Journal of Optometric Phototherapy

April 2012

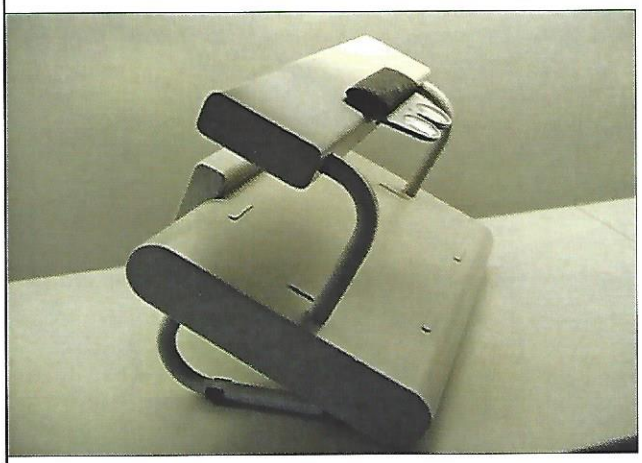
Syntonic Theory & The Visual Process

Low Light Therapy To Treat Ocular Pathology

Is UV Good or Bad? Health Benefits and Risks Involving Ultraviolet Light

Phototherapy Research Update

OPTOMATTERS — SYNTONICS — EQUIPMENT— 2012



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A new colorfield tester with 2 build-in camera's and 1 LCD screen for a better Test observation and a correct charting of fields

Incl: 1 COFMA, 1 case test sticks, 50 charts for the left eye, and 50 charts for the right eye, one 12volt adapter, CE & URL Norm.

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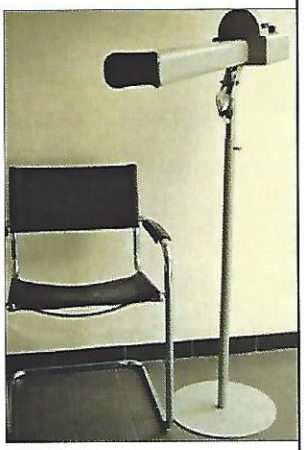

A new Syntonizer for office Training. This instrument has the following integrated filters: alpha, delta, theta, mu, pi, omega, upsilon, lambda, D, S, N.
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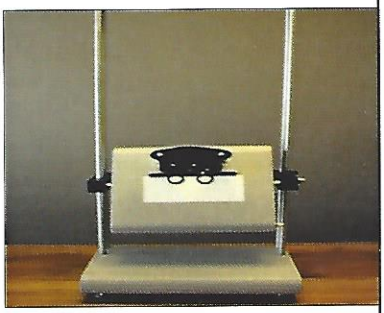

This total new concept will be able to chart a VO Star while giving a syntonic stimulus. So you will see directly how the filter combination changes the Visual- and behavioral projection in space.

Price: 5.800,00 Euro excl. shipping

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College of Syntonic Optometry

A NONPROFIT ORGANIZATION DEDICATED TO RESEARCH IN PHOTORETINOLOGY, THE THERAPEUTIC APPLICATION OF LIGHT TO THE VISUAL SYSTEM

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Submission of Manuscripts

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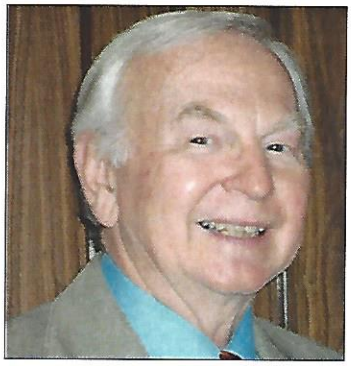
The President's Message

Don Barniske, O.D., FCSO



This is a great, interesting and exciting time for the College of Syntonic Optometry. The greatness is exemplified by our 80th International Conference on Light & Vision being held in Colorado later this year. Multiple health care organizations including traditional Behavioral Optometry, Occupational and Physical Therapy are now recognizing that light therapy enhances the success of their treatments. Our excitement is generated by this interest and by the dedication and thoughtfulness of our members and associates in bringing their expertise to bear on an increasingly aware patient population. Working with these dedicated professionals, in camaraderie unparalleled in other health care organizations, is making this growth in the awareness of the effectiveness of light therapy treatment a reality.

