The History of Spectacles

We generally take for granted one of the world’s most important inventions - spectacles. Imagine what life would be like not being able to see images clearly or sharply...

According to the January 11, 1999 Newsweek Magazine, reading glasses are one of the most important inventions of the past 2000 years. They developed because of the work of artisans, like glassmakers, jewelers and clockmakers, along with some of the most brilliant scientific minds over the centuries. According to Dr. J. William Rosenthal, "Philosophers, monks, mathematicians, physicists, microscopists, astronomers, and chemists all played vital roles in developing this instrument."

No one really knows about the early history of image magnification. In ancient times, someone noticed that convex-shaped glass magnified images. Sometime between the year 1000 and 1250 crude technology began to develop regarding reading stones (simple magnifiers). English Franciscan Friar Roger Bacon (1220-1292), in his 1268 'Opus Majus', noted that letters could be seen better and larger when viewed through less than half a sphere of glass. Bacon's experiments confirmed the principle of the convex (converging) lens, described by Alhazen (965-1038), "Father of modern optics", Arabian mathematician, optician and astronomer at Cairo, and even earlier by the Greeks. Bacon recognized that this could assist weak eyes or the vision of aged persons.

Early recorded evidence demonstrates that glasses first appeared in Pisa, Italy about the year 1286. Technically, they were formed from two primitive convex shaped glass/crystal stones. Each was surrounded by a frame and given a handle. These were then connected together through the ends of their handles by a rivet. They were not really an invention per se but instead a bright idea or “adaptation” of something used earlier - the simple glass stone magnifier. Essentially someone took two existing mounted stones and connected them with a rivet. Most likely, this first pair of glasses were invented by a lay person who wanted to keep the process a secret in order to make a profit. This individual was a true visionary (no pun intended). Two monks from the St. Catherine's Monastery, Giordano da Rivalto and Alessandro della Spina, provide the earliest (primary source) documentation to support this fact. On Feb.23, 1306, Giordano mentioned them by stating in a sermon "it is not yet twenty years since there was found the art of making eyeglasses which make for good vision, one of the best arts and most necessary that the world has." He coined the word "Occhiale" (eyeglasses) and its use began to spread throughout Italy and Europe. Friar Spina's 1313 obituary notice mentions, "when somebody else was the first to invent eyeglasses and was unwilling to communicate the invention to others, all by himself he made them and good-naturedly shared them with everybody." Salvino D'Armato Degli Armati of Florence was at one time thought to be the inventor of eyeglasses but this claim has been proven to be totally false. It is not surprising that spectacles would receive a major impetus for their future development in regions where other glass objects were being produced. At that time Venice, Italy (the island of Murano specifically) was one of the most advanced centers for the medieval glass industry, its guild of crystal workers officially created in November 1284. In one of the guild's earliest regulations adopted in April 1300, the organization adopted a term for the discs for the eyes ("roidi da occhi") for the first time.

it was definitely the city of Florence that by the middle of the fifteenth century led in innovation, production, sale, and spread of spectacles within and outside Italy as attested by documents already or soon to be published. In particular, Published evidence in the form of letters of the dukes of Milan, Francesco and Galeazzo Maria Sforza, dated 1462 and 1466 respectively, reveal the first detailed information about spectacles since their invention; namely, 1. Florence was producing in large quantities not only convex lenses for presbyopes (a condition with onset usually after the age of forty, when the lens loses its elasticity and muscles assisting in changing the shape of the lens in order to make near vision possible, loses tone) but also concave (diverging) lenses for myopes (i.e., about a half century before the latter were thought to have been developed); 2. Florence had become the leading manufacturer of readily available and affordable good-quality spectacles; 3. Florentine spectacle makers were well aware of the fact that visual acuity declines gradually after the age of thirty, and were constructing lenses progressively graded in five-year strengths for hyperopes (far sighted persons) or presbyopes and in two strengths for myopes (near
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sighted persons), practically prescription lenses; 4. The dukes of Milan were ordering prestigious Florentine glasses by the hundreds to give them away as gifts to their courtiers, the first record of such a phenomenon in the literature. The massive documentation available only in Florence for this early period has revealed the name of fifty-two spectacle makers between 1413 and 1562 and the location of their shops. The large numbers of spectacles circulating in northwest Europe (especially London) from the 14th century were being mass produced in the Low Countries. They were then manufactured in England beginning in the 15th century. Other centers of production like Germany, France, and Netherlands began to appear more frequently in the sources only by the sixteenth century but they never produced anything near the quantity of the Florentine documentation until well into the seventeenth century. The documents from Florence and other places will be discussed along with archeological evidence recently discovered in various digs in Europe in the forthcoming book, "Renaissance Vision from Spectacles to Telescopes," by Vincent Ilardi.

