Homer Hendrickson, OD

The Armbruster – A Modification

Pasadena Visual Training Forum 1950

This is not a paper on Visual Training, but it has to do with our thinking in visual training. Because of subsequent papers to be presented today and tomorrow it was felt by the committee that we who are attending should have a common understanding of the subject. Several of you are better qualified to present and discuss this topic since you have worked with it at great length at Ohio State University in the past summers. Nevertheless, here it is for whatever it is worth.

Retinoscopy has long been looked upon as a means of accurate measurement of the total dioptrics of the eye. It has, by its very name, been considered static, unchanging. True, it is an objective measurement. But, it is not a final, static, unchanging or accurate measurement in the accepted sense.

When Dr. Harold Lutes and I were attending our Optometric Alma Mater we were taught that in static retinoscopy we were measuring the amount of accommodation free of convergence with convergence under control. We had trouble understanding how convergence could be in control when a subject could not see the target with both eyes while the observer was scoping the one eye. We were cautioned to adjust the observer's position so that the scoping was as nearly as possible on the subject's visual axis. This of course permitted no fusion by the subject.

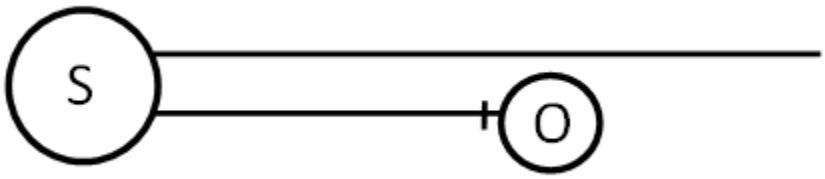

Figure 1 S=subject O=observer The small vertical line in front of the observer is the retinoscope being used to directly view the subjects right eye, with the subject viewing a distant target with their left eye.

Thirteen years ago, while in school, we made a gadget which we came to know as the Lutescope (Figure 2). With this we could scope on eye without interfering with the line of vision of either eye. We placed the working lens in front of the second mirror so that the eye being scoped was not blurred by the working lens. The scoping was done through a phoropter. However, with convergence truly in control we discovered nothing very startling about the findings and soon discarded the apparatus. We concluded that it did not seem to make much difference whether convergence was in control or not. If we saw any other phenomena, it had little meaning for us at that time.

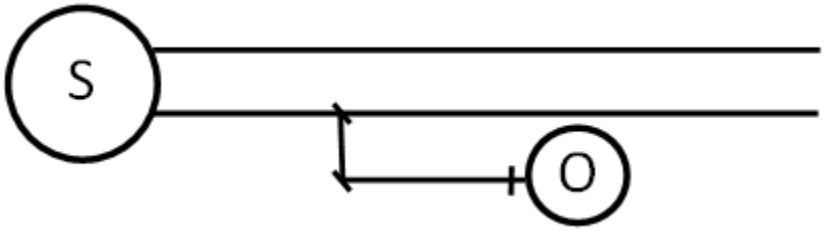

Figure 2 shows the Lutescope which now allows the Subject to view the distant target with both eyes, while offsetting the Observer still allowing a clear view of the retinoscopic reflex.

We were also taught, the same as Dr. Ed Richardson, that hyperopia is a condition wherein the patient has a short eyeball. That is, the parallel light from infinity, or 20 feet, does not "focus" by the time it reaches the retina. This was easily measurable by the retinoscope using plus spheres since we could make the subject's retina and the observer's retina "conjugate", while the observer looked at infinity.

If you have heard Dr. Skeffington on this subject you already doubt this explanation of the above phenomena and are familiar with his reasoning. The nativist approach says:

1. Hyperopia is a condition wherein the patient tends to focus parallel light behind the retina.
2. If he sees a distance chart clearly, that is, reads 20/20 or better on Snellen letters, he accommodates, overcomes the hyperopia and the light focuses on the retina.
3. The best objective measurement of the hyperopia is with a retinoscope. By placing plus spheres in front of the eye and by neutralizing the shadow the hyperopia is determined.

Now the question arises, how can the patient continue to read 20/20, or his best acuity, and still display hyperopia measurable by the retinoscope?