The expertise of our members is demonstrated by these significant accomplishments during the past year:

- The FDA has approved the College's Syntonizer for patient treatment. This was accomplished due to the persistence and perseverance of past president Larry Wallace. Well done Larry.
- The international development of Syntonic Phototherapy is progressing rapidly. Europe is developing more practitioners with the eclectic educational efforts of Dr. Stefan Collier.
- The establishment of the Behavioral Optometry Academy Foundation (BOAF). Newly elected President Claus Ellinghausen of Germany and many CSO fellows and practitioners of Syntonics in the European Union are responsible for creating this new organization (Editor – see International News for more information).
- Dr. Simon Grbevski is helping build Syntonics in Australia and New Zealand with their annual conference and the ongoing activities of the Australian College of Syntonics.
- Canada, Mexico, Brazil, and Malaysia now have Syntonic members and light and color practitioners.
- In the U.S., the surge of interest in Syntonics is evidenced by discussions with members of COVD, NORA and individual ODs at various conferences and meetings.
- Our website is receiving many more visits from professionals and patients throughout the world. Increased requests for referrals and more information are being received constantly. Our members are making use of the enhanced Library content. These improvements have been spear headed by Dr. Tom Cunningham.
- In Syntony (A Mini-Guide about Syntonics) was published by Stefan Collier, FCSO and New Light on Fields (A new look at the visual fields exam) was completed and published Denise Hadden, FCSO.
- Work is ongoing to establish a Ph.D. through CSO.
- Our Journal of Optometric Phototherapy has been reformatted by Ron & Irene Wahlmeier.
- We are still working with leaders of the Western University of Health Sciences College of Optometry to integrate Syntonics into their program. Visual fields evaluation and light treatment equipment has been donated by Rex Cross of C&J Instruments. and Sonja Vanhimbeeck of Optomatters.
- Our CSO Vice President Dr. Mary Van Hoy, will be representing CSO at the NORA Conference. She has also been promoting Syntonics at several optometric conferences and lectures she has given.
- Past CSO President Dr. Larry Wallace and I lectured about Syntonics at the International Light Association in Montreal. Dr. Wallace also published an article in their journal.
- CSO Dean Dr. Ray Gottlieb published and lectured for the Society of Photo Illumination and Engineering. He has noted with amazement how many research articles about light effects on the body are now being published in scientific literature.
- Dr. Ed Kondrot is in Rome doing research on animal studies with micro current, and possibly light effects, on cellular physiology.

All of these amazing developments come together at our annual conference, which seem to get better each year. This year is no exception. Low Level Laser treatment of eye diseases, a new and interesting subject, will be presented. Please bring along an associate interested in Syntonics and attend the conference in Colorado Springs, CO May 2-5.

Syntonic Theory and The Visual Process

Geoff Shayler, BSc, FCOptom, FCSO

It is difficult without access to such techniques as fMRI to prove the effect of optometric (syntonic) phototherapy, however in this article I wish to turn the tables and demonstrate how syntonic theory and practice can help us understand the visual process.

When examining a patient, an optometrist trained in syntonics, not only carries out a typical 21 point assessment, or similar, but carries out some supplementary tests, typically visual fields (using a campimeter), the "alpha-omega" pupil reaction, and use of Brock string as an assessment tool. They may also carry out pre-emptive tests using (Optomatters) syntonic goggles or microprisms in various positions to see their effect on patient performance.

In this article I am going to examine some of these tests and what we can learn from them when we consider the neurology behind the results.

