

# Italian Inventors

## LEONARDO DA VINCI



Leonardo da Vinci was born on April 15, 1452, near the small Tuscan hill town of Vinci. He was one of the greatest painters of the Italian Renaissance. His paintings of the Mona Lisa and The Last Supper rank among the most famous paintings in the world.

Leonardo, though trained to be a painter, became one of the most versatile geniuses in history. His interests and achievements covered many fields that are usually considered scientific specialties. He studied Anatomy, Astronomy, Botany, Geology, Mathematics, Optics, Mechanics, Physiology, Zoology and Paleontology.

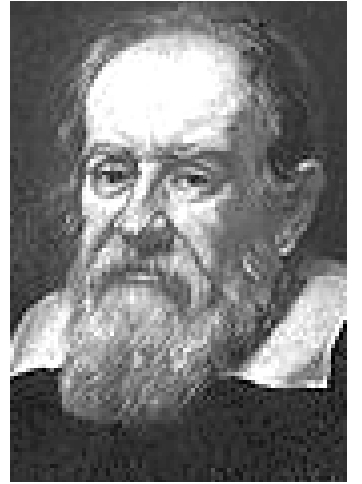
Leonardo explored an amazing number of areas of human knowledge and is often called a universal genius. He recorded his scientific observations and his ideas for inventions in notebooks. Many of the ideas and designs Leonardo preserved in his notebooks were far ahead of their time.

Written in a peculiar right-to-left script, Leonardo's manuscripts can be read with a mirror. In 1965 in Madrid, two previously unknown notebooks belonging to Leonardo were found. His manuscripts reveal that Leonardo explored virtually every field of science. They not only contain solutions to practical problems of the day, such as the grinding of lenses, and the construction of canals and fortifications, but they also envision such future possibilities as flying machines and automation.

Leonardo's observations and experiments into the working of nature include the stratification of rocks, the flow of water, the growth of plants, and the action of light. The mechanical devices that he sketched and described were also concerned with the transmission of energy. His solitary investigations took him from surface to structure, from catching the exact appearance of things in nature to visually analyzing how they function.

Leonardo da Vinci's art and science are not separate, but belong to the same lifelong pursuit of knowledge. His paintings, drawings, and manuscripts show that he was the foremost creative mind of his time. Leonardo died on May 2, 1519

## GALILEO GALILEI



Galileo Galilei was born in Pisa, Italy on February 15, 1564. He has been called the founder of modern experimental science and famous for his studies of the laws of falling bodies and the laws of motion. Galileo was the first person to use a telescope to make important discoveries about the planets and the stars in the Milky Way.

In the late 1580s, he gained his first public notice with his new Hydrostatic Balance, an instrument used to find the specific gravity of objects by weighing them in water. In 1592, he was appointed Professor of Mathematics at the University of Padua, where he spent the next 18 years. During this time, he became convinced of the truth of the Copernican Theory that all planets, including the earth, revolve around the sun. In 1609, using his knowledge of light and lenses, he built his first telescope and turned it to the sky. He made his most sensational discovery when he discovered four moons circling Jupiter.

Galileo also pursued research on motion. He worked to develop a new theory of motion consistent with a moving earth. Among the most important results of this search were the law of the pendulum and the law of freely falling bodies. His law of falling bodies states that all objects fall at the same speed, regardless of their mass.

In 1632, Galileo published his first scientific masterpiece, the "Dialogue Concerning the Two Chief World Systems". In this work, he compared the Ptolemaic-Aristotelian Theory to the Copernican Theory to show that the Copernican system was logically superior. His second scientific masterpiece, the Discourse on Two New Sciences, was published in 1638.

Some historians maintain that Galileo's real originality lay in the way he approached scientific problems. First, he reduced those problems to very simple terms on the basis of everyday experience and common sense logic. Then he analyzed and resolved them according to simple mathematical descriptions. The success with which he applied this technique to the analysis of physics, especially the physics of motion, opened the way for the development of modern mathematical physics.

