

# The History of Microscopes

WICROSCOBES



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# The History of the Microscope



A microscope is an instrument used for viewing objects that are too small to be seen easily by the naked eye.

# The History of the Microscope

Important terms to review 😊



naked eye



4x magnification



6x magnification



8x magnification



10x magnification



20x magnification

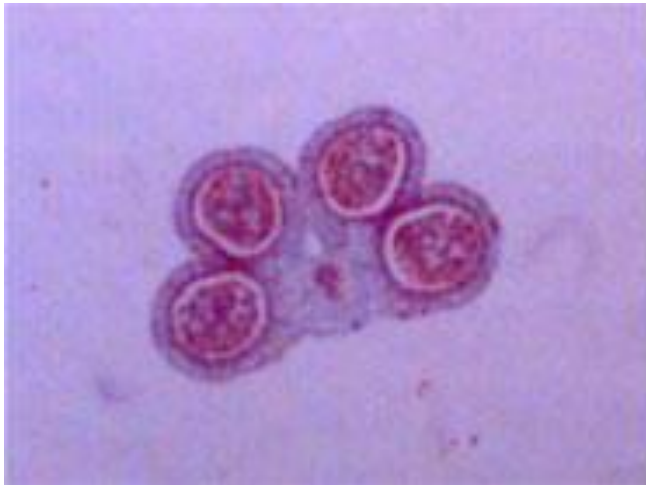
**Magnification** is how much an image is enlarged under a microscope.

# The History of the Microscope

Important terms to review 😊

**Resolution**: the amount of detail you can see in an image. You can enlarge a photograph indefinitely using more powerful lenses, but the image will blur together and be unreadable.

*Therefore, increasing the magnification will not improve the resolution. This is also known as the resolving power.*

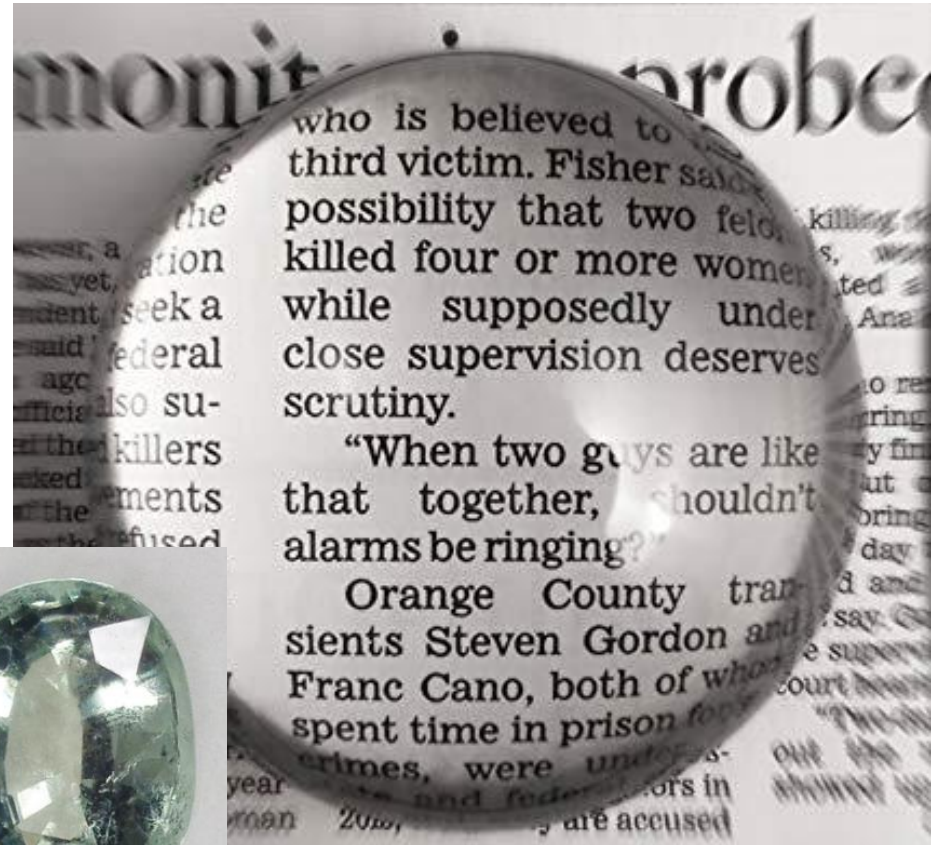




# The History of the Microscope

**Circa 1000AD** – The first vision aid was called a reading stone.

The inventor is unknown. It was a Beryl stone, which is a crystal sphere that magnifies when laid on top of reading materials.



