Cogan

OPHTHALMIC HISTORY SOCIETY

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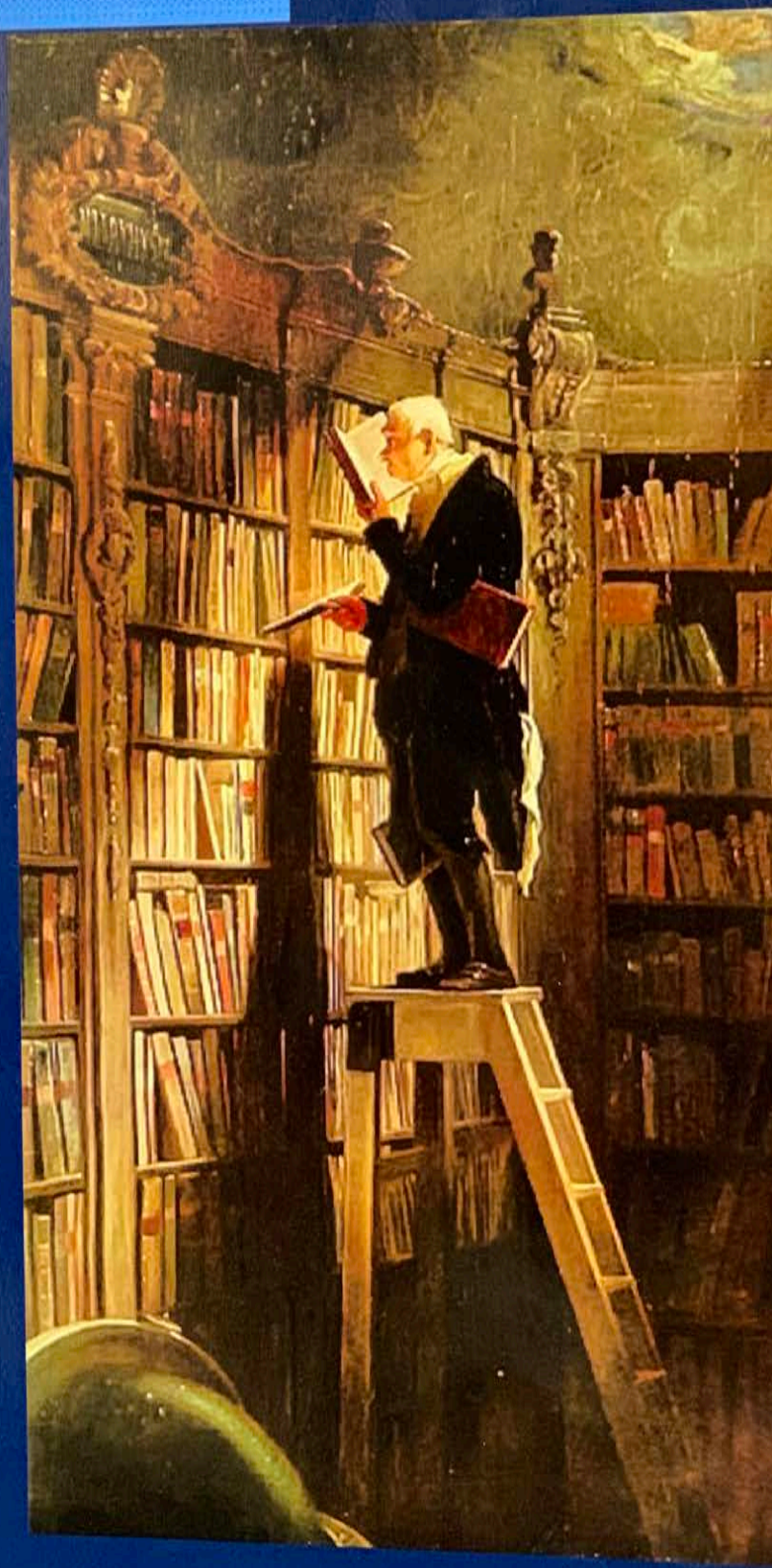


The Bookworm
by Carl Spitzweg
(1857)

EYES OF GOLD

Michael O. Hughes

Introduction

In the last seventy years since PMMA (Polymethyl Methacrylate) has been utilized, there has been a rapid change in materials used in medicine, including ophthalmology/eye care. Gold's inherent qualities suggested its early use. Few materials have the history, value, and dependability of gold. Such terms as "gold standard," "golden," and "the Gold Rule," all demonstrate the value and mystique of this legendary element. Gold has been the international standard of luxury for millennia. In addition, the metal has many practical uses, including some in medicine and prosthetics.

