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Late 17th century optometry:

At about age 14 or 15 John Marshall (?1659-1723) of London began his seven-year apprenticeship under the surveillance of the Turners' Company (instrument makers guild). He then entered the trade and soon attained a favorable reputation as a lens maker and won his freeman status in the guild in 1685. Although most of the contemporary London opticians belonged to another guild, the well founded Worshipful Company of Spectacle Makers (the "S.M.C."), Marshall, for some undetermined reason, could not be persuaded to join it. His relationship with the S.M.C. was sometimes amicable, sometimes not. On one occasion its members were ordered not to patronize Marshall, but the order was quite ineffective. His thriving establishment was on Ludgate Street, identified by the impressive sign of the *Archimedes and Spectacles*.

At some time prior to 1693 Marshall designed what he believed to be an original modification of the tools for grinding and polishing lenses. The precise details of the invention have not been firmly documented by the available records, but it is quite apparent that two features were (1) the use of very large convex and concave laps or tools on which several lenses could be cemented and surfaced simultaneously with identical curvatures, and (2) the laps were made of brass instead of iron. The results were less costly lenses of much higher quality and precision.

In November 1693 his friend Robert Hooke (1635-1703) arranged for Marshall to demonstrate a large telescope objective lens to the Royal Society (London). The records show that the members were duly impressed. A month later Marshall was given the opportunity to testify before the Society concerning his multiple spectacle lens grinding technique, whereupon the Society authorized Edmund Halley (1656-1742) and Hooke to witness the process and report back to the Society. Following this site visit Marshall received the following letter:

I have (by Order of the Royal Society) seen and examined the method used by Mr. JOHN MARSHALL, for grinding glasses; and find that he performs the said Work with greater Ease and Certainty than hitherto has been practised; by means of an Invention which I take to be his own, and New; and whereby he is enabled to make a great number of Optick-Glasses at one time, and all exactly alike; which having reported to the Royal Society, they were pleased to approve thereof, as an invention of great use; and highly to deserve Encouragement.

Lond. Jan. 18.
1693, 4.

By the Command of the Royal Society:
EDM. HALLEY.

This is copied from a post-1707 issue of John Marshall's handbill. Grammatically it varies slightly but negligibly from the text appearing in J. Houghton, *A Collection for the Improvement of Husbandry and Trade*, second series (London), No. 77, 19 January 1694. The title of Houghton's publications reflects a strong mission of the Royal Society during that era, namely, the encouragement of technological advancement whether by scientists, artisans, or trades personnel.

Though neither having patented his invention nor having kept his technique a secret, Marshall promptly exploited the Society's approbation by citing the letter repeatedly in his advertising. The Spectacle Makers guild, the S.M.C., on the other hand filed a complaint to the Royal Society that Marshall had misrepresented himself and that the procedure for which he claimed credit was neither new nor valuable. In response the Royal Society requested more documentation from Marshall, which he seems to have supplied. As a result the Society chose not to retract its approval.

Then followed some competition from another prominent provider of spectacles, John Yarwell, an S.M.C. member, whose handbills and media advertisements stated that his lenses were made in compliance with methods approved by the Royal Society. He, too, located his place of business on Ludgate Street. Marshall's advertising then claimed that only his methods were approved, that only he had received the soon famous letter.

A bit later numerous other, especially younger, opticians entered the promotional foray with advertisements and handbills that cleverly implied Royal Society approval of their lenses. "Some of the advertising copy would have done justice to squabbling fishwives," is the evaluation of authors D.J. Bryden and D.L. Simms in the January 1993 issue of *Annals of Science*, Vol. 50, No. 1, pp. 1-32, in a detailed article entitled "Spectacles Improved to Perfection and Approved of by the Royal Society," from which the above account is derived.

In addition to the above almost legendary abstraction of much of their thoroughly researched paper, authors Bryden and Simms provided a technical review of the history of lens grinding itself, apparently for the benefit of readers without optical background. The authors also generously provide a several-page commentary on the difficulties of documentation and interpretation. Historically the tradesmen and artisans who knew the technology and crafts did not write, and the savants or learned people who wrote the documentation were unskilled in the crafts. "Indeed Robert Smith, Plumian Professor of Astronomy at Cambridge, in his 1738 survey of grinding glasses for telescopes, openly admitted he had never seen the operations he described." More recently, but similarly, D.J. de Solla Price in an Evening address, International Edison Birthday Foundation (Detroit, 1968), "distinguished between scientists and engineers as the former writing, but not reading, while the latter reads, but does not write."

These observations certainly reenforce my own theory explaining the dearth of written documentation of optometry's history in the many centuries following the invention of spectacles. Little is obtainable prior to optometry's emergence from its exclusively craft and guild status and its evolvement into a profession with academic infrastructure.