Translations of the two key 1460’s letters this period of time, spectacles were both cheap and plentiful. Ordinary “run-of-the-mill” spectacles cost the buyer just 2 or 3 soldi (shillings). Middle priced ones were selling for 6 to 18 soldi. The finest examples with quality crystal/glass lenses and gold or silver frames were priced at 1 ducat (the equivalent of 82 soldi). So who could afford them? As an example, a mason from Florence in the 15th century made 17 soldi per day so multiple pairs were frequently ordered. They were not the expensive vision aids of the clergy, the wealthy, and intellectuals, but instead were extensively used by artisans as well. Almost everyone over forty had to have recourse to them without eliminating entirely the need for magnifying lenses and concave mirrors for close work. In fact, documents show that by the end of the 14th century thousands of spectacles were being exported from country to country throughout all of Europe.

The oldest known pictorial representation of eyeglasses is a fresco in the Chapter House of the Dominican Monastery attached to the Basilica of San Niccolò in Treviso. It was painted by Tommaso da Modena (1325-1379) in 1352 and shows Cardinal Hugh of Provence (1200-63) wearing a pair of rivet spectacles. What makes this painting interesting is the fact that the Cardinal died before glasses were invented but the painter added spectacles to his fresco as a sign of old age and scholarship. Domenico Ghirlandajo included spectacles in his painting of St. Jerome at his desk in 1480 as a symbol of scholarship. For this specific reason and since he was the first person to translate the bible into Latin, St. Jerome (340 - 420 A.D.) was adopted as the patron saint of scholars……and by the French as the patron saint of spectacle-makers. The earliest glasses discovered thus far have been an incomplete pair of rivet spectacles found under the floorboards of the nun’s choir-stalls during the 1953 renovations to Kloster Wienhausen in northern Germany. Other similar finds dating to the early 15th century have since been made at a former trash site in Freiburg, Germany (two very early pair) and in London (both the “Trig Lane” spectacles and the “Swan Stairs” spectacles). In the Netherlands, in 1986, a nearly complete pair was unearthed in Windesheim, and another was found in 2001 in Bergen op Zoom.

