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Who really invented the telescope

Many people believe that Galileo Galilei was the first astronomer to invent and build the telescope; however, the first telescope was made by Hans Lippershey in the early 1600s. Lippershey was a German-Dutch glass maker, and he managed to reduce the amount of light in his telescope while focusing it. His model inspired other scientists to work on perfecting the telescope. It is easy to point to Hans Lippershey as the inventor of the telescope, but the history of its invention is chaotic and confusing. Historians and scientists today still argue about who invented the telescope. Let's take a look at the telescope and its impact on scientific history. What is the History of the Telescope? The telescope traces back to early makers of eyeglasses and lenses. In the 1400s, glasses were used widely across Europe. These lenses were not powerful, not polished, and not clear. Due to their imperfections, they were not useful for astronomic observation. By the end of the 1500s and early 1600s, lens makers improved their abilities to cut and polish glasses. It was at this time that Hans Lippershey, who made spectacles in the Netherlands, began experimenting with lenses. Lippershey put a mask on his telescope that only allowed a small amount of light to enter his telescope. When he reduced the amount of light and focused it, the images became clear but remained dim. No other telescope makers had done this, and Lippershey's telescope was the beginning of the telescope's evolution. In September of 1608, Lippershey took his telescope to Prince Maurice of Nassau. A week later, Lippershey applied to patent his new device. Other scientists and glass-makers came forward to claim that they had made similar devices; Lippershey was denied his patent because of the claims. The telescope spread across Europe after Lippershey. By the end of May in 1609, the telescope could easily be found and purchased in large cities like Paris. Galileo picked up Lippershey's telescope and began to improve it. Galileo's telescope was the first to be used for space observation. Over time, astronomers began to build telescopes that had more power and clearer images. Thomas Harriot in England managed to build a telescope that could magnify objects six times. Galileo then made a telescope that could magnify objects by eight times. What did the First Telescope Look Like? Early telescopes looked similar. The first telescopes consisted of long tubes with one or several cylindrical sections. The tube could be made of tin, lead, cardboard, and wood held together by copper, cloth, or leather ties and/or glue. Polished lenses and mirrors were placed inside the tubes to magnify images and reflect light. Credit: Museo Galileo, Institute and Museum of the History of Science What Were the Major Problems with Early Telescopes? Galileo's telescope, along with others built during the 1600s, had serious problems. Early telescopes were exceptionally small in size and had a limited viewing range. It was nearly impossible to see objects further away. Earlier telescopes did not have a fixed place for the eye, meaning the images that appeared in the telescope would move out of sight or out of focus. The smaller sizes also led to chromatic aberrations, meaning the telescope could not bring the colors of the object into focus or alignment. Where did the Word Telescope Come From? The word 'telescope' comes from the Italian word telescopio, which appeared in the early 1600s. Telescope appeared in a letter from Frederico Cesi to Galileo in August 1611. Galileo's letters show that he used the term after Cesi. The English form 'telescope' appeared in 1650. We still use this form in English today. Did the Telescope Have a Major Impact on Science? Telescopes have given us significant insight into the workings of the universe, allowing science to progress further. Nicolaus Copernicus argued that the Sun was the center of the Solar System. With the use of the telescope, Galileo realized that the sun was truly at the center. Yet, the telescope did more than convince scientists that the sun was at the center of our Solar System. The telescope has allowed us to observe planets and stars that are millions of miles away from our planet. They have allowed us to see the surface of the moon and the weather patterns of other planets. The telescope has also allowed us to look at nebulae or clouds of dust and gas in space. The increasing power of the telescope gives us a clear understanding of patterns in planetary movements. In fact, Galileo first saw Jupiter's moons and their movements through his telescope, registering these moons as satellites. They were the first objects in space recognized as orbiting another object. Telescopes have allowed us to see into and study the depths of space, but they have also given us the opportunity to examine our own planet. Modern telescopes can detect heat waves, x-rays, and radio waves. Telescopes demonstrate how our planet interacts with others, and they can illustrate the properties of gravity and physics. More recently, telescopes have allowed us to examine galaxies with planetary systems similar to our own. In fact, scientists are currently using telescopes to study planets with similar sizes and compositions to our own. We may be able to pinpoint planets in habitable zones, which are planets with conditions that could sustain life. What Are Some Modern or Well-Known Telescopes? The Hubble Space Telescope is perhaps the most well-known of the modern telescopes. The Hubble is 13.2 meters long and has a 4.2-meter diameter. It launched in 1990, and it has completed more than 1.3 million observations since that launch. Its battery capacity is similar to the capacity of 22 car batteries added together. NASA is currently constructing the James Webb Space Telescope, which should be launched in 2021. The Webb will primarily act as an infrared telescope. The mirror in the Webb is comprised of 18 different segments that fold and adjust. To protect it from the sun, the telescope has a shield with five layers, each the size of a tennis court Celebrating the Telescope! In 2008, a conference was held at the European Space