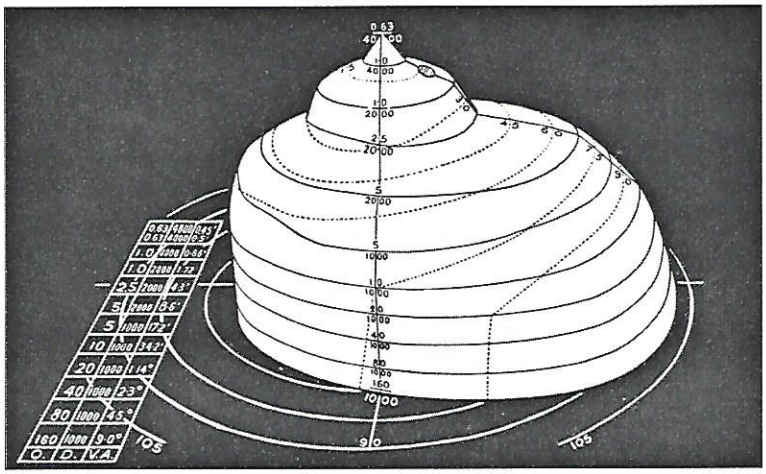
The visual field

Unfortunately technology has taken over so much in visual field analysis, that automated visual field analysis is based on an instruments' ability to identify and monitor glaucoma. Other conditions of a gross nature such as haemianopic defects associated with conditions such as stroke, pituitary tumor, brain tumors, etc., will also be identified.

Consequently, peripheral awareness is not considered to be an issue although it is intimately linked with many aspects of visual performance as well as survival mechanisms at the most fundamental levels of our nervous systems. It is also closely related to systems involved with balance, movement, stress and relationships. It is well accepted that 20% of the fibers that make up the optic nerve go directly to so-called lower (postural) centers in the brain rather than to visual centers as do the other 80%. However, those 20% fibers represent up to *80% of the area of the retina* - the peripheral retina. Apparently a large amount of visual information has little to do with "seeing" per se, but very much to do with being.

Traquairs model of the Island of Vision

Visual field analysis using different size targets, produces an "isoptre plot" similar to that seen on maps, and thus a 3D model of the visual field can be produced, the so called "island of vision in a "sea of dark".

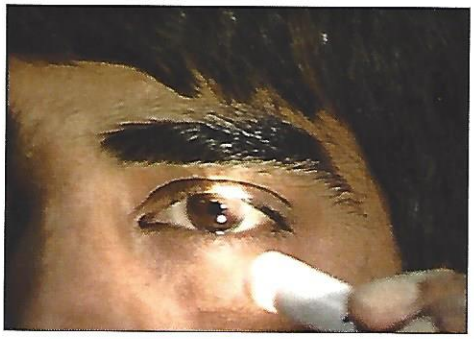


The alpha omega-pupil reaction

The late Dale A. Fast, O.D., F.C.S.O. identified that pupil examination is an important part of the evaluation of a patient who is to be considered for syntonics. One of the most useful tests is for an Alpha Omega (αω) pupil. This test gives the practitioner a good indication how the autonomic nervous system is functioning at that particular time. It indicates whether the sympathetic or parasympathetic is dominating the individual; specifically, it is indicative of inadequate adrenal function. The name was suggested by Dr. Paul Johnson after hearing Dr. Dutton Brewer's paper on pupillary asthenia in 1934.

To administer, the test, a penlight is pointed directly at the pupil of an eye while the patient fixates a distant non-accommodative target. Normally when the sympathetic and parasympathetic systems are in balance, the pupil will constrict and maintain that initial constricted size for about 15 seconds if the light is not varied. With an Alpha Omega pupil the pupil will constrict and then start to dilate back again. The quickness and amount of dilation will depend on how dominant the sympathetic system is over the parasympathetic.

Lets consider how the visual system reacts to (excessive) bright light - the fast magnocellular loop to the Edinger-Westphal nucleus will stimulate the parasympathetic to constrict the pupil to reduce light input. The slower parvo system, activating the sympathetic (fight or flight) system reacts to the stress of the bright light staying on the eye, has the opposite effect, dilating the pupil and exacerbating the problem! Thus we see the pupil re dilate – the alpha omega pupil.



So how can the body now deal with the situation……?
1) Squinting is a natural reaction to reduce discomfort in bright light, but causes a lot of strain to the obicularis muscles, and can't be maintained for long.
2) As my son-in-law noticed, covering one eye reduces glare and is a much more comfortable way to cut this glare problem, so we can conclude that the reaction to glare (or "excessive neurological input from the visual system") is <u>cortical</u> not ocular, (unless there is an underlying ocular disease such as corneal damage) and *Photophobia* can be therefore considered to be an inability to <u>react to and adequately control cortical input</u> from the eye.