Spectral therapy:

In the Dr. James Leeds collection of optometrically related books is one which he must have acquired under the impression that it was another in a series of publications on an ophthalmic theme that caught the attention of a number of optometrists in the late 1930s and early 1940s, namely, color therapy. This one is entitled "Chromaray Triorays Manual, Color Energy" on its green stiff-paper cover, and "Chromaray, The Scientific Way to Health with the Seven Colors of the Spectrum" on its title page. Authored by E. Ruscheweyh, R.N., and E.A. Ernest it consists of 90 pages, 23.5 x 15.5 cm., bound by a brass spiral and published by Ernest Distributing Company in Milwaukee, Wisconsin, 1937.

Apparently Ruscheweyh was a nurse (R.N.) and perhaps Ernest was the designer of the subject equipment or instrumentation, the Chromaray, the Focoray attachment, and the three supplementary Triorays. The Chromaray consisted of a tripod-supported, somewhat barrel-shaped housing slightly larger than one's head and containing a 100 watt clear "spotlight" bulb (price \$1.00) with a reflector and condenser system for projecting a diverging beam of light through any of seven dial-mounted colored filters directly onto a patient's exposed chest, back, or elsewhere. The Focoray attachment would concentrate the beam onto a small area of choice on the patient's body. From the illustrations the Triorays appear to have been separate hand-held converging lenses of several inches diameter, one green, one blue, and the third "penetrating." They could be used for focusing colored light directly from the sun or an exposed bulb onto the area to be treated.

Variouly referred to as chromo therapy, color therapy, or color healing, the recommended treatment durations range from five to 30 minutes. It is suggested that for maximum affectivity the patient should be oriented in the "magnetic meridian" during treatment, i.e., head to the north when lying down, or facing south when sitting up. Further enhancement may be gained by means of "charged water" taken internally as a purgative or cathartic, the "charged water" consisting of distilled water irradiated for one hour with the properly selected Chromaray color.

Eighty-one pages of the manual consist of numerous tables and listings identifying the functional roles of each color and color combinations in terms of therapeutic effects, drug similarities, chemical element analogues, vitamin equivalents, and choices of colors to be applied for dozens, if not hundreds, of clinical aberrations ranging alphabetically from abortion to zoster. There is no suggestion that the manual was intended for optometrists, nor is it clear for what health practitioners it was written. Its scientific integrity is reinforced with citations of such anonymous assertions as "Facts of science do not change" and "The study of mankind is man." The only cited reference is a book entitled "The Principles of Light and Color" by Edwin D. Babbitt, 1877.

Do not smile. This was not long ago.

H.W H.

Notes from OPHTHALMIC ANTIQUES:

The January 1994 issue of the Newsletter of the Ophthalmic Antiques International Collector's Club, No. 46, informs us that the Worshipful Company of Spectacle Makers displayed its history at THE CITY ANTIQUES AND FINE ART FAIR held in London on 28 October to 1 November, 1993. Included were two showcases of optical items from the collection of Hugh Orr, the 90-year-old Honorary Curator of the B.O.A. Foundation Museum. He, himself, spent several hours each day meeting the fair-goers, among whom was HRH The Duchess of Kent.

Derek C. Davidson traces the involvement of the Dixey family in ophthalmic opticianry from the enrollment of young Edward Dixey as an apprentice with "Linnell the Optician and Instrument Maker of 14 Cow Lane in the City of London" on August 19, 1771. In the earliest days of opening his own establishment some years later Edward is reported as having "sold sweets at one counter, spectacles at another, and also kept a cow for milk to refresh his more thirsty customers." By 1989 the Dixey name became identified with two multiples, one, an eleven-branch chain with head office in London, and the other a group of six practices headquartered in Brighton.

Editor MacGregor questions the validity of an interpretation in the 1945 catalogue of the Bibliotheque Royale in Brussels describing an artist's illustration of a dragon-like bird in a psalter (library number BR5163-4) as a "dragon with spectacles." The psalter is identified as having come from Ghent circa 1240, with another opinion in the 1260s, both of which dates are decades before the presently widely accepted date of the invention of spectacles. What were obviously presumed by the 1945 cataloguer to be spectacles were two circles on the face of the bird located only very approximately where the eyes might be.

Their possible interpretation as spectacles is the theme of a paper by Judith S. Neaman of the Department of English, Yeshiva University, New York, entitled "The Mystery of the Ghent Bird and the Invention of Spectacles," *Viator Medieval and Renaissance Studies*, Vol. 24 (1993), pp. 189-214, University of California Press, Berkeley, Los Angeles, USA.