The Mystique of Gold

A recent article in National Geographic describes Gold:
"No single element has tantalized and tormented the human imagination more than *the* shimmering metal known by the chemical symbol Au. For thousands of years the desire to process gold has driven people to extremes, fueling wars and conquests, girding empires and currencies, leveling mountains and forests. . . [Its] chief virtues—its unusual density and malleability along with its imperishable shine— have made it one of the world's most coveted commodities, a transcendent symbol of beauty, wealth, and immortality. From pharaohs (who insisted on being buried in what they called the "flesh of the gods") to the forty-niners (whose mad rush for the mother lode built the American West) to the financiers (who, following Sir Isaac Newton's advice, made it the bedrock of the global economy): Nearly every society through the ages has invested gold with an almost mythological power.

Humankind's feverish attachment to gold shouldn't have survived the modern world. Few cultures still believe that gold can give eternal life, and every country in the world—the United States was last in 1971—has done away with the gold standard"

A Few Basics

Gold's chemical symbol (Au) is from the Latin aurum (glowing), and its atomic number , 79, places it just between platinum and mercury in the periodic table of the elements. It is a noble metal with a valence of 1 or 3. A highly sought-after metal, this naturally occurring mineral is found in grains, nuggets, and underground veins in rock and deposited in river sand. It has several crystalline structures, including wire, leaf, branch, and tree forms, often within quartzite formations.

78% of the gold mined today is used for jewelry manufacture. 22% of gold mined is used for industrial (12%) and the remaining 10% is used for financial transactions. In medicine (including ophthalmology), gold has been used in both practical and decorative ways. The medical uses of gold date back to the ancient cultures as far back as 2500 BC in countries such as India, Egypt, and China, where gold was a key element in the treatment of illnesses such as measles, skin ulcers, and smallpox.[3] The use of gold compounds in medicinal treatment, known as chrysotherapy, has been used for the treatment of arthritis since it was first reported in 1929.

Gold used in restorative dentistry leads all healthcare use (today).

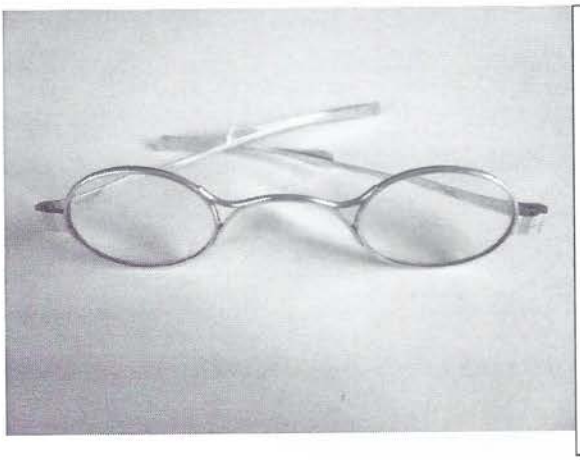


Photo courtesy of Werner Weismuller, Germany

The most obvious use of gold in eye care has been with gold framed eyeglasses. These spectacles are solid gold (no mark on) from Early 19th century Romania. (Solid gold spectacles in 1828 between 12-18 Rthlr. (Reichstaler)

Spectacle frames of "gilded silver" were first mentioned in 1321. This is the first known mention of metal spectacles. Later, the Bishop of Orvieto, Italy, owned a pair of crystal lenses with gilded frames.

