

A HISTORY OF SPECTACLES

J. William Rosenthal, M.D.

The further one reaches in time and distance from the origins of truths, the more varieties, shadings and downright falsifications for many human reasons will one find. And so it is with the history of spectacles.

As a point of reference, let us hang our hats on the year 1300 as the approximate time of the invention of spectacles. Previous to that date, we have the beginnings:

1. As early as 2283 B.C., a Chinese emperor was supposed to have used lenses made of rock crystal (quartz) or topaz to observe the stars.

2. Until a short time before the first century A.D., the Phoenicians learned the art of glass making from the Chinese and Phoenicians discovered that nitre mixed with sand was melted by the heat of the sun into a coarse glass, some of which were found in the excavations of Pompeii and Nineveh; but the focal lengths of these lenses were so short they could not have been used before the eyes. After the birth of Christ, the Roman writer Gaius Plinius, (23–79 A.D.) reported that Nero viewed the fights of the gladiators using an emerald. This emerald, however, we believe was used either as a sunglass or as a mirror.

3. Chinese spectacles were used to protect the eyes against bright light, as many were in color. Also, these spectacles were used to augment an imaginary force, which was supposed to be present in the glass and help visually deficient people. They were not used for refractive powers but indicated social status.

About 1000 A.D., the arabian physicians and mathematicians were acquainted with plano convex lenses, used resting on a page, and with bi-convex lenses held in the hand.

A Short History of Glass

The first glass was made by Phoenicians about 1900 BC in Egypt and was known as sand mold glass, the mold being made of sand and clay having two parts. Later glass was Roman (really Syrian in 3rd century B.C.) and was blown glass. The same was used until the industrial revolution in 1830. The latter was soda glass as was that of the Phoenicians as it contained sodium silicate. Ravenscroft in London in 1675 under Charles II invented a glass in which flint (lead oxide) was used and which made the glass much clearer — called crystal — or crystalline originally. This is not crystal which is mined and cut stone of quality probably from the mines of Siberia. Venetians learned glass making from Etruscans and then moved their factories to Murano, an island in the Adriatic. These Muranos were given status of noblemen but were not allowed to leave the island. Some, however, did and went to Bohemia around the 15th century and made glass like the Venetians. Etching on glass was first done in Germany in the Gothic period (1250 & 1500) where they used a diamond point to make their incisions.

4. A teacher of the Church, Sophronius Eusebius Hieronymus (347—420 A.D.) is frequently credited with the invention of spectacles because he has often been represented with three insignia: a lion, a skull, and spectacles, and he has been regarded as the patron saint of spectacle makers.

5. Saint Fridolin, lived around 500 A.D. and he has also been regarded as the inventor of spectacles and was later on considered the patron saint of people with visual defects, as was St. Lucy.

6. Roger Bacon in 1268 in his *Opus Magnus* described several shapes of lenses which he recommended for old and weak eyed people.

7. Friar Giordano of Pisa, delivered a sermon in February 1306 in which he spoke of the invention of eyeglasses, twenty years previously. To support this, a manuscript in Florence dated 1289 contains the passage that "I am so debilitated by age that I can no longer read or write without the aid of the glasses called spectacles. These have been lately invented for the convenience of old people."

PRESERVED AT PISA, ITALY IS A CHRONICLE OF A DOMINICAN FATHER OF ST. CATHERINE UNDER THE YEAR 1313 WHICH STATES THAT ALLESSANDRO SPINA, A MONK OF EXCELLENT CHARACTER AND MIND, SAW A PAIR OF SPECTACLES MADE BY ANOTHER UNNAMED INDIVIDUAL AND COPIED THEM WITH HIS OWN HAND. HE MADE THE SPECTACLES AVAILABLE TO ALL PERSONS WHICH THE ORIGINAL INVENTOR HAD NOT DONE.

Thus we conclude as this section began, that spectacles were invented about 1300 A.D. by an unknown inventor in Northern Italy.

Pay no attention to the fact that in a Church in Florence, Italy is a marble bust with a tablet bearing an epitaph that reads, "Here lies Salvino Degli Armati, son of Armato, of Florence, inventor of Eyeglasses. May God forgive him his sins, AD 1316". Historians have concluded that this is a fable.

Pay no attention to the fact that Moses, the apostles and many other biblical personalities were painted wearing spectacles. The artists of the 15th to 17th century painted their subjects as if they had lived several centuries earlier, but they surrounded them many times with accessories which were fashionable at the time that the artists painted the pictures.

Of course, few of the earliest spectacles have been preserved, and knowledge of them is derived from paintings of the period. At first these spectacles were made by riveting together two hand lenses and the hinged pair were hung over the bridge of the nose. For perhaps two hundred years no change was made in these riveted spectacles. But in the 16th century we find that a rigid bridge had been adopted and that the spectacles were held against the eyes with a handle. Some were attached around the ears with a string and some were made of leather and stayed in place without a method of attachment.

Also, during this time, guilds of spectacle makers were recognized in certain cities such as Nuremberg and they were, therefore, separated from other glass workers. The earliest known lenses were exclusively for the relief of presbyopia and the strongest lenses found were approximately +3 diopter spheres.

In 1623, the earliest illustrated scientific work on the use of spectacles was written by Daza Valdes (Benito) a notary at the inquisition at Seville. In this work, he mentioned cataract lenses.

The popularization of the telescope by Galileo in 1608, of course, gave fresh impetus to the profession of lens grinding.

During the 17th century, throughout much of Europe, itinerant peddlers sold eyeglasses. They wandered from village to village and farm to farm offering spectacles made of oxhorn and leather and offering small telescopes made of cardboard draw tubes. The latter were also sold in stalls at markets in

various cities. Later, frames of lightly silvered brass with flexible bridges were made. Other methods of fixing frames before the eyes were: clamping on the temples, fixing in the hair; putting spatula like extensions under the hat and actually attaching it to the hat brim.

