossombrone assigned him the task of rewriting the church calendar. “With Herculean toil he set his admirable mind to the task” (p. 520, line 3-4), and the church accepted his rewritten calendar. Galileo argues that if the church did not condemn Copernicus for holding these viewpoints, it cannot censure him.

Copernicus and Galileo introduced a controversial idea to the medieval world. Coming at around the same time as Martin Luther’s drastic reforms, the thought that the very stars might not behave as men had believed for thousands of years was almost too much for the church to handle. Copernicus managed to escape confrontation with the church by not holding that his ideas were absolutely true. He merely laid them out as an optional explanation for the movement of the planets. Galileo, however, saw no reason to be submissive to the church over this issue, since he believed that his discoveries were in perfect compliance with faith and scripture.

Copernicus and Galileo dealt with the church's influence in different ways, as they approached their scientific observation in different ways.