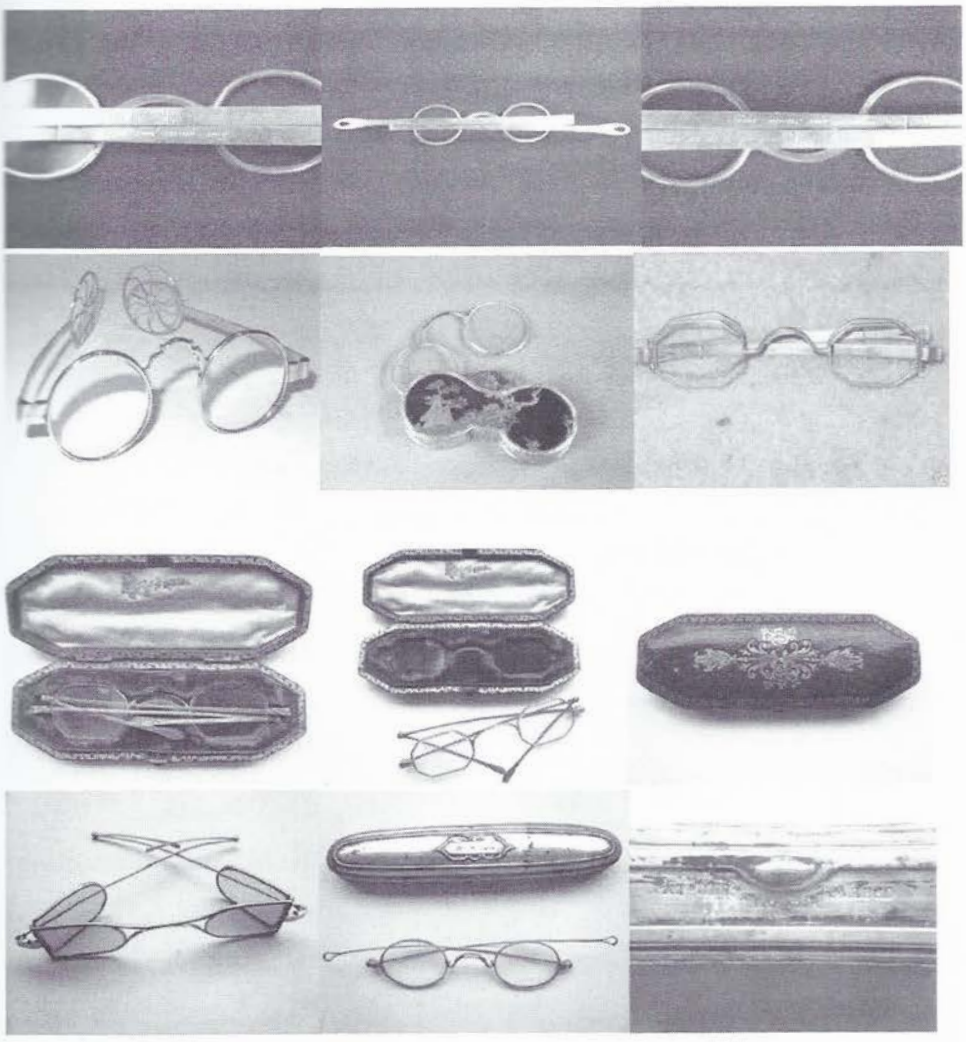
Solid gold between 9K and 18K is the ideal metal for making spectacle frames (pure gold is 24K). Solid gold spectacles are rare prior to the 19th century. Even with the specific (shown) examples does not change the fact. Most of these rare examples have been produced by jewelers dabbling in optics rather than specialist opticians. By November 1935, and possibly earlier, American Optical Co. had a dedicated catalogue for 'Solid Gold Spectacle Ware' separate from their gold-filled frames.

