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# Introduction to Opticianry

## HISTORY OF GLASSES AND EYE CARE

Glasses are also known as *spectacles*, *specs*, and *eyeglasses*. If they have a dark color to protect the eyes from bright light like sunlight, they may be called *shades*. Modern glasses are made up of two parts:

1. Some form of a *frame*, normally made from either metal or plastic
2. *Lenses* that are held in front of the eyes and correct the wearer's vision for some particular visual task

There are two other ways to correct vision for a particular visual task: *contact lenses* and *refractive surgery*. Contact lenses eliminate the frame and place the lens directly in contact with the front of the eye. Opticians in some states fit and dispense contact lenses as well as glasses. Refractive surgery actually changes the eye itself. Surgery isn't within the scope of practice for the optician, but you should be aware of this option.

### Ancient History

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One way to see something better is to magnify it, or make it appear larger. In Egyptian hieroglyphs from the eighth century B.C., there's evidence for the use of magnifying lenses. Ruins found at the site of the ancient city of Nineveh, somewhere in the eighteenth to fourteenth century B.C., include a polished rock crystal that could have been used as a magnifying lens.

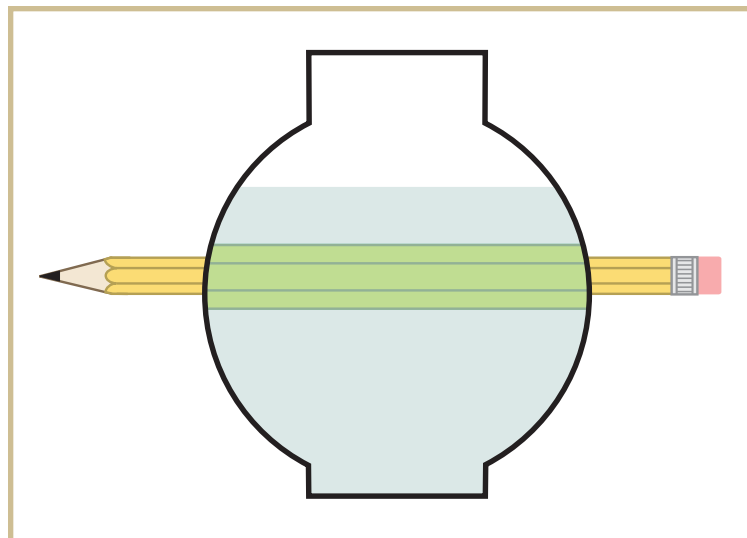
There's also evidence that the Chinese placed a form of glasses in front of the eyes about 2,000 years ago to protect their eyes from evil forces. One of the uses of glasses now is safety glasses, which may or may not correct vision but definitely help protect the eyes from harm.

In about 400 B.C., Aristophanes, a playwright, referred to the use of the magnifying lens to set parchment on fire. In the first century A.D., Pliny the Elder, another author, referred to the use of magnifying lenses to cauterize wounds.

In the first century A.D., the Emperor Nero used a green lens, possibly an emerald or a similar stone, to view the games in the Colosseum. This would be an example of sunglasses, since the color would filter some light, decreasing the brightness. It's possible that Nero was squeamish, and the green color of the emerald made red blood look black. There are also some people who think that he was shortsighted (or myopic) and that the green stone was shaped to make the image he saw sharper.

Nero's tutor, Seneca the Younger, also used enlarging lenses made from a globe or glass filled with water. You may have experienced something similar if you've ever looked through a small round fish tank at something on the other side, as long as the tank was full of water (Figure 1).

**FIGURE 1—A round fish tank filled with water has the same effect as an enlarging lens.**



Ptolemy, the Roman mathematician and observer of astronomy, who was born in 90 A.D., discussed the principles of magnification. At the end of the first century B.C. the Venetians began making glass, and at some point started making “reading stones,” which were part of a glass sphere. The flat side of the reading stone would be placed on the material with the writing on it, and the round curve would magnify the image.

## Middle Ages

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Glasses as we know them were invented somewhere in the twelfth or thirteenth century A.D. There are several people who may have come up with the idea independently. These first glasses would have had lenses made from quartz, and the frames used to hold them in place would have been made of metal, leather, or bone. The Italian Salvino D’Armate is normally credited with the invention in about 1284. There’s a story that his tomb had the inscription “Here lies Salvino D’Armate, inventor of eyeglasses. May God forgive his sins. A.D. 1317.” Another claim is made for the Dominican monk, Fra Alessandro da Spina, at about that same time. Monks were major users of glasses, as they were more likely to be literate than the general population.