Another article in the newsletter is Henri Obstfeld's translation and annotation of a 1973 booklet entitled "Der Fund vom Nonnenchor" (The discovery in the nuns' choir) published by the Kloster (nunnery) at Wienhausen, a village near Celle in Lower Saxony, Germany. Archeological work which had commenced there in 1953 uncovered many artifacts prompting a 1958 article by Horst Appuhn entitled "Ein gedenkwürdiger Fund" (A noteworthy discovery) in *Zeiss Werkzeitschrift*, No. 27, pp. 2-8. Inasmuch as the choir at Wienhausen dates from about 1330 it is presumed that the wide variety of artifacts found there relate to the early 14th century. The publications report the inclusion of numerous pairs of spectacles. These spectacles may well be the earliest extant, for until this discovery the earliest evidence has been derived entirely from artists' paintings. Hence it was not known whether the earliest spectacle frames were made of horn, bone, or metal.

The spectacle frames uncovered in Wienhausen are all of wood, reflecting the "wood culture" of the Middle Ages. The Obstfeld article describes three types of frames, all of wood, with each pair of the two lens-holding halves centrally joined by a rivet. The presence of a wide assortment of handicraft tools suggest that the fabrication of the frames was done by nuns.

H.W H.

Long time between blinks:

"Wink" was a contest between two individual Potawatomi Indians who stood face-to-face and stared at each other. The first individual to blink, or "wink," lost the contest. Such staring matches attracted the attention of other Indians and were surrounded with much good-natured joking and teasing.

The pastime prompted artist George Winter (1809-1876) to sketch a graphite and diluted ink watercolor on a 13.4 x 17.2 cm slip of paper a scene of about 30 Indians, a couple of horses, and a dog, all casually gathered to watch two manly-looking, high-costumed Indians in the foreground poised in a game of wink.

At the youthful age of 28, George Winter, an English immigrant, after a brief study in New York and a couple of years of studio work in Cincinnati, Ohio, decided to migrate to Logansport, Indiana, where he set up a studio next to a fur-trading post. He was lured there by his fascination with Indian culture and the awareness that the Potawatomi and Miami Indians in that area were being pushed westward under the Indian Removal Act of 1830. He was a prolific artist as well as an observer who provided substantial documentary commentary. His drawings were very realistic and meticulously detailed whether of portraits or landscape, and always executed in excellent perspective. With regard to the Indians' grasp of pictorial art and especially their lack of experience with perspective he wrote as follows:

The indian is quick in his perception, and being without the civilized man's conventionalities and affectations, he was a model of 'good breeding' in his opinions upon so strange an art as painting. The indian applauded by his signs and gesticulations, the painted resemblance of natural objects though often puzzled over effects of color, and by landscape painting, by the distance and nearness of objects as perspectively drawn and painted.

I remember an indian in my studio once, going down upon his hands and knees to examine minutely a painting that was upon my easel—he gazed long upon it grunting out his approbation—he then went behind the canvas, under the impression that he could look through the atmosphere of the painted scene. Both sides of the canvas he imagined contained the same scene.

The above excerpts are from a 1993 publication of the Indiana Historical Society entitled INDIANS AND A CHANGING FRONTIER, THE ART OF GEORGE WINTER, a Catalog of the George Winter Collection Located at the Tippecanoe County Historical Association, Lafayette, Indiana. It is perhaps one of the most intimate documentations

of the Indian acculturation process during the westward movement. Objectively detailed as it is, we may well infer that the complete lack of evidence of, or reference to, spectacles, even as recently as the early 1800s, suggest that glasses had not yet had any significant impact on either the Indians or white pioneer traders of this region. The only two other mentions of anything optical or ocular in the whole 250-page book are a comment that Chief O-kah-maus was what the Indians call Po-ke-quek, or one-eyed (p. 79), and that Chief Francis Godfroy (a "half-breed") had eyes "larger than that of the general characteristic eye of the indian which is rather small, sharp, and piercing" (p. 122).

That there were visual limitations of that era which simply do not exist in today's civilization is lucidly conveyed by Mr. Winter's notation regarding a conversation with an African American who had identified himself with the Miamis, married a squaw, and spoke their tongue fluently. "I told the Negro interpreter to say that the sun was now low, and the light nearly gone, and that on the morrow, I would make my sketch of her."

H.W H.

100 years ago:

In the April 1896 issue of *The Optical Journal*, Vol. II, No. 2, the editorial deals with the State of New York Assembly Bill No. 727 entitled "A Bill to Incorporate the Optical Society of New York." In opposing the bill the dispensing opticians declared, "Its real object is to legalize a limited class of imperfectly qualified men, who are really not members of the Optical Trade, but call themselves refractionists, to practice in a semi-professional manner upon the public."

In the May 1896 issue the editor reports, "The only published lists of opticians are those contained in the jewelers' directories, but these are so incomplete and useless to the optical trade that we have determined to publish a directory ourselves, if enough support can be had."