Obviously, if the observer's retina and the test chart were conjugate, there would be no hyperopia to measure with the retinoscope, no "with" motion. On the other hand, if they were not conjugate, the observer couldn't read with his best acuity. The nativist explanation is that the plus spheres replace the accommodation and the question remains unanswered. Another question arises: Are conjugate foci a requisite for best visual acuity?

"Pellicle", according to Webster, means a "thin skin or film". A pellicle mirror is made by stretching a membranous substance over an optically flat frame and providing for a partial reflectance and partial transmission of light by the membrane.

Commonly employed are the so-called half-silvered mirrors. Here, we have not half-silvered mirrors but half aluminized mirrors. More correctly, these are mirrors which transmit about 60% and reflect about 40% of the incident light and which happen to be coated with magnesium fluoride on each surface to reduce reflections and absorption from and by the glass and glass surfaces. These mirrors are known as beam splitters. These comments may be known as hair splitters. At any rate, these are anything but thin except for the aluminum oxide coating.

At Ohio State, using similar mirrors, the retinoscope findings have been investigated by scoping, on axis, with the observer out of the line of vision. In addition, both eyes may be scoped at the same time, each

by a different observer (Figure 3), while the subject reads the test letters. Lenses are not introduced in the line of sight but between the observer and the subject's eye, on the observer's side of the mirror.

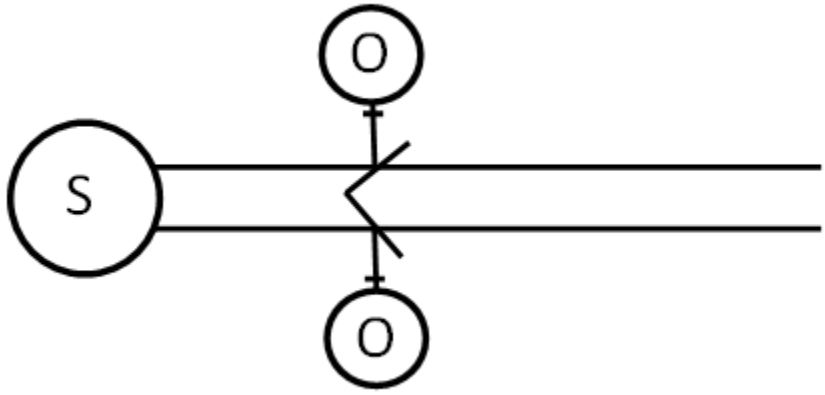

Figure 3 shows the setup which allowed for two different people to use their retinoscopes, each observing one eye, but at the same time, still allowing the subject the ability to look with both eyes together at a distant target.

Lo and behold, while the hyperopic subject is "conjugate" and reading his best acuity, 20/20 or better, at 20 feet, the observer sees with his retinoscope a "with" motion, in an amount over and above that expected because of his working distance. This motion may be neutralized with plus spheres, not in the subject's line of vision and without affecting the subject's acuity. Using this method, it is found that the hyperopia measurable is not static but variable, flexible, and it appears in amounts comparable to the hyperopia found by the usual method. In fact, it appears in children the findings may be more, and often less than that found by the usual method.

If you have never experienced this phenomenon we invite you to use this gadget, made by Dr. Lutes, while you are here in attendance. A chart will be set up in the adjoining hall and there are several different types of retinoscopes so you may use one you are familiar with. Find a hyperope in the gang sessions this evening, tomorrow morning and afternoon and take turns scoping each other. Then let's have a discussion and an explanation of what we are measuring with a retinoscope.

In conclusion, we report very briefly an investigation made two years ago in our study group using these mirrors. One of us as subject read the letters on the central target of Polaroid rings as the rings were made to approach and recede, or as the central target was made to approach and recede, while observers scoped the right and left eyes simultaneously. Noticeable changes were found in the neutralizations whenever there were changes in the apparent distances of the rings of the central figure.

These are demonstrable phenomena which cannot be ignored, and in fact, are highly useful and significant when used in your thinking in connection with refracting and visual training. This is particularly true in work with pre-school and school children. You will hear more of their significance in Dr. Emery's paper.

