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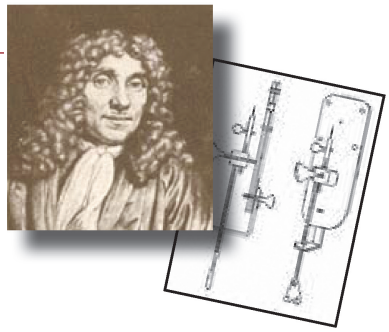
MicroscopyPioneers

Pioneers in Optics: Leonardo da Vinci



From the website Molecular Expressions created by the late Michael Davidson and now maintained by Eric Clark, National Magnetic Field Laboratory, Florida State University, Tallahassee, FL 32306

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Leonardo da Vinci (1452-1519).

Leonardo da Vinci was a painter, sculptor, architect, engineer, scientist, and genius who best represents the ideals of the Renaissance period. He was one of the greatest painters of all times. *The Last Supper* and the *Mona Lisa* are two of his best-known paintings.

Leonardo was born in Vinci, Italy, in 1452. His early education was at home where he studied reading, writing, and arithmetic. When he was 20 years old he became an apprentice in the studio of Andrea Verrocchio learning painting and sculpture and acquiring technical and mechanical skills. His highly inventive style and technical skills were quickly recognized, and he eventually began to work for himself in Florence as a painter and also sketching pumps, military weapons, and other machines. Leonardo was a great engineer and inventor who designed buildings, bridges, canals, forts, and war machines. He was also fascinated by birds and flying and drew designs of fantastic flying machines. Leonardo kept huge notebooks of his fantastic designs, sketches, and ideas.

In his notebooks, Leonardo wrote using "mirror writing", writing backwards from right to left. In order to read this type of writing, you must place a mirror beside it and read the reversed image in the mirror. No one knows why Leonardo wrote this way, but some believe he was trying to avoid theft of his ideas. Others point out that he was left-handed, which made it easier for him to write from right to left.

In 1482, Leonardo began to work for the Duke of Milan as a painter and engineer. In this capacity he not only painted, but designed buildings and hydraulic and mechanical systems. It was during this time that Leonardo developed a fascination with geometry. He particularly enjoyed finding mechanical solutions to geometric problems.

Leonardo was also intrigued with the study of optics and conducted extensive investigations. He made drawings about the nature of light, reflections, and shadows. Even though it was not until over 100 years later that the first telescope was invented by Hans Lippershey, Leonardo realized the possibility of using lenses and mirrors to view heavenly bodies. In his notebooks he writes of "...making glasses to see the Moon enlarged ... and ... in order to observe the nature of the planets, open the roof and bring the image of a single planet onto the base of a concave mirror. The image of the planet reflected by the base will show the surface of the planet much magnified."

In 1499, the French armies defeated the Duke of Milan, and Leonardo returned to Florence to become the chief architect and engineer for the ruling Borgia family. He worked on plans to divert the River Arno and to build a canal to give Florence access to the sea. During this period, engineering and scientific work was given precedence over his painting. He was involved in studying and working in hydraulics, anatomy, mechanics, mathematics, and optics.

The reputation of Leonardo's genius became known throughout Europe. In 1516, he was invited to France by the king to become his head painter, architect, and mechanic. Leonardo was allowed to work on any project he wished. He spent much of this time writing, arranging, and editing his studies. He did not paint much but finished his paintings of Saint John the Baptist, Mona Lisa, and the Virgin and Child with Saint Anne. Leonardo died in 1519 and was buried in the Church of Saint Valentine at Amboise, France.

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