Galileo's main achievement is that he established for all time the need and the right of scientists to question. Above all, he insisted on searching for the truth. He was still searching when he died on January 8, 1642.

## GUGLIELMO MARCONI



Guglielmo Marconi, inventor of wireless telegraphy, was born in Bologna, Italy on April 25, 1874. He was educated at home by private teachers. Guglielmo spent a great deal of his free time reading in his library at home.

By the time he was 12 years old, he was working with wires and batteries. When he was about 16 years old, he began to study electricity under the guidance of a Physics professor.

Marconi read about Heinrich Hertz who had produced certain kinds of electric waves by means of electric sparks. They were called Hertzian waves. (They are now called radio waves.)

Guglielmo thought it might be possible to use these radio waves to send wireless dot-and-dash messages like those used in the telegraph. He began to experiment in order to work out his ideas. Within a year, he was successfully sending weak dot-and-dash signals to a nearby receiver. Before long, he was able to send stronger signals that could be received eight miles away.

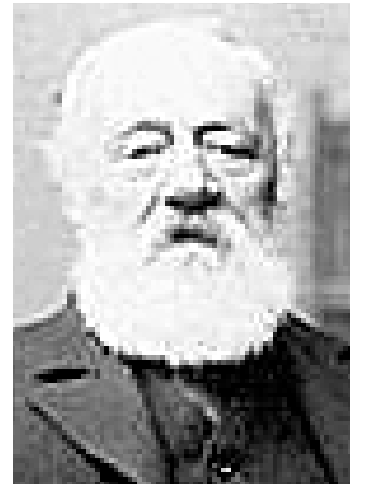
He recognized that he had a useful invention. He thought that its greatest use would probably be in communicating with ships at sea. He went to England to perfect his wireless.

By 1899, Marconi was able to send messages across the English Channel to France, about 28 miles away. He believed he also could set up wireless communication across the Atlantic Ocean. He arrived in Newfoundland on December 6, 1901. Six days later, on December 12, 1901, Marconi received a signal in dot-and-dash code sent from the station in England, 3,000 miles away. Within a few years, the usefulness of wireless communication from ships at sea was also proved.

Many countries showered honors on Marconi. In 1909, he won the Nobel Prize in Physics for his invention of the wireless.

Marconi continued improving his wireless, which had come to be called radio. By means of radio, his own invention, the world learned of his death in Rome on July 20, 1937.

## ANTONIO MEUCCI



Antonio Meucci was born in Florence in 1808. When he was a young man, he emigrated from Florence to Havana, Cuba, where he became employed as Superintendent of Mechanics at the Tacon Opera House.

While experimenting with the new phenomenon of electricity in 1849, he discovered that sound could be transmitted by electric wires. He then began his experiments on the transmission of the human voice.

Meucci emigrated again, this time to the United States. He settled in Staten Island, New York, where his home still stands. (The Garibaldi-Meucci Museum).

By 1857, he had developed a working model of the telephone and in 1871 obtained a provisional patent from the U. S. Patent Office. In the years that followed, he was stricken by a series of disasters. As a result, he was unable to finance the development of his invention or to renew the costly patent.

When Alexander Graham Bell obtained his patent in 1876, Meucci, his friends and the Globe Telephone Company began a legal battle with Bell Telephone. An account of the life and inventions of Meucci, with his affidavits, his memorandum book, the designs and the telephone instruments recently reconstructed, were provided to the Secretary of the State of New York.

In a judgment in January, 1886, the Secretary declared that there was sufficient proofs to establish Meucci's priority in the invention of the telephone and he sent the case to the courts. Meucci's testimony lasted thirty-eight days and formed a volume of 172 pages. He explained how through his metallic diaphragm, the human voice was transmitted by means of the electromagnetic current created, not by vibrations of the air.

Finally in July, 1887, the court handed down a decision that went against Meucci. Though the case was appealed, it was postponed from year to year and finally died a lingering death in 1896.

Antonio Meucci died unrecognized on October 18, 1889. He is interred on the grounds of his home in Staten Island, New York.



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