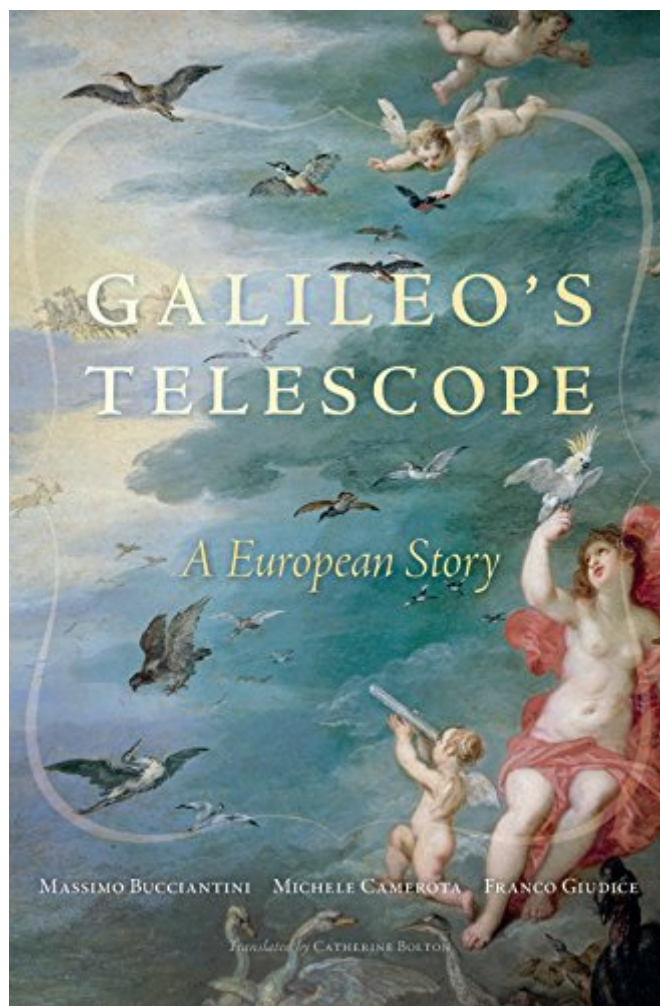


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# Galileo's Telescope



## Synopsis

Between 1608 and 1610 the canopy of the night sky was ripped open by an object created almost by accident: a cylinder with lenses at both ends. Galileo's Telescope tells how this ingenious device evolved into a precision instrument that would transcend the limits of human vision and transform humanity's view of its place in the cosmos.

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## Customer Reviews

As someone interested in the history of science, I found this an enthralling book, providing detailed insights to how Galileo modified the Dutch spyglass, made his seminal observations, and subsequently persuaded his peers of what he saw and their significance. The description of how news of his findings spread -- through Europe and then to the East were very informative. At a time when evidence for human causation of climate change is challenged, the resistance to Galileo's findings has a very modern ring. I wish that the authors had also mentioned Simon Marius, whose work was contemporaneous with Galileo, and who named the moons of Jupiter that have endured

(e.g., Ganymede). But Galileo's interactions with Kepler and other contemporaries are well described. Also useful, as a postscript, is the account of how Galileo deliberately pressed the Vatican's button -- which got him into trouble -- but thank goodness that he did! Highly recommended

As I write this, we have in the past few days gotten pictures of Pluto from the flyby of the New Horizons satellite. They are wonderful, but by now such detailed pictures of distant worlds are fairly commonplace. We used to explore space merely with earth-bound telescopes, and there was a time when even the telescope was a new invention. Telescopes were a sensation in seventeenth-century Europe; think how astonishing it must have been to have had a device that made distant objects look close! Such gadgets had extraordinary military potential, and all the kings wanted them. Galileo, however, took the telescope to the heavens, and changed history. How he did so is the story of *Galileo's Telescope: A European Story* (Harvard University Press) by Massimo Bucchiantini, Michele Camerota, and Franco Giudice, translated by Catherine Bolton. The authors are all professors of the history of science, and have here traced the invention of the telescope and the roundabout ways that Galileo got his observations published, promoted, and accepted by many thinkers (although there was that little problem of their contradicting the Bible). The authors say they are telling a crime story, of how Galileo robbed us of our beliefs that the Earth was central to everything; that's a fine way to describe how dramatic were the changes related here. The idea of using a combination of lenses to make things seem closer had been around for a while, but the glass wasn't fully transparent and the grinding of lenses was crude. Galileo didn't invent the telescope, but he so improved it that many people think he did. What did Galileo get to see? First, he saw the surface of our Moon, and realized that it had mountains and valleys something like our own planet, and it was not the sort of perfect orb the heavens were supposed to contain. The Sun was no more perfect than the Moon, but changeable in that it had spots that played across its surface. The planets like Venus and Jupiter could be seen to be illuminated by the Sun, showing phases just as the Moon showed; they were all just spheres in orbit. When he looked at Jupiter, Galileo saw three (later confirmed to be four) moons. The discovery of Jupiter's moons was to be a special blow against the universe as Earth-centered; those moons were going around with another planet at their center, and there was no reason to think anymore that everything went around the Earth. Galileo was quick to publish his discoveries; just two years after Lipperhey produced his lens tube Galileo published *Sidereus Nuncius*, and it caused a sensation. People didn't even have to read