Agency/European Space Research and Technology Center (located in Noordwijk, Netherlands) to celebrate the 400th anniversary of Hans Lippershey's patent for his 'telescope.' Astronomers, historians, and the public were invited to the ESTEC conference center to discuss the history of telescopes, telescope technologies, politics surrounding the telescope, and the future of instrument technologies. Part of the celebration included a visit to the Leiden Museum Boerhaave-National Museum of the History of Science and Medicine. Part of the reception included a dinner cruise that traveled from Katwijk to Leiden on the Rhine river to the Kagerplassen. How Can I Learn More about the Telescope? There are several books that cover the history of astronomy. One is The History of the Telescope, written by Henry King and published by Dover Books. This book is a good start to learn about history, but the history in the book does end around 1950. To supplement Dover's book, Geoff Andersen gives a good account of the telescope in The Telescope: Its History, Technology, and Future (Princeton University Press, 2007). The organization of the book may seem confusing, but Andersen provides credible information. Andersen's writing is also easy to read. For those interested in using a telescope, Terence Dickinson and Adolf Schaller offer an easy guide in NightWatch: A Practical Guide to Viewing the Universe (Firefly Books, 2006). The book includes helpful inserts and diagrams to guide any telescope user. Related Questions We use items every day of our lives without knowing that some of them have origins that took root centuries ago. Whether it's the clock on our living room wall or the engine under the hood of our car, there is some pretty amazing history behind the origin of the objects we rely on. With something as old as the telescope, you can be sure that there is an interesting story behind how this astronomical instrument came to be. Those with a rudimentary understanding of history might claim that it was Galileo Galilei who invented this device. After all, he was just as well known for his inventions as he was for his search of the night sky. But in fact, while Galileo was one to improve the telescope, he was not credited for actually inventing it (per Explaining Science). That honor has been given to another European, who may have invented this star-gazing device after making a chance observation one day in his glass workshop. While there are several stories behind how the telescope came to be, the most settled upon one involves Dutch glassmaker Hans Lippershey in the 17th century (via Space.com). Glassmakers had been experimenting with glass lenses inside of tubes since the early 1400s. But as these lenses were not very powerful and remained unpolished, they weren't great at magnification. Even though they could make distant objects appear bigger, they weren't suitable for stargazing by a long shot. By the end of the 16th century, however, the lenses were becoming much better made and more suitable for magnification. One day in 1608, Lippershey was in his shop working when he began to notice that two young boys were playing with some of the lenses. The story goes, according to Space, that the boys put two lenses together and were able to make a distant weathervane look bigger. This inspired Lippershey to begin experimenting with different lenses, before finally setting a concave eyepiece paired with a convex objective lens. Nine Planets tells us that Lippershey "put a mask on his telescope that only allowed a small amount of light to enter. When he reduced the amount of light and focused it, the images became clear but remained dim." He was the first to do this, thus getting credit as the inventor who kickstarted the evolution of the telescope. When he felt comfortable with his prototype, Hans Lippershey took his telescope to the Prince of Nassau (via Nine Planets). Lippershey then applied for a patent for his invention. According to Britannica, he applied to the States-General for either a 30-year patent or an annual pension, the condition being that he would not share his discoveries with any foreign leaders. But two other inventors came forward and claimed that they had also invented the same style of the telescope, which resulted in the patent being denied. The States-General reasoned that not only was it impossible to determine who had developed it first, but that too many individuals already knew about it, and it was also terribly easy to replicate. The States-General did give Lippershey 900 florins for his telescope, under the condition that it be transformed into a binocular device. By the end of 1608, King Henry IV of France had been given one of Lippershey's new devices. This caught the attention of French astronomer Jacques Boveador, who penned a letter to his colleague Galileo Galilei about the instrument. Belvedere discussed the possibilities of such a device being further modified to study the night sky (via The Biography). Galileo was able to produce his own, and it's thought that his telescope was the first one to observe the heavens. Over the next several decades, he and other astronomers continued to improve upon Lippershey's telescope, increasing the magnification and improving the clarity. So, who else laid claim to the telescope when Hans Lippershey was applying for his patent? Fellow glassmaker Zacharias Jansen has been credited with this invention as well. Jansen and Lippershey were from the same town in the Netherlands and were known to one another. Janson claimed that Lippershey stole his idea, though this was never proven, according to Space.com. Jansen was credited for using glass lenses in a similar manner, however. According to Live Science, he is considered the inventor of the microscope. To make things even more confusing for the States-General, a third person came forward mere weeks after Lippershey filed for his patent. This man, Jacob Metius, was an inventor from the Dutch city of Alkmaar and the brother of astronomer Adriaan Adriaanszoon. While he and Lippershey's patents were both denied, Metius was given a small amount of money from the government for his submission, Space.com notes.

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