# The History of the Microscope

THE HISTORY OF THE MICROSCOPE



**Circa 1284** – Italian, Salvi-  
no D'Armato, is credited with inventing the first wearable eyeglasses.



# The History of the Microscope

**1590** – Two Dutch eye glass makers, Zaccharias Janssen and son Hans Janssen, experimented with multiple lenses placed in a tube. The Janssens observed that objects in front of the tube appeared greatly enlarged, creating both the prototype of the compound microscope and the telescope.



The First  
Compound  
Microscope  
(circa 1595)

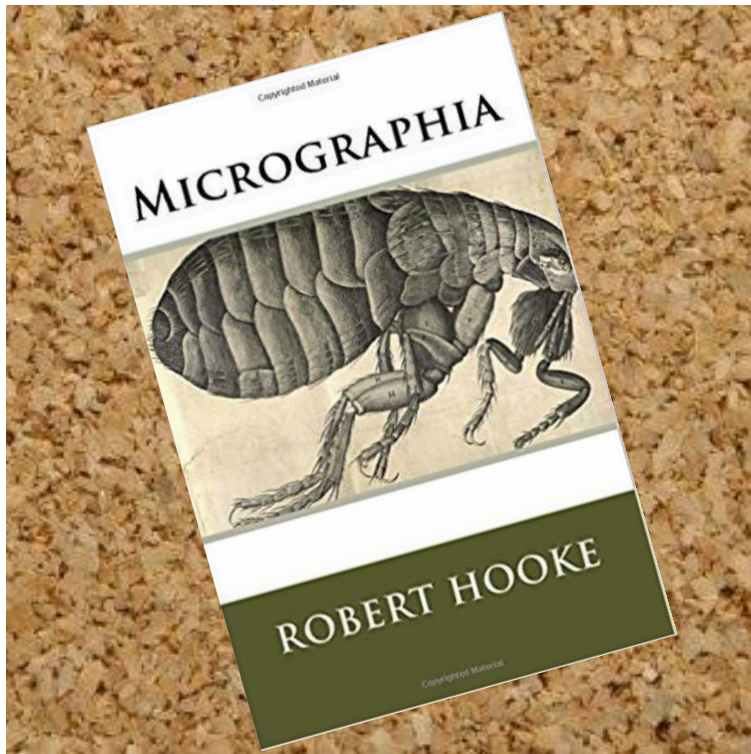
# The History of the Microscope



**1609** – In 1609, Galileo Galilei perfected the Janssens' compound microscope. Galileo named his device an *occholino*, which means, "little eye."



# The History of the Microscope



**1665** – English physicist, Robert Hooke is most known for his published work, **Micrographia**, which described his microscope studies. While looking at magnified cork, Hooke comes up with the terms, “pore” and “cell”.

# The History of the Microscope

**1674** – Anton van Leeuwenhoek built a simple microscope with only one lens to examine blood, yeast, insects and many other tiny objects. Leeuwenhoek was the first person to describe bacteria. He also invented new methods for grinding and polishing microscope lenses that increased magnification up to 270 diameters, the best available lenses at that time.



