The Synapse: Intercollegiate science magazine

Volume 6 | Issue 1 Article 17

2015

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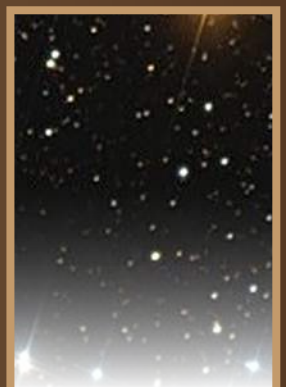
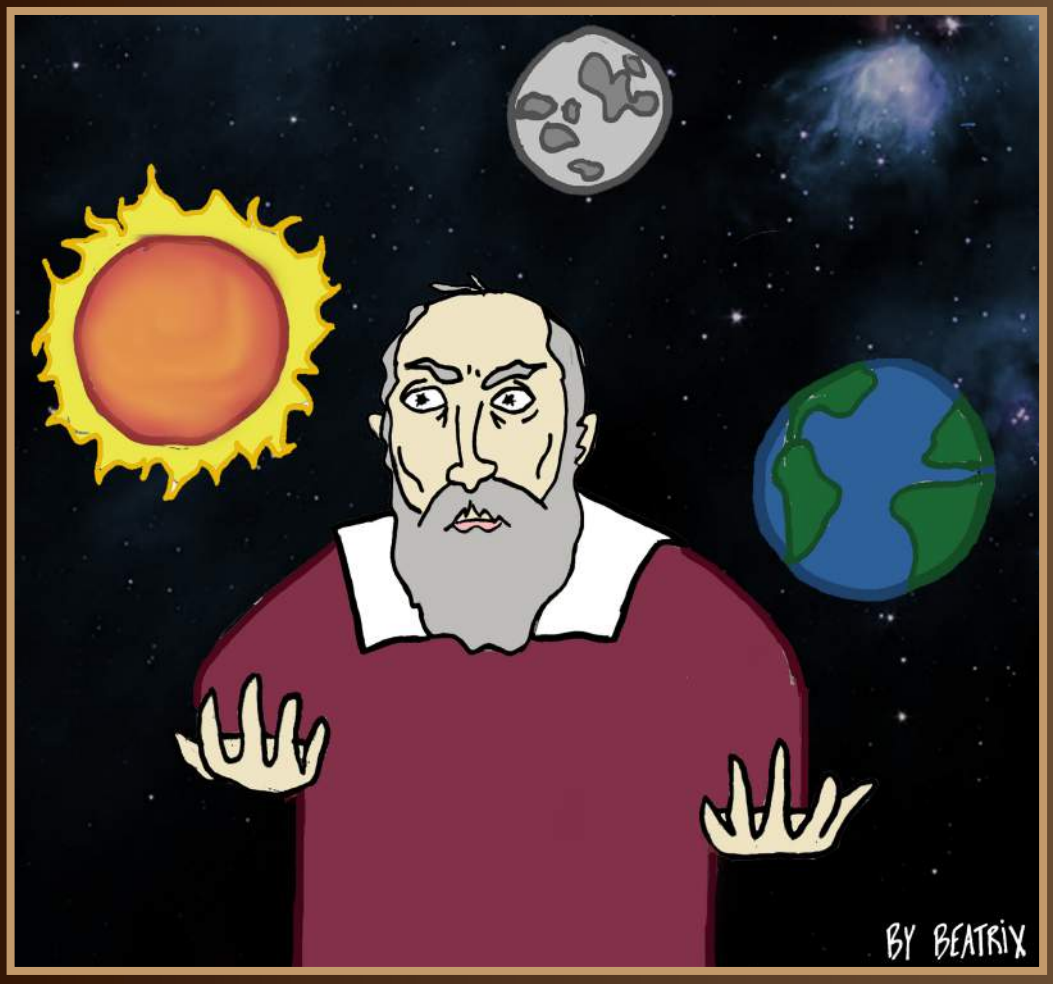
Seated at a roughly hewn table in the work room of his shabby apartment in Florence, Italy, Galileo Galilei poured over the sparsely detailed patent of the first telescope by German-Dutch spectacle-maker, Hans Lippershey. According to Lippershey, the crafting of the glass itself was an especially difficult task, one that involved the precise and dangerous process of boiling noxious sand and soda, borax, manganese oxide, and a bit of lime in gigantic vats. Then, the glass maker would have to deposit the boiling liquid into a lens mold, layer by layer, until the right thickness was achieved. According to Lippershey, lenses were often marked with blemishes; particulates, discolorations, and differing densities were frequent. Finished lenses, like the one now in Galileo's hand, were often sea water green. Once the mold had set and the glass cooled, the lens had to be cut with a diamond, no easy requirement in 15th century Europe. Finally, the lens had to be tirelessly ground to the right proportions. It is here that Galileo first made his mark.