The June 1896 issue included the following comment on the first state meeting of the Optical Society of the State of New York: "Quite a lot of singing talent was developed on board the steamer coming down Onondaga Lake on Wednesday night. A glee club of about twenty voices awoke the echoes over the lake, and continued on the trolley car trip home."

H.W H.

Wavelength cures:

Reminiscent of the earliest years of my own optometry career, the '30s, was a packet of publications in the Dr. James Leeds collection. They related in various ways to the briefly promoted faddistic notion that innumerable ills could be cured by exposure of the body or eyes to prescribed colors of light. In the packet were included a cloth-bound collection of pamphlets under the title "Handbook of Specific Light Therapy," Fifth

Edition, 1930, and an Accopress-bound "Course in Specific Light Therapy" of redundantly similar content, Sixth Revised and Renewed Edition, 1939, both authored by Dr. Carl Loeb and published by Actino Laboratories, Chicago, Illinois. The clinical procedure is called Harmono Chrome Therapy and the instrument touted in both compendia is called the Mountain Sun. It is represented as having carbon electrodes as its light source with capabilities of producing a wide range of wavelengths from infrared to ultraviolet.

Enfolded in the latter were several documents, as follows: An undated mimeographed two-page sheet entitled "A Five Year Plan for the American College of Optometrists"; a one-page "Dear Doctor" form invitation on College letterhead to optometrists "familiar with . . . the use of selected spectral bands" such as contained in Dr. William Henning's book, "The Practice of Modern Optometry"; a mimeographed five-page "National Educational Bulletin #1," dated 1939, listing the "Fundamental Principles" and detailed instructions for a 21-point clinical procedure to be followed by College members; an undated seven-page pamphlet by Wm. Henning entitled "Sensible Food Selection," courtesy of "Drs. Henning & Bursack, 411-414 Black Bldg., Fargo, North Dakota"; and a long personal letter dated Aug. 31, 1936, from Dr. Henning to Dr. Reinke discussing a mechanical flaw in the Syntonizer which Reinke had purchased, a reference to a concern of Dr. Loeb about payments, and the procedure to be followed in a variety of mostly ocular clinical conditions.

The two books authored by Dr. Loeb indicate that he was some sort of physician, perhaps naturopathic. The texts are clearly intended for physicians. Henning identified himself as both a Dr. of Naturopathy and Dr. of Optometry. One of the letterheads suggests that Bursack was a naturopath. Various rubber stampings in the contents of the total packet clearly identify Albert R. Reinke as an optometrist, somewhat victimized perhaps.

I personally knew Dr. Henning while he practiced in Columbus, Ohio, in the early '40s. He suddenly disappeared under threat of arrest for fraud.

H.W H.

Helmholtz's contributions:

"Hermann von Helmholtz, M.D. (1821-1894): Father of the Ophthalmoscope," is the title of a brief and succinct review of Helmholtz's contributions to the eyecare professions by G. Peter Halberg, M.D., in the May/June 1994 issue of *Eyecare Technology*, Vol. 4, No. 3, pp. 35 and 104.

H.W H.

Deju vu:

Not unlike the optometric efforts in the English speaking world beginning earlier this century to agree on a title or designation for the profession, the Chinese are presently challenged to invent and adopt an appropriate set of Chinese characters to identify more

accurately today's optometrist. It must be presumed that prior Chinese terms or descriptive phrases have been in use for centuries to identify persons who did sight-testing and spectacle fitting but apparently no exclusive or functionally identifying appellation has emerged comparable to the English word "optometrist."

At the Ninth Asian Pacific Optometric Congress George Woo challenged the Chinese delegates to invent a suitable set of characters to serve as the designation of the profession into the future. The delegation drew up six versions. After much discussion and debate a vote was taken. Two versions showed greatest acceptance. It was agreed that these should be circulated for wider consideration before finalization.

The six suggestions can be found in the June 1993 issue of *Vision Asia-Pacific*, Vol. 2, No. 2, p. 8

H.W H.

Refractometers:

Reminding us that in the strictest sense "objective refraction" calls for no involvement of the patient's judgement, Dr. Günter Ueberschaar of Jena, Germany, does a historical review of three refractometers developed during the period 1922-1926. These were the Thormer refractometer (Busch, Rathenow), the Kühl prism refractometer (Rodenstock, Munich), and the Henker parallax refractometer (Zeiss, Jena). He includes also the later Hartinger coincidence refractometer (Zeiss, Jena). The title of the review is "Über die Historie der Augenrefraktometer" and it appears in the *Deutsche Optiker Zeitung*, Vol. 47, No. 11, November 20, 1992, pp. 48-49.

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