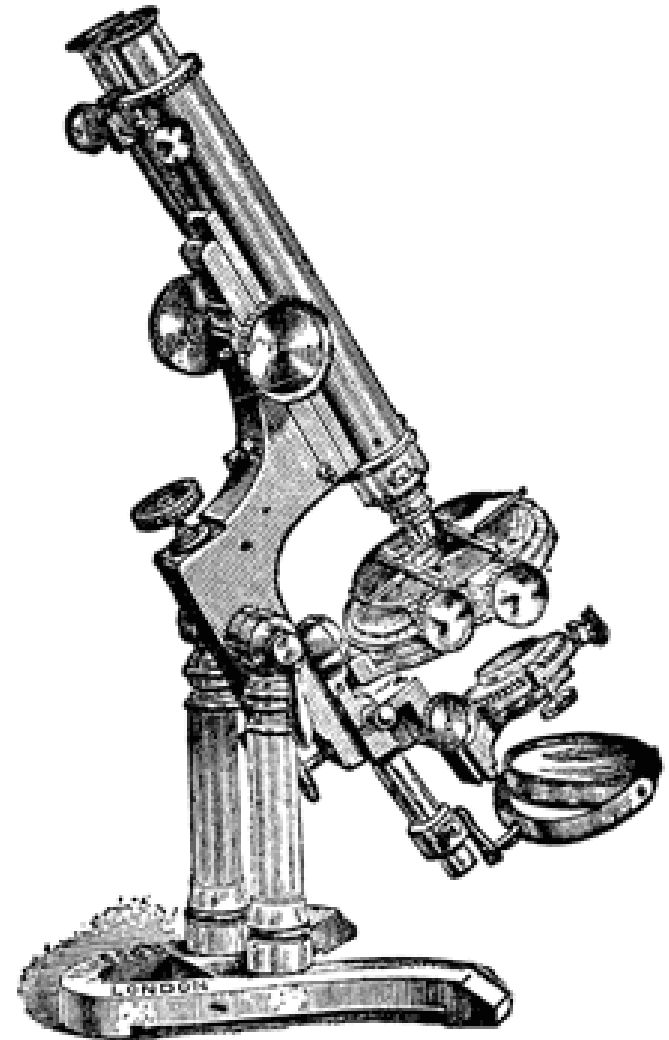
# The History of the Microscope

**18th century** – Technical innovations improved microscopes, leading to microscopy becoming popular among scientists. Lenses combining two types of glass reduced the "**chromatic effect**" the disturbing halos resulting from differences in refraction of light.



# The History of the Microscope

**1830** – Joseph Jackson Lister reduces spherical aberration or the "chromatic effect" by showing that several weak lenses used together at certain distances gave good magnification without blurring the image. This was the prototype for the compound microscope.





# The History of the Microscope

**1872** – Ernst Abbe, then research director of the Zeiss Optical Works, wrote a mathematical formula called the "Abbe Sine Condition". His formula provided calculations that allowed for the maximum resolution in microscopes possible.



# The History of the Microscope



Richard Adolph Zsigmondy  
(1865-1929)

**1903** – Richard Zsigmondy developed the ultra microscope that could study objects below the wavelength of light. He won the Nobel Prize in Chemistry in 1925.

# The History of the Microscope

**1931** – Ernst Ruska co-invented the electron microscope and won the Nobel Prize in Physics in 1986. An electron microscope depends on electrons rather than light to view an object. Electron microscopes make it possible to view objects as small as the diameter of an atom.



Siemens Elmiskop IA  
Transmission  
Electron Microscope  
(circa 1964)

# The History of the Microscope

**1932** – Frits Zernike invented the phase-contrast microscope that allowed for the study of colorless and transparent biological materials for which he won the Nobel Prize in Physics in 1953.

Transmitted Light Contrast Modes

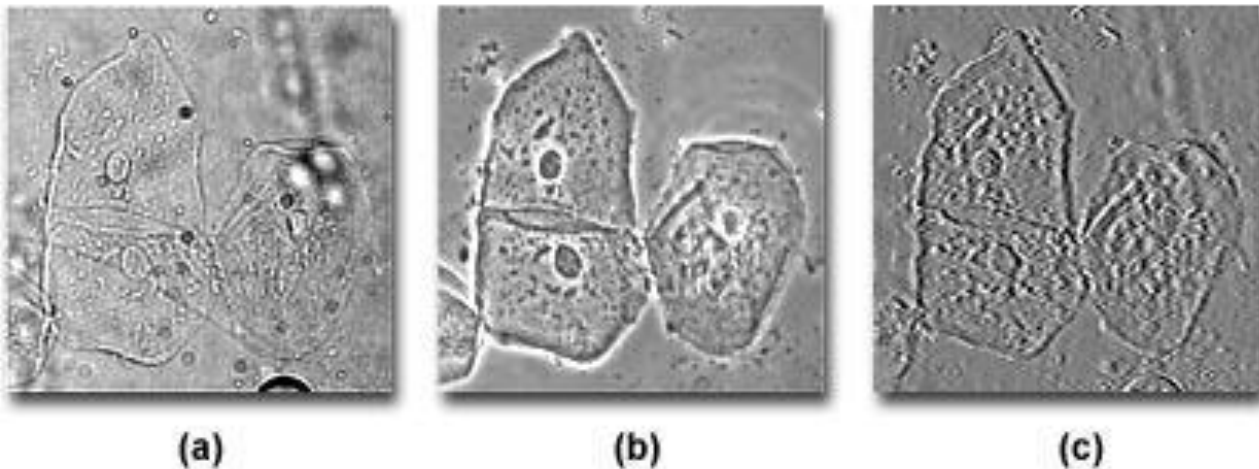


Figure 2



# The History of the Microscope



**1981** – Gerd Binnig and Heinrich Rohrer invented the scanning tunneling microscope that gives three-dimensional images of objects down to the atomic level. Binnig and Rohrer won the Nobel Prize in Physics in 1986. The powerful scanning tunneling microscope is the strongest microscope to date.

# The History of the Microscope

**1985** – The Atomic Force Microscope (AFM) was invented by IBM scientists, Gerd Binnig, Calvin Quate, and Christoph Gerber.

AFM can image almost any surface, including ceramic, glass, polymers, composites, and biological samples.



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Neither is there any creature that is not manifest in his sight: but all things *are* naked and opened unto the eyes of him with whom we have to do.

**Hebrews 4:13**

**HEBREWS 4:13**

the eyes of him with whom we have to do.

# References

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