The 15th century marks a crucial time in the development of spectacles. By the time of Johann Gutenberg’s invention of the printing press around 1450, glasses were already used by artisans as well as monks and other religious scholars. Then once books were made available to everyone, the demand and subsequent popularity of spectacles rose dramatically. By the end of the 15th century, spectacle peddlers who were selling glasses was a common sight on the streets of Western Europe. People often rummaged through baskets filled with German metal and leather spectacles in an effort to improve their vision. The purchaser tried on several pair and finally selected the one of his preference. This demand increased exponentially after 1665, when the first newspaper, the London Gazette, appeared. All classes of Spanish people thought that wearing spectacles made them appear more dignified and important. The possession of Florentine glasses was also considered a status symbol. After all, early ones had been the prized possessions of churchmen, wealthy scholars, artisans, and high-class individuals of the medieval world. As a result, people in Spain, Italy, and even China regarded eyeglasses as a sign of superior intelligence and nobility. In the Far East, spectacles had a different development. They were brought in by Western European merchants and missionaries in the early 15th century. Everything was by trial and error and the larger the spectacle the more influential the man since they reflected social status more than a need for vision correction. In Asia, these eyeglasses were attached to the ears by loops of cord; a concept
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originally noted around 1500 in Spain and called threaded (thread loop) spectacles. Occasionally weights were applied to the end of the cords which then hung over the back of the ears. In China, tea-colored sunglasses were introduced and used to treat conjunctivitis. This was a "cool mass when placed near the eyes" and therefore was soothing to the wearer. They were large and rested on the cheeks because of the facial anatomy of the Chinese. Though roughly made, early spectacles were full of charm and rapidly became a symbol of wisdom and learning. Later glasses quickly became more technically sophisticated. One of the most important industries, the German spectacles industry, was formulated in 1535 with the issuance of regulations of the Nuremberg spectacle makers' guild. In London in 1629, King Charles I granted a charter incorporating the Worshipful Company of Spectacle Makers. Unfortunately all of their earliest records were destroyed in the Great Fire of London in 1666 except for that charter. During most of the 17th century, Germany remained the center of spectacle making. Germans made the finest frames while the Italians made the highest quality lenses. The early lenses were still cloudy until manufacturing developed and flint was added to make the glass clearer. Genuine, original pre-1700 spectacles are exceedingly rare today and are highly treasured by museums and collectors alike.

After supplies gave out in Europe and Russia, rock (quartz, beryl, or pebble) crystal, mined in Brazil and Argentina, was used because this hard material was more durable than regular glass. Craftsmanship and great skill were required to make each individual lens. Once the lenses were ground and polished, they were fitted into the frames. All early lenses were positive or convex and spherical. On the other hand, concave lenses for the nearsighted came into use in Florence in the middle of the 15th century. During the 17th century tinted lenses first became popular. Round lenses were almost universal until the end of the 18th century when oval lenses became fashionable. Frames went through a similar evaluation and evolution. The earliest frames were made of wood, horn, or bone. Leather frames had a relatively short life span from the 16th to the middle of the 18th century. Few have survived to present day time and those are highly sought after. The first frames were for round lenses, followed by oval, and eventually rectangular ones became popular in the mid-1830's. Some materials for later frames included brass, tortoiseshell from the hawksbill turtle, baleen, steel, silver, and gold. The cases also were often very finely crafted. The oldest existing spectacle case in the world was found in 1982 in Freiburg, Germany and it probably dates to the 14th century.

From the beginning, spectacles failed to remain in position and stay on. As noted during the 15th and 16th centuries, they were of the riveted type which was normally hand-held. These spectacles evolved into the type with a more comfortable arched bridge known as bow specs. Following this, the ultra-rare slit-bridge spectacles appeared with slits to give some added elasticity to the nose bridge. Then one piece wire (usually copper) frames with round lenses, better known as Nuremberg style nose spectacles, came into fashion, being mass-produced throughout the 17th century and until the early 19th century. Compounding the problem of stability, the first spectacles did not have side arms. This critical problem went unsolved for about 440 years until finally London optician Edward Scarlett (1677-1743) was credited with perfecting temple spectacles – those having short, stiff side pieces that pressed against the temples above the ears. This innovation facilitated the easy putting on and taking off of the glasses and didn't interfere with a person's long hair or wig. It hasn't been proven that Scarlett truly was the inventor. He advertised spectacles with spiral ends and his trade card is the earliest surviving illustration of them. Twenty-five years later, longer sides (temples) hinged in the middle became popular. This change finally added much needed comfort and stability. Another London instrument-maker and optician, James Ayscough, gets the credit for inventing this first double-hinged temple in 1752. He described these sides as "so contrived as to press neither upon the nose nor upon the temples." 3 In 1783, Optician Addison Smith obtained the first spectacle patent, # 1359, in London for two additional lenses hinged above the distance correction and capable of being rotated down for close work (making a total of four lenses). In 1797, English Optician John Richardson conceived the idea of different four lens spectacles where the two supplementary lenses, patent #2187, could be rotated in when doing close work. That same year, English optician Dudley Adams patented a device with a near complete headband and folding, adjustable drop-down lenses. No part of the spectacles rested on the nose and the distance between the two lenses could be modified depending upon the interpupillary distance. Only a half dozen of these super orbital patent specs are known to exist in private collections today. In England, especially between 1758 and about 1790, the so-called Martin’s
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Margins became popular. London optician Benjamin Martin (1704-1782) developed these Visual Glasses in 1756 in an attempt to reduce the supposed damage to the eyes from excessive light. The aperture of the lenses was reduced by a horn annulus placed inside the ordinary sized frame. They were described in his "Essay on Visual Glasses (Vulgarly called Spectacles)" and then remained popular during the Revolutionary War period. Martin felt that these smaller sized lenses were beneficial for the eyesight. Interest in them, however, faded after the turn of the 19th century.

