

# Eyeglasses



## Yesterday and Today

*Every morning millions of people reach for their eyeglasses before they even get out of bed. With their weak vision corrected and the world back in focus, the day can begin. Oddly enough, the inventors and history of eyeglasses still remain somewhat of a mystery.*

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Photographs: Museum of Ophthalmology, San Francisco



A very large percent of eyes worldwide depend on eyeglasses. Yet, no one knows exactly when or where eyeglasses were invented. Or, for that matter, who invented them.

Although their origin is shrouded in mystery, lenses and their enlarging properties were known in ancient times. The Roman statesman, orator, and tragedy writer, Seneca (4 BC – AD 65) wrote that, "thin, muddled writing looks larger and clearer through a ball full of water". The historian Pliny the Younger (AD 62 – 113) told us in his letters, that the blue-eyed Emperor Nero watched games at the Circus Maximus through an emerald lens.

Around AD 1000, in his treatise on optics, the Egyptian physicist Alhazen mentioned magnifying glasses, but the first to exalt the magnifying function of spectacles was the

English philosopher and scientist Roger Bacon, (ca. 1214-1294) who had been greatly influenced by Alhazen. In his *Opus Majus* (1266) Bacon asserted that segments of glass can enlarge the characters of writing, rendering them legible even for people with weak sight. To test his theory, he sent French-born Clement IV, pope from 1265 to 1268, some magnifying lenses for reading.

Perhaps because of this, Bacon is often considered to be the inventor of eyeglass lenses. However, another contender is the Florentine naturalist and physicist Salvino d'Armati whose tombstone reads: "Here lies Salvino d'Armati of Florence, inventor of spectacles. May God pardon his sins, A.D. 1317." D'Armati had impaired his vision performing light-refraction experiments and sought a personal remedy. In 1280 he and Alessandro da Spina, a

Dominican monk at the Convent of St. Catherine in Pisa, found a way to enlarge objects by using two pieces of glass having a specific thickness and curve. A few years later da Spina is said to have invented eyeglass frames, although many scholars insist that eyeglasses originated in China and were brought back to Venice by Marco Polo.

The earliest surviving documents about making eyeglass lenses were printed in Venice in 1284. These regulations for the crystal workers guild state that *lapides ad legendum*, or magnifying glasses, must be made of rock crystal, not inexpensive glass. Another Venetian document, dated June 15, 1301, mentions *vitreis ab oculis ad legendum*, or reading glasses, for the first time. Thus, even if we can't put a face on the inventor of eyeglasses, their first European craftsmen lived in Venice.



Like many medieval inventions, eyeglasses were greeted with suspicion at first. Dominican friars played a decisive role in the dissemination of eyeglasses, so vital to their daily work as scribes. The Franciscan Order, already widespread throughout Europe, also made spectacles and disseminated the art outside Italy. The earliest record of spectacle making outside Italy is a Nuremberg town council decree passed in 1478.

Naturally, the invention of the printing press, the translation and the circulation of the Bible and of works by ancient Greek and Roman writers, and the foundation of numerous universities greatly stimulated the demand for spectacles. Wearing eyeglasses, however, remained the privilege of a few: mostly clerics and scholars. Halfway through the fifteenth century, the eyeglasses most commonly



16th Century painting showing eyeglasses

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found had bi-convex lenses useful for hyperopia (long-sightedness). Lenses correcting myopia (short-sightedness) came along a few decades later. Tired of having to change his glasses, in 1752 American statesman, diplomat, inventor and typographer, Benjamin Franklin broke the lenses for distant and near vision in half and welded the split parts together in a metallic frame. Bifocals were born.

Frames developed slowly. Not until the 18th century, or 450 years after their invention, did eyeglasses have side-arms. The first ones were short and pressed hard against the temples. The invention of frames, as we wear them today fitting over our ears, is attributed to the English optician, Sir Edward Scarlett in the early 1700s or to a French optician and mirror maker named Thomin in 1746.

In the second half of the 18th century it was felt that short-sightedness was a defect to be disguised: it was a disgrace to need glasses. They were no longer worn; instead, they were held up to the eyes only when absolutely necessary. They were used exclusively by the upper classes because if



Double eyeglass case, 17th Century, Italy



Folding spectacles made from brass and horn, Chinese, c. 1790



you were already using your hands to hold glasses, how could you do menial work? For vanity's sake, lenses were hidden in fans, sewing kits, and *necessaires* by women and in snuff boxes, ear trumpets, and walking stick handles by men. In the nineteenth century, monocles and pince-nez (eyeglasses with nose clips) became popular.

Eyeglasses continued to be made by artisans until 1878 when Angelo and Leone Frescura and their partner, Giovanni Lozza, opened their first factory in Calalzo di Cadore, an out-of-the-way place in the mountains of the Veneto, Italy's most northeastern region. Still one of Italy's important industries, more than 80 percent of the eyeglasses manufactured in Italy



Frame fitting chart, c. 1900



Trade cards for Spencer Optical Company, New York, c. 1890



Monoculars with additional functions

continue to be made here. Nevertheless, Greg Mankevich of the Optical Industry Association in Falls Church, Virginia, just outside Washington D.C., confirmed that the largest exporter of eyeglass frames worldwide is Hong Kong. The United States is the top importer, with 90 percent of the frames bought there manufactured overseas.

Today there are many museums which document the history of eyeglasses. The most extensive ones, with over two thousand items each, are the Carl Zeiss museums in Germany; the Wellcome Historical Medical Museum in London's Science Museum; Pierre Marly's collection in Paris; the Musei dell'Occhiale in Italy; and the American Academy of Ophthalmology in San Francisco ■



Chinese eyeglasses dating to the 18th - 19th Century