MISCELLANY

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Celebrating volume 50 of Hindsight next year!

You may have noticed that this year's *Hindsight* is volume 49. To celebrate volume 50 next year and the 50th anniversary of the founding of the Optometric Historical Society, we are planning a theme issue. We hope you will consider making a contribution. Examples of topics we hope to include are (1) opinion pieces on why it is important to know about the history of optometry, (2) memories and appreciations of Optometric Historical Society co-founders Henry Hofstetter and Maria Dablemont, and (3) information on archives, museums and other resources which may be helpful in learning about optometry history. Submit your contribution on the journal website by October 15, 2018 or send it in an email to the editor at dgoss@indiana.edu.

Helmholtz's ophthalmometer

Helmholtz Physicist-Physician. Robert A. Thom, 1961. Parke, Davis & Company. Image Courtesy of The National Library of Medicine

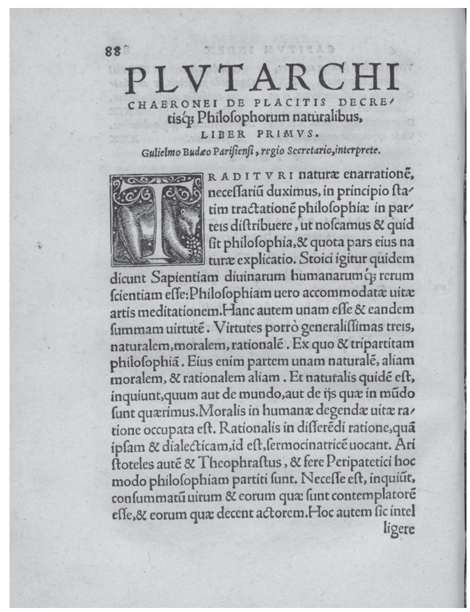
A recent article in the journal *Acta Ophthalmologica* discussed Hermann von Helmholtz's ophthalmometer.[1] Helmholtz (1821-1894) made significant contributions to several areas of physics and physiology. Among his contributions to vision science were his work on the direct ophthalmoscope, his theory of accommodation, his famous book *Physiological Optics* and his invention of an ophthalmometer to measure the radius of curvature of the anterior surface of the cornea.

The authors noted that the first ophthalmometer to evaluate corneal curvature was built by the English optician Jesse Ramsden and Everard Home in 1794, but they were looking for changes in the cornea rather than determining the radius of curvature. Helmholtz's advancement was the creation of a device which doubled the corneal reflections making it possible to measure the corneal radius despite movements of the eye being measured. Helmholtz was able to make precise measurements but the repeated readings and calculations that were needed made it suitable only as a laboratory device rather than a clinical instrument.

The authors were able to locate an original Helmholtz ophthalmometer in a museum in Utrecht in the Netherlands. They attempted corneal curvature measurements with it, but they found its usage to be "even more challenging than expected" based on the statements made by Helmholtz's contemporaries. However, they expressed the opinion that "the von Helmholtz ophthalmometer is a beautiful instrument that was one of the first steps in performing keratometry measurements in humans, designed by one of the most important scientists of the 19th century."

The writers also discussed the modifications of the Helmholtz ophthalmometer by Coccius, Javal, Schiotz, Kagenaar and Sutcliffe that led to common keratometers used today. The authors concluded that, even though the Helmholtz ophthalmometer proved to be impractical in the clinic, "this does not detract from the greatness of this development."

Ancient theories of presbyopia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tisq; Philoſophorum naturalibus,
LIBER PRIMVS.
Gulielmo Budæo Pariſienſi, regio Secretario, interprete.