Bifocals or split lenses were improvised most likely in London after the 1760's by Benjamin Franklin (1706-1790). They were made by halving lenses of differing powers and positioning the segments together with a straight line across the middle. The upper portion was ground for distance vision while the lower portion was ground for the near vision. He was certainly wearing them and able to order them from local opticians by the mid 1780's. Franklin wrote to London philanthropist George Whatley in May 1785, "as I wear my own glasses constantly, I have only to move my eyes up or down, as I want to see distinctly far or near, the proper glasses being always ready." Franklin's split lens bifocal was the first "no-jump" bifocal, one hundred years ahead of its time, because the distant optical center, the near optical center, and the combined optical center were all at the same point. During this period, spectacles also came into more common use in the United States. John McAllister, Sr. (1753-1830) arrived in America from Glasgow, Scotland in 1775 just before the Revolutionary War. He began selling hickory walking sticks (canes) in 1783 and, soon thereafter, riding whips. In 1799, he decided that spectacles might be an appropriate addition to these other wares so he established the first optical shop in America in Philadelphia. Until the War of 1812, McAllister imported all of the spectacles he sold in his shop. However, as a result of the conflict, the major trade embargo with Great Britain forced all Americans to rethink their dependence on imported goods. McAllister, a perfectionist, began producing his own gold and silver frames in 1815. Astigmatic lenses came into being in the U.S. in 1828 when McAllister and his son John, Jr. began importing cylindrical lenses for the correction of astigmatism. Actually Sir George Airy (1801-1892) was the first to design concave astigmatic lenses for his own myopic astigmatic eyes in 1825. John McAllister, Jr., (1786-1877) also has the distinction of developing the system of numbering street houses by blocks of 100 - 200, etc. with even numbers on one side and odd numbers on the other. This was first adopted in Philadelphia in 1858, and then spread throughout the United States and to much of the world. The McAllister family business continued for five generations over a span of 173 years and it developed from prolific spectacle making to optometry. Because of this remarkable family, Philadelphia ranks not only as the birthplace of the nation, but also as the focal point for the development of optometry. Basically John McAllister Sr. is undisputedly the first important figure in America's optical field and the founder of the profession of opticianry in this country. Besides McAllister, there are over three hundred different maker and retailer marks found on American spectacle frames of the 1820's -1830's. Most certainly finding an original pin-in-slot example (the 1st adjustable spectacle sidearm introduced just after 1800) with a McAllister or any other maker's mark in fine condition can be a rewarding experience for the collector. Following McAllister's success, spectacle production continued to develop rapidly in the United States. In 1826, Optician William Beecher established a jewelry-optical manufacturing shop in Southbridge, Mass. By 1833 his workmen also began manufacturing spectacles to compete with the more costly foreign imports. He sold his business to Holdridge Ammidown and then in 1849 Robert Cole joined the company. Two years later Beecher bought back in and then in 1852, Hiram Wells joined the firm. His younger brother George Wells gained employment in 1864. All the partner's interests were consolidated and, though the foundation of the company was in 1833, the American Optical Company was formally incorporated in 1869. In another important development, Optician John Jacob Bausch set up a tiny optical goods shop in Rochester, New York in 1853. Shortly thereafter, he needed some additional capital so he borrowed $60 from his good friend Henry Lomb and a partnership was formed. After the Civil War demand for their hard rubber ("Vulcanite") eyeglass frames increased dramatically and this company diversified its product line into precision optical products like microscopes, telescopes, binoculars, and photographic lenses. Thus began a long growth period for both of these companies whose purpose was to make a profit from products that would improve man's priceless faculty - eyesight. American Optical and Bausch & Lomb became enormously successful up to the end of the 20th century. Their influence even continues into the 21st century.
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Meanwhile, the perspective glasses of the 17th century were single lenses often used for distance vision by young fashionable myopes who suspended them from a neck-cord. In France these were Les Encroyables, upper class men who may have even exhibited a bit of arrogance when wearing this visual aid. Miniature ornate pocket-sized telescopes (spyglasses) were also used by some men and women especially to view other people at the theater. They were sometimes hidden in fans and walking sticks. Monocles were introduced by the German Baron Philip Von Stosch around 1720, but didn’t reach the height of their popularity until the 1880’s. The golden era for monocles then followed on into the early 20th century. It has been suggested that there was an evolution from the primitive magnifier to the quizzer and then to the monocle. Aristocrats commonly used monocles as a status symbol and fashion statement. Many had extension galleries which gave them stability in the front of the eye socket and prevented lashes from rubbing against the lens. The elegant double eyeglass on a handle (scissors glasses) and the typically elaborate single lens magnifier (quizzer) had become common among the more fashionable members of French and German society in the second half of the 18th century. Both Lafayette and Napoleon used scissors glasses.