By the 18th century, steel was being made and its spring like quality was utilized in the manufacture of optical frames. In 1746, the optician Thomin of Paris advertised eyeglasses with "branches" (temples), of silver or steel which held the eyeglasses to the temples and did not obstruct respiration. Most early temples ended in a ring which rested against the patient's temple. Later they were extended posteriorly and eventually looped around the ears as they are worn today.

While the riveted spectacles had to be held from above, the so-called scissors spectacles which had longer stems on the handles, had to be held from below. These first appeared in Italy in the 15th century and had a handle which grasped the bridge of the nose with a scissor-like action. Some famous individuals who used them were Goethe and Napoleon Bonaparte.

The forerunner of the lorgnette was seen in an illustration in the Monastery of St. Marco of Florence in the 14th century. According to R. Greeff, the English optician George Adams was the first to construct the lorgnette around 1780. Previous to that the monocle, as we know it today, was developed by the German Baron Philip von Stoch (1691–1757) and it spread throughout the European continent in the following centuries, finally falling to disrepute after World War I.

In 1752, an English optician described a temple piece that had a joint so that the ear pieces could fold inward and rest against the back of the head. In 1771, George Adams described extendible bows which could be placed behind the back of the head. Modern type spectacles with temples which curve behind the ears appeared only after 1850. Various type bridges besides the simple original one have been described. Of course, bridges have varied in size and shape depending upon the dimensions of the nose of the wearer. Some of the original bridges had their sides padded with silk for comfort as were some of the ring temples. Other shapes for bridges were saddlebridge, the x-bridge, the k-bridge.

The various types of pince-nez were, of course, the original rivet, then with the invention of steel, the spring; the bar spring; and in the 1800's the individual springed pads.

The use of spectacles for relief from bright light, was, of course, besides being illustrated by Nero and the Chinese, accentuated by the use of beryllium (thus the origin of the German "Brille" for the word eyeglasses). The use of green, and blue glass was found in the 18th century and many cases of fine "railroad glasses" with hinged side pieces are available in collections today.

Of course, the Eskimos used the principle of the stenopaik slit for their protection from the brilliant reflections on the snow fields. Green glasses were manufactured in England in 1561, blue glasses in 1672, smoke glasses in 1767 and amber glasses in 1832. Amethyst colored obtained from windows tinted by long exposure to the elements was suggested in 1885, in Philadelphia.

Benjamin Franklin is credited with the invention of the bifocal when he wrote to a friend (George Wattley) in May 1785 and described these bifocals.

The first record of toric lenses occurs in 1840—44 when a Roman optician by the name of Suscipi, is reported to have applied them for the correction of astigmatism. These were not used, however, until the early 19th century for the correction of errors of refraction when the english scientist, Thomas Young, demonstrated the condition of astigmatism (1801).

In 1804, Wollaston, an Englishman, advocated the use of meniscus lenses instead of the ordinary double and plano convex and concave types and he named them periscopic lenses because of the concave surface nearest the eye. Meniscus lenses had previously been described in 1716 by the german mathematician Hertel and A.J. Luteman, a technical professor in St. Petersburg in 1719. They did not, however, develop their use.

A great step forward was marked in optical science when in 1875 the international scale of measurement of diopters was adopted as was first suggested in 1866 by Nagel. The term diopter proposed by a Frenchman named Monoyer is now universally used and designates the dioptric or refractive power of a lens of one meter focal length.

The first rimless spectacles appear around 1825 but it is not known who developed them.

Another outstanding contribution was made in 1888 by C.F. Prentice on the subject of ophthalmic prisms. He proposed the generally accepted designation of "prism diopters".

In the early 1900's a hand ground lens with no spherical aberration was produced in Germany and was called the Punktal lens.

During the time of development of spectacles, the development of cases to house them also proceeded. First these were made of brass, wood, horn, tortoise shell and leather. The cases were sometimes works of art and later on when silver, and gold became popular many of the cases were embellished with these precious metals and also precious stones. Some were covered with sharkskin, which was dyed to various colors and many were designed to hang on the belt as a Chatelain.

Various optical devices were incorporated into handy everyday items such as the head of a cane for a gentleman and the handle of a fan for ladies. Some

were made of porcelain in France and England, some made of lacquer inlaid with mother of pearl and many were covered with velvet.

There are several great collections of ophthalmic instruments, spectacles and related appertinences. To my knowledge, they are the following:

1. Medical Science Division of the Smithsonian Institution in Washington, D.C.
2. The British Opticians Collection in London.
3. The Wellcome Collection in London which has recently been bought by the British Crown and exhibited in the Museum of Science in London.
4. The Zeiss Optical Collection in Oberkochen, Germany.
5. The University of Berne Collection in Berne, Switzerland.
6. The Pierre Marly Collection in Paris.
7. The American Academy of Ophthalmology has recently, through its Foundation, and with impetus from Dr. Fred Blodi and Dr. Bruce Spivey, established an ophthalmic museum which promises to grow to be one of the world's principal collections.

References:

- Fashions In Eyeglasses, Richard Corson
2nd Edition, 1980, Peter Owen, Ltd., London
- Les Lunettes, Pierre Marly
1980, Atelier Hachette/Massin, Paris
- History of Spectacles, Volume I, W. Poulet
(Trans. by F. Blodi) 1978, Wayenborgh, Bonn.
- Personal communication, Henry Stern

Dr. J. William Rosenthal
3715 Trytania Street, Suite 201
New Orleans (LA 70115)