Latin, or even read at all, to appreciate it. It was not the first illustrated book, but its words were there to discuss the images, and the images were such as had not previously been seen. There were engravings of Galileo's watercolors of the Moon, a view of how many more stars were held in the Pleiades than anyone had ever suspected, and a chronological view of the movements of the moons around Jupiter. The authors show how Galileo not only made the discoveries, and published them, but set out on a traveling campaign to defend them. Some scholars, even the Christian ones, were excited by the new view of the cosmos. Others, like Bonifacio Vannozzi of Pistoia, a papal court secretary, wrote, "To say that the Moon is earthlike, with valleys and hills, is as if to say that there are flocks that graze there and cowherds who cultivate it. We must stand by the Church, which is the enemy of anything new, according to the teachings of St. Paul. The findings of the telescope were so repulsive that some said they were merely optical illusions or hallucinations. The most famous part of Galileo's story, of how he was convicted of heresy in 1633 and was kept under house arrest until he died nine years later, is not covered here. Instead, here is the clear but complicated narrative of what Galileo had done with his singular device. "His discoveries seemed endless," the authors write, "... the havoc he was wreaking could not have been more devastating."

I'm a big reader AND a telescope enthusiast. Yet I couldn't get through this book. The text is ponderous and plodding. I couldn't find the rhythm to it. If there is one, it was probably lost in the translation. Too bad for me! A subject I am interested in and I am a history buff and a reader. When that many clicks are not able to keep me reading, something is wrong.

Fifteenth century Italy was a world of rival principalities and scheming for advancement in courts. Science, such as it was, was practiced by a few people in the ducal courts and colleges for the glorification of their patrons, under the watchful eye of the catholic church. Galileo was Head Professor of Mathematics at the University in Padua when the "spyglass" or telescope, was invented, apparently first by Hans Lipperhey of the Hague in 1608, and slightly later the same year by Jacob Metius, both Dutch spectacle-makers. Galileo, apparently a talented craftsman, immediately devoted himself to perfecting the instrument (increasing magnification from X3 to X20 within a year) and turning his new instruments upon the heavens. He found that the surface of the moon was irregular and mountainous, rather than smooth as thought by the ancients and prescribed by church dogma, that

Jupiter had four planets (moons) revolving about it, that the milky way was actually composed of millions of stars, etc., all of which he quickly published in *Siderus nuncius*. The reaction to *Siderus nuncius* in the courts and colleges of Europe was vigorous and immediate. Some of Galileo's colleagues were angered that their contributions to his development of the telescope were not acknowledged. Many astronomers reported failure to observe these phenomena, while others claimed to have already seen them, and some nonentities attacked Galileo as a means of advancing their careers. Galileo's reaction was to make telescopes and send them to the various important courts in Italy, France and most importantly in Prague, where Johann Kepler, the leading astronomer of the day, was the court astronomer. Galileo carried the day when Kepler published his *Dioptrice* supporting Galileo's findings. Galileo continued to devote his energies to improving his telescopes and studying the sky to accumulate observations, many of which supported Copernicus's model of planets revolving about the sun rather than the official church dogma of planets and the sun rotating about the earth. Then Galileo went on the offensive. He secured the position of Chief Mathematician and Astronomer to the Tuscan court of the Medicis at Florence under very favorable terms. Then he immediately set about arranging a trip to Rome to present his work at the Collegio Romano and to the various Cardinals of the church, helping them to view the heavens through his telescopes. He carried the day with the astronomers and mathematicians, who could not refute what they saw with their own eyes. However, for the catholic church there was too much at stake to tolerate such evidence that contradicted the holy scripture of the church. The Inquisition condemned, 70 years after fact, the work of Copernicus positing that the planets revolved about the sun, which was clearly supported by Galileo's results, and Galileo died under house arrest by the Inquisition in January 1642 in Arcetri, where his tomb remained hidden for a century. The authors provide manuscripts, drawings by Galileo and art from the period to illustrate this fascinating account of the life of the man who, more than any other, forced the world to open its eyes to the sky above us.

It was a gift that was very well received.

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