Lorgnettes, used most often by women, developed around 1780 from the scissors glasses of France and England. Believed to have been first popularized by London’s George Adams, Jr. (1750-1795), they had a handle on the temporal side. A useful innovation for these developed by Robert Bretell Bate in 1825 became patent #5124. His outstanding invention was the double-spring lorgnette, an “improved spectacle folded to form a single eyeglass.” Most of the examples of lorgnettes seen presently date from the Victorian era and are quite decorative and fashionable. Viennese optician Voigtlander invented rigid glass spectacles in 1824 and Austrian optician Waldstein also offered all-glass spectacles around 1840. Few examples of these have survived so they are considered quite rare today.

Five hundred years after they had first been invented, spectacles without sides, which had been originally clamped on top of the nose, reappeared around 1840 as the pince-nez. They became very popular as middle-class eyeglasses for both men and women before the end of the 19th century and were worn until about 1935. The 20th century opened, eyeglass wearers emphasized style. The improved plastics in the early 1900’s heralded a new era in frame styling. During the 1930’s sunglasses became especially popular. By 1950, as described by Pierre Marly of France, spectacles had become a fashion accessory in Europe and North America. In Great Britain at that time, they were just starting to become an accessory. Eyeglass wearers demanded stylish, comfortable, and functional designs exhibiting both variety and elegance. They still do...

Glasses have become an added refinement by which people can enhance their personality. Individuals can look smart and also discreet in a variety of designs and colors. Consider this. The earth was formed 4.5 billion years ago. Society has been around for about twenty thousand years. Spectacles did not appear until just over seven hundred years ago. Before that time, nearsighted youth endured a world that was clear only to within four to five feet from where they stood. Farsightedness and more specifically presbyopia affected almost everyone. Active, productive members of society had to stop working, writing, reading, and using their hands for skillful tasks at a relatively young age. The invention of spectacles to improve vision, society’s progress in culture, crafts, art, commerce, and science, was severely limited! Then, sometime in the last quarter of the 13th century, an unknown, an artisan whose name remains lost, made the first spectacles. In 1946, Vasco Ronchi of Florence stated "when it is all summed up, the fact remains that this world has found lenses on its nose without knowing whom to thank." 4

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