This aspect of "monocular occlusion" was identified by Prof Stein at Oxford University in 2000 when he found improved reading performance of dyslexic children by "reducing binocular instability", however this is not addressing the cause and is an inappropriate treatment as it substantially reduces cortical processing according the research of Hubel and Weisel.

Is there another way to filter visual input to the cortex?

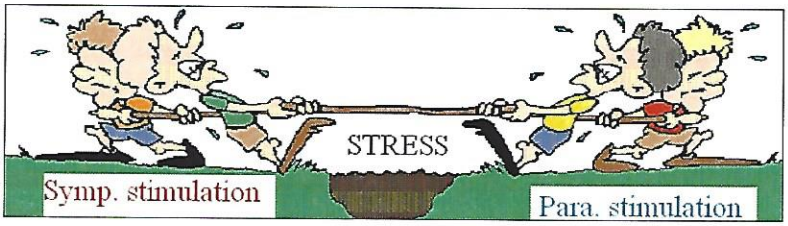
Despite the great influence that innervation from the retina has on the structure of the LGN, about 80% of the excitatory inputs to the LGN come, *not from the retina* but, from the primary visual cortex! The primary visual cortex thus appears to exert a significant feedback effect on the LGN. In other words, the LGN's main target may in turn modify the LGN's own visual responses.

Another observation lends weight to the idea that the LGN, just like the other subcortical structures involved in vision, does more than just passively relay information from the retina to the cortex: the LGN may be activated by brainstem neurons whose activity is associated with *vigilance* and with processes related to *attentiveness*.

This modulation of the response of the LGN neurons tends to confirm that the LGN is actually the first location on the visual pathway where particular mental states can influence our visual perception.

Proposed schematic "model" of filtering system activation at the LGN to reduce cortical overload. The use of a lens, prism or tint may reduce stress within the visual process requiring less "filtering" at LGN allowing more cortical processing to take place

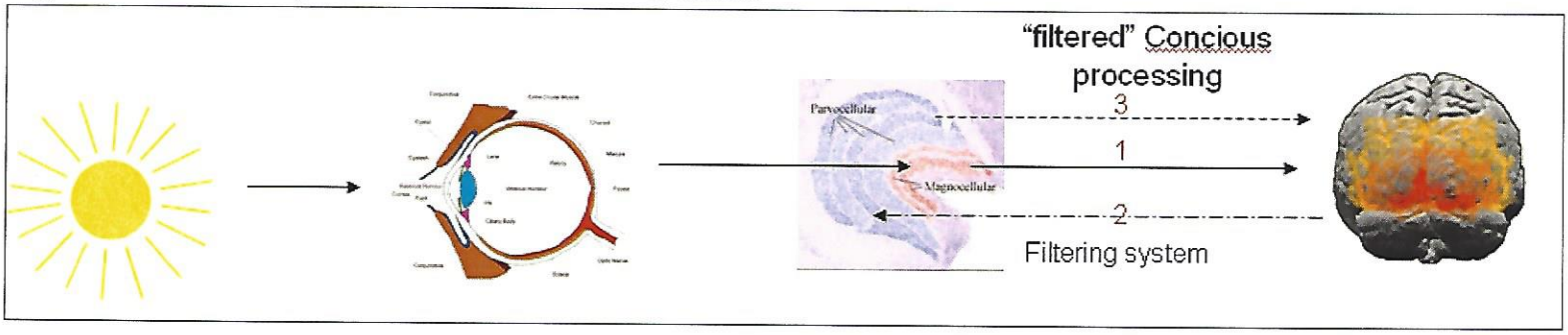
If we follow this thread, the parasympathetic also stimulates convergence and accommodation. When an individual finds close work stressful, the reaction of the sympathetic will attempt to negate other parasympathetic actions, i.e. dilating the pupils (aω pupil), diverging the eyes and reducing accommodation (an exo flight response), however as it is necessary to succeed in school by reading, additional effort is forced into the situation to attempt to enable the individual to perform at near (at a reduced performance level) *and* at the expense of mental and physical energy leading to: convergence insufficiency (or adaptive convergence excess, an eso fight response), restricted range of clear near reading, reduced accommodative facility, poor pursuit and saccadic eye movements, reduced fusional reserves, etc.



How does