TRADITVRI naturæ enarrationẽ, neceſſariũ duximus, in principio ſtatim tractationẽ philoſophiæ in parteis diſtribuere, ut noſcamus & quid ſit philoſophia, & quota pars eius naturæ explicatio. Stoici igitur quidem dicunt Sapientiam diuinarum humanarumq; rerum ſcientiam eſſe: Philoſophiam uero accommodatæ uitæ artis meditationem. Hanc autem unam eſſe & eandem ſummam uirtutẽ. Virtutes porrò generaliſſimas treis, naturalem, moralem, rationalẽ. Ex quo & tripartitam philoſophiã. Eius enim partem unam naturalẽ, aliam moralem, & rationalem aliam. Et naturalis quidẽ eſt, inquiunt, quum aut de mundo, aut de ijs quæ in mũdo ſunt quærimus. Moralis in humanæ degendæ uitæ ratione occupata eſt. Rationalis in diſſerẽdi ratione, quã ipſam & dialecticam, id eſt, ſermocinatricẽ uocant. Ariſtoteles autẽ & Theophraſtus, & fere Peripatetici hoc modo philoſophiam partiti ſunt. Neceſſe eſt, inquiũt, conſummatũ uirum & eorum quæ ſunt contemplatorẽ eſſe, & eorum quæ decent actorem. Hoc autem ſic intel
ligere

Plutarch's Moralia, 1531 A.D. Original file held at the BEIC digital library.]

Another article in *Acta Ophthalmologica* discusses theories of presbyopia found in the writings of the Greek polymath Plutarch (c.45-120).[2] The first theory suggested that older persons held reading material farther out to "fill with bright air the space between their eyes and the writing." This theory was consistent with Aristotle's theory of vision in which the transmitting medium was a key element. More transparent air between the eye and the book would improve clarity of vision.

The second theory of presbyopia relates to the ancient theory that thin films on objects (eidola) peel away and transmit the forms of those objects when they penetrate the eye. The theory of presbyopia held that older eyes have stiffer pores, making it more difficult for the eidola to enter. Moving the book farther away allowed the eidola to diffuse and become thinner, making penetration into the eye easier.

The third theory of presbyopia came from a theory of vision favored by Plato in which a stream of rays or opsis emanated from the eye to surround objects being viewed. In older persons, the opsis was thought to be weak. Moving reading material farther away resulted in a better balance of opsis and sunlight.

The author was most intrigued by the fourth theory and speculated that it may have come from the astronomer and mathematician Hipparchus who lived about two centuries before Plutarch. This theory suggested that by moving the viewing plane away from the eye there would be more overlap of the cones of rays entering the two eyes. However, the author did note that this theory did not consider convergence eye movements.

Old and new existing together in harmony

I enjoyed reading an online article by optometrist Michael Brown.[3] A self-described bibliophile, he noted that he sometimes reads electronically, but that he feels that there is "just something irreplaceably satisfying about holding a book in one hand…" yielding "a sensory experience that e-reading simply can't match." He tells how he considers a copy of the 1954 second edition of *Clinical Refraction* by Irvin Borish, inscribed to him by the author, to be a powerful possession that could not be duplicated with an electronic device. He stated that he is not greatly worried about potential incursions of telemedicine, online apps, etc., into optometry because "traditional, face-to-face" care will survive and find new niches just as books have in an increasingly digital world.

Origin of the 20-20-20 rule for digital eyestrain

Optometrist Brian Chou recently reported in an online article how he did some historical sleuthing to find the origin of the 20-20-20 rule for digital eye strain.[4] The rule says to take a 20-second break every 20 minutes and look at something 20 feet away when using digital devices. This rule is referred to by various professional groups, including the American Optometric Association,[5] as well as trade and consumer media.

I can remember hearing recommendations in optometry school in the early 1970s that one should take periodic breaks from reading or doing near work to look at something in the distance. For example, Nolan[6] suggested that children should be encouraged to look up from their reading for an instant at the end of each paragraph to view an object between 15 to 20 feet away or to look out a window in order to help prevent or control myopia. It seems likely that similar advice was around decades or centuries before that. But what was the origin of the specific 20-20-20 rule?

After finding a 2001 article by optometrist Jeffrey Anshel in a search for the catchphrase, Chou contacted Anshel who said that he came up with the idea in or about 1991. Anshel, author of the 1998 book for the *Visual Ergonomics in the Workplace*, said that his experiences in caring for corporate workers with vision problems such as late-in-the-day headaches and adult onset myopia led him to think of a way to get workers to take regular breaks while still being productive. Chou noted that there have been no peer-reviewed studies evaluating the rule, but that it may be a reasonable recommendation for those with ocular discomfort from using digital devices.

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