The forty-three-year-old mathematician ground his lens to a degree that allowed him to achieve an unprecedented 30x magnification. In a historic moment that would forever change the scientific community, he lifted his glass upward and identified the irregularities in a space once considered to be perfect. The moon contained craters and mountains, was rough, and was not a perfect sphere. Jupiter had three differently shaped and colored moons. These observations, as well as the teachings of his predecessor, Copernicus, convinced Galileo that the sun, not the earth, was the center of the solar system. This revelation would immortalize Galileo in the minds of scientists to come, but it would also guarantee the condemnation of the Catholic Church.

In the wake of the Counter Reformation, the Church was quick to silence anyone whose ideas threatened the sovereignty of The Holy See. Church inquisitors, the Pope's personal censorship cronies, actively condemned or otherwise disposed of progressive academics. In 1615, Galileo submitted his writings on heliocentrism to the Inquisition, wherein he not only provided evidence for his theories, but went so far as to reinterpret passages of scripture to discount geocentrism. For example, Ecclesiastes 1:5 states "And the sun rises and sets and returns to its place," which, according to Galileo, need not be interpreted literally. To the Inquisition, this looked suspiciously like Protestantism. Galileo was summoned to Rome to appear before the Inquisition. Following his trial, it was determined by the court that heliocentrism was "foolish and absurd in philosophy, and formally heretical since it explicitly contradicts in many places the sense of Holy Scripture." Galileo was sent away with the firm recommendation that he abandon his foolish ideas and commit himself to more constructive work.

Seventeen years later, the mathematician had found a generous patron in the powerful, Florentine banking family of the Medici. In addition to being the official mathematics tutor, Galileo's second Medici patron, Ferdinand Medici, Duke of Duscany, was constantly delighted by the bizarre demonstrations of scientific phenomena conducted by Galileo: massive chunks of ice floating in water, free





pendulums that changed their direction as the earth spun below them, and, not least of all, the astronomical bodies observable through Galileo's now highly developed telescope. With the security that only a wealthy patron can bring, Galileo decided to try once again to circulate his ideas of a sun-centered galaxy.

Seated at a sturdy mahogany table in the richly furnished study of the Palazzo Medici Riccardi, Galileo Galilei added the finishing touches to his novel, *Dialogue Concerning the Two Chief World Systems*. Rather than presenting his theories through direct arguments and equations, Galileo attempted to convey his findings through an accessible, fictional dialogue. Its ideas were new and lofty, but its presentation was simple and, more importantly, fictitious. It is for these reasons that it became immensely popular among the literate middle class, and perhaps the reason that it was initially approved by the Inquisition. However, it did not take long for the novel to enter the hands of more perceptive clergy who recognized it for what it was: a thinly veiled attack on church doctrine.

In the novel, three friends discuss and defend the merits of both heliocentrism and geocentrism. The language is plain, the arguments simplistic, but it is clear that heliocentrism has the upper hand. It is also worth noting that the character responsible for defending the Church's views is named Simplicio (simpleton, in Italian). Whether this is an intentional jab at the Church or a reference to Simplicius of Cilicia, an astronomer and contemporary of Aristotle, is uncertain, but the potential double entendre was not missed by the Church.

In February, 1633, Galileo stood once more before the holy tribunal. Presented with the opportunity to confess, the aged astronomer defended his innocence, insisting that the Dialogue was not intended to purport Copernican ideas. He then denied having held any opinions that were at odds with the geocentric model since his first summons to Rome in 1616. The Church was unconvinced. Under the threat of torture, Galileo confessed that his work could lead one to doubt Church teachings. For this confession he was found "vehemently suspect of heresy" by the court, who then demanded that he henceforth "abjure, curse, and detest" his heretical opinions. The publication of any of his works was banned, and the Dialogue was added to the List of Prohibited Books. Galileo spent the rest of his life under house arrest.

Galileo's life holds, for me, many significant features. On one hand, he is a venerated scientist whose ideas have influenced generations of thinkers and thus has been a source of inspiration for countless brilliant minds. On the other hand, Galileo cowardly insisted he had no intention of opposing church doctrine, until the threat of torture was employed against him. However, as a scientist, the greatest lesson I take from Galileo is this: however complex, disputed, or controversial your discoveries may be, if there is sufficient evidence to support them then it is incumbent upon you to make them accessible to the public. How else can we expect humanity to progress, if not through the intentional effort of our scientists to make knowledge accessible?