The glasses pictured in Figure 2 are probably from the mid-1400s. They would have been balanced on the bridge of the nose. The hinge allowed them to be rotated open and closed for fit and when not in use.



**FIGURE 2**—Glasses from the Middle Ages

In 1450 Johann Gutenberg invented the printing press, resulting in a drastic increase in the availability of reading material, thus causing an increase in the need for glasses. Because of the Venetian glassmaking skills, Florence became a major source of spectacles. By the end of the sixteenth century, glasses were sold by street peddlers. A person would try on various pairs to determine which one worked best for his eyes. This was an early use of the skill of *refraction*, where a doctor or a technician in the doctor's office determines what the correct prescription for your glasses should be.

In the fifteenth century, the Dominican Girolamo Savonarola is credited with suggesting that glasses could be held in place with ribbons that extended from the front over the head and held in place by a hat or hood.

In 1508 Leonardo da Vinci published the *Codex of the Eye, Manual D*. In this document he described submerging his eye in a bowl of water to change the way the eye could see near objects. Although he didn't extend the idea to permanent correction of vision, he's credited with first introducing the idea of contact lenses. The concept of changing the eye's focal length was also discussed in the 1600s by Rene Descartes and in the 1800s by Thomas Young.



**FIGURE 3—President Teddy Roosevelt Wearing Pince-Nez**

## Modern History

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The problem of keeping glasses in place was addressed in various ways. The frames that we're most familiar with today, with *temples* that go from the *front*, or *eyewire*, of the frame back over the ears, were invented in 1727 by Edward Scarlett.

Among the other types of frames there was the *pince-nez*, or "pinch nose," which was two lenses joined by a weak spring that held the lenses in front of the eyes with pressure. The picture at the right is of President Teddy Roosevelt wearing pince-nez (Figure 3).

There was also the *monocle*, a single lens that was designed to fit over one eye and held in place by the structures of the face around the eye. It tended to have a chain or string attached to it with the other end connected to the person's clothing so that if it fell it wouldn't get broken or lost. Since this type of lens had to be fit to the wearer, it was usually used only by wealthy people, and was in fact very comfortable when fit correctly. If you're an old television show buff, you may remember the monocle worn by the German officer Klink on the TV show *Hogan's Heroes* (Figure 4).

The *lorgnette* is another type of glasses frame that has two lenses with a handle on one side for holding the glasses up in front of the face. They tended to be very ornate and were a fashion statement as well as a visual aid.

Benjamin Franklin is credited with inventing bifocals in 1784. He needed glasses to read and other glasses for distance, so he cut each pair of lenses in half horizontally and mounted the reading lenses below the distance lenses. Although it's now becoming hard to find, the *Franklin*, or the *executive lens*, which has the full bottom of the lens for reading and the full top of the lens for distance, is still worn by some people.

The first lenses to correct astigmatism, which you'll learn about later, were invented in 1825 by astronomer George Airy.

In 1887 F. E. Muller made an eye covering from glass that was used to correct vision, and in 1888 Adolf Fick successfully fit a glass contact lens. These lenses were large enough to cover the whole front of the eye, and could be worn for only a few hours at a time. Fick first tried them on rabbits, then on himself, and finally on a few other people. Frames, lenses, and contact lenses evolved rapidly during the twentieth century into the models you may be familiar with.



**FIGURE 4—A Monocle as Worn by Colonel Klink**

Now, review the material you've studied here. Once you feel you understand the material, complete *Self-Check 1*. Then check your answers with those provided at the end of this study unit. If you've missed any answers, or you feel unsure of the material, review this section until you feel that you understand the information presented.



# Self-Check 1

**At the end of each section of *Introduction to Opticianry*, you'll be asked to pause and check your understanding of what you've just read by completing a "Self-Check" exercise. Answering these questions will help you review what you've studied so far. Please complete *Self-Check 1* now.**

**Questions 1–7: Choose the correct answer.**

1. A word commonly used to refer to eyeglasses with a dark protective color is (shades/tints).
2. A modern pair of glasses consists of the frame and the (stones/lenses).
3. If you look at a pencil through a clear glass filled with water, the pencil will appear (larger/smaller) than normal.
4. A type of glasses frame that has two lenses and a handle is called a (lorgnette/monocle).
5. (Adolf Fick/Benjamin Franklin) invented the bifocal.
6. (Girolamo Savonarola/Leonardo da Vinci) first described submerging his eye in a bowl of water, the precursor to contact lenses.
7. The modern frame consists of two parts: the temple and the (eyewire/pince-nez).

**Check your answers with those on page 33.**

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