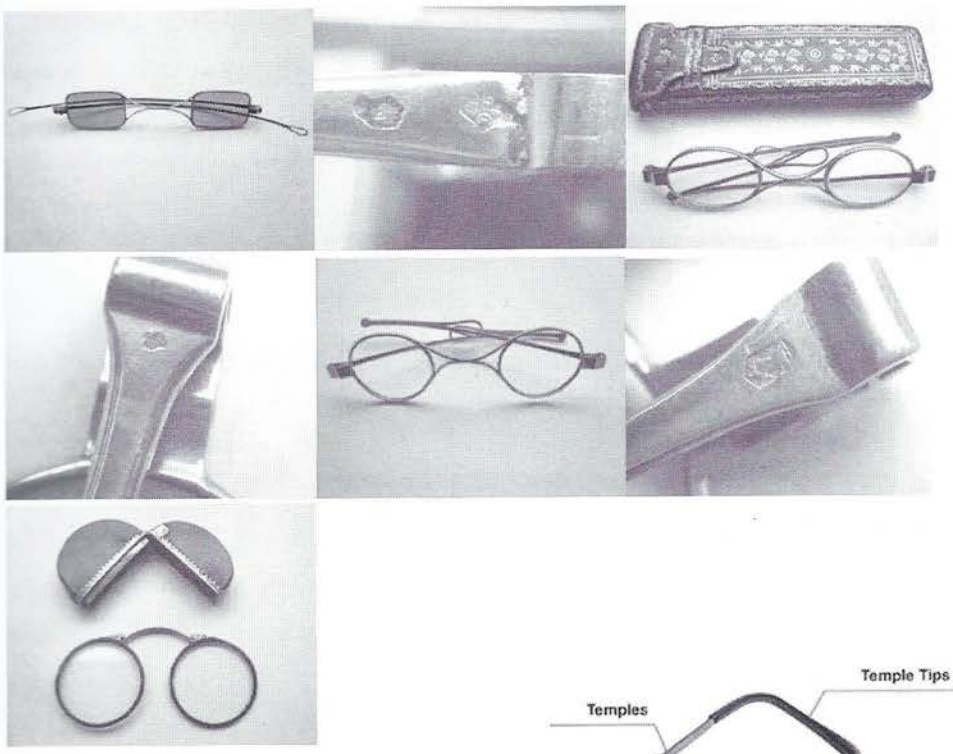
One of the earliest known existing solid gold (and enamel) spectacles are those of Archduke Ferdinand II of Tirol (1529-1595).

Image courtesy of Ronald MacGregor.

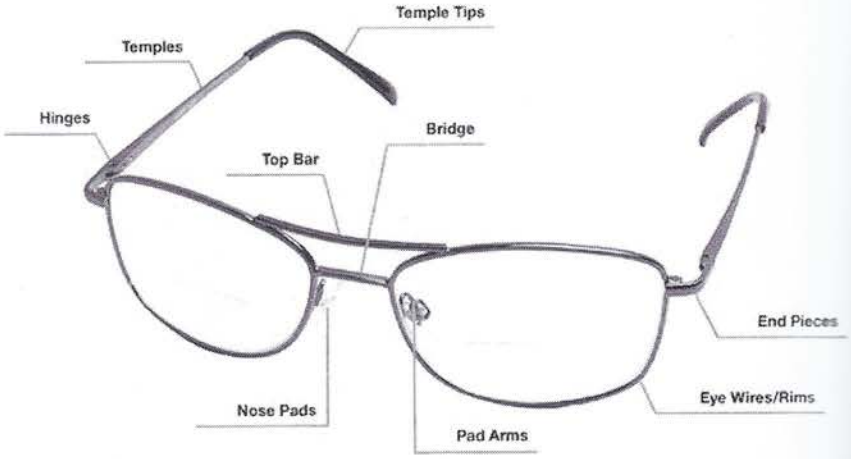
We can assume that goldsmiths were making plain gold spectacles for the rich well before this sophisticated example, as early as 1450. *Photo courtesy of Wernes Weismuller,* Germany

Of course, gold was used in various magnifiers, decorative cases, and eye-cups (eye-baths) other than optical goods, 1880, ca. Eyeglasses shown are Martins Margin with tortoise shell rings and a shagreen case with gold amations.