(Typed from the original December 2021 by Paul Harris, OD from the papers of Robert A. Kraskin, OD)

HAROLD RAYMOND LUTES, O. D.

Enjoying the confidence and respect of his patients and colleagues, Dr. Harold Raymond Lutes has achieved an important position in the community, not only in his profession as an Optometrist, but also for his inventive genius. He holds many patents on medical, optical and photographic devices, is well known for his scientific work in these fields, and has 57 major inventions to his credit. He is the author of articles in Optometric trade publications. The Optometric Weekly of November 10, 1960, published a story and award for Dr. Lutes' contribution to Stereo Photography.

Dr. Lutes has the distinction of being honored with Associate Membership in the largest photographic organization in the world, the Photographic Society of America. In 1958 he received the Service Award from the same organization and in 1960 the Realist Award for "Greatest Contribution to Stereo Photography and Vision". These contributions include the design of many photographic instruments and processes for stereo vision and photography. Dr. Lutes designed "The Triad", the only stereo slide projector commercially available in this country. He was recently given Fellowship with the Southern California Council of Camera Clubs, which is the highest award given.

During the last two years, Dr. Lutes has given much attention to contact lens research, both in fitting and manufacturing processes. During his 18 years of practice, he has fitted hundreds of patients with contact lenses, and he applies his scientific knowledge to the design for each individual case. He has designed many surgical instruments for the Huntington Hospital Research Foundation.

Since 1950 Dr. Lutes has owned and operated the H. L. Instrument Company in South Pasadena, which was organized for research and manufacturing of photographic, medical and optical equipment. At the Indenticolor Laboratories, another one of Dr. Lutes' scientific enterprises, he produces color slide duplicates for business, education institutions and industry.

Born in Christopher, Illinois, on April 20, 1916, Dr. Lutes is the son of Mr. Russell Raymond and Mrs. Minnie B. (Bray) Lutes, who live in Santa Ana, California. Dr. Lutes received his first technical training in photography and his inquisitiveness about the subject matter of photography and optics from his father, who is a well known portrait photographer, and has been interested in photography for 60 years. The father of Dr. Lutes has been an active member of the Methodist Church for many years, and helped to found the Methodist Organization "The Methodist Men", the plans for which were first started in the living room of his home. The organization is now worldwide. The mother of Dr. Lutes is also an ardent supporter of the Methodist Church, and has done church work in Santa Ana since 1921.

Dr. Lutes' family moved to Santa Ana in 1921 where he attended grade and high school. He continued his education at Santa Ana College, and graduated from Los Angeles College of Optometry in 1938. He took a summer course in Psychological Optics at Ohio State University and extension courses at the University of Southern California and the University of California in Los Angeles in Engineering.

After termination of his service during World War II in the Army Signal Corps from 1942 to 1943, Dr. Lutes set up practice in the same block on South Garfield Avenue in Alhambra, where he now maintains his professional offices at 35 South Garfield Avenue in Alhambra.

Dr. Lutes married Dorothy J. Johns in the Presbyterian Church in La Crescenta on October 21, 1944. Mrs. Lutes, the daughter of Dr. L. Johns, prominent dentist and pioneer of Montrose, California, belongs to the women's organization of the Kiwanis Club, and is past president of the ladies' auxiliary of the San Gabriel Valley Optometric Organization. Dr. and Mrs. Lutes have two children, a daughter Nancy Lutes, aged 11, and a son, William Harold Lutes, aged 6. Both attend Willard Elementary School in Pasadena.

Dr. Lutes is past president of the South Pasadena Kiwanis Club, and past president of the San Gabriel Valley Optometric Association.

The hobbies Dr. Lutes enjoys are photography, hi-fi music recording and medical research work.

His philosophy of life is "improve living" by scientific research.

Transcribed by V. Gerald Iaquinta.
Source: Historical Volume & Reference Works Including Alhambra, Monterey Park, Rosemead, San Gabriel & Temple City, by Robert P. Studer, Pages 522-524, Historical Publ., Los Angeles, California. 1962.