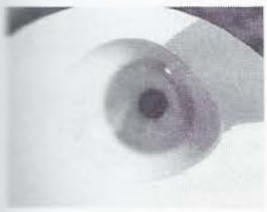


With spectacles/eyeglasses, the use of gold (and to a lesser extent, silver) can be used as a symbol of social status, as a bridge between fashion and science. This diagram shows the various parts of eyeglasses. Gold was generally used on the temple, bridge.



Ambroise Pare in 1561 described the first prosthesis which was made of metal and coated with paint.

The Ecblepharon prosthesis was gripped securely by a band and worn outside the socket-almost like a custom made eye patch. The first prosthesis worn in the socket was a gold shell with the iris painted in colored enamel-reported in the thesis of Mauchart, of Turbinden in 1749. Gold is mixed with cryolite decorative glass which was used to enhance colors in mouth blown human eyes (starting In 1870).



Modern surgical enucleation techniques was first described by O'Farrell in Dublin and Bonnet in France in 1841. Years later, ocular implants began to emerge to help reduce enophthalmos. While hollow glass implants were the first successful ocular motility implant used (1884), hollow Gold sphere ocular motility implants were used as early as 1902. These (implants) were used to reduce the appearance of enophthalmos while being compatible with human tissue.


Ocularist Paul Gougelman (of Mager and Gougelman) from Chicago, Illinois, began large scale distribution of hollow gold implants in the 1930's.

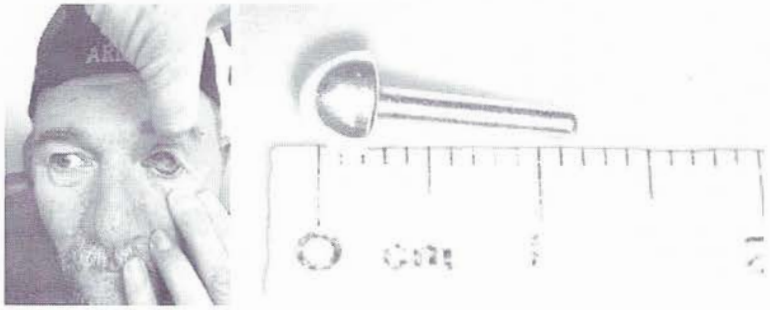
The semicircular gold band ocular implant. The implant is inserted (by the patient) with the bar open as shown in (A). The bar is then hinged up and snapped shut (B and C). A prosthetic eye is then clipped to anterior portion of gold band.

A B C

Other ocular motility implants were created using both gold and PMMA in the 'Grand Era of Ocular Motility Implants' 1945-1955.

While gold is inert and does not cause irritation, migration and implant exposure can happen. Galeski Optical of Richmond, Virginia manufactured Gold plated surgical shields, ca. 1920.

Ocular Motility pegging systems which incorporates an 18K solid gold peg (right) have been utilized.



Surgically implanted Gold eyelid weight implants have been used for over 30 years in the rehabilitation of patients with lagophthalmos caused by facial palsy.

A Gold handle on scissors, forceps, or needle holders on contemporary instruments means they have tungsten carbide (TC) inserts on the working surfaces. They are approximately twice as expensive as standard instruments.

India is the worlds largest consumer of gold- where custom gold and diamond-studded contact lenses are available.

For many decades, the U.S. Treasury fixed the price of gold by the ounce at $20.67 until 1934, when it increased to $35.00; simultaneously, the U.S. Mint took the

$20 gold double eagle out of circulation and melted down more than 45,000 coins to generate funds for the New Deal. While it is difficult to determine if this change in price actually led to the decline in the use of gold in medicine (including dentistry), most likely due to the costs that increased 75% overnight.

Conclusion

Although gold still has some uses in ophthalmology (and eye care), it is unlikely to be widely used again as its cost increases. Gold has developed and will continue to develop as a vital component in ophthalmic surgery and other eye-related medical treatments, particularly as research has proven that gold has strong resistance to bacteria and is not an irritant.

Acknowledgements

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- Ridgeway, Pennsylvania- San Salvador, Central America
- Seventy combined missions between the two!
- Over 100,000 eyeglasses collected , sorted, measured and dispensed free of charge to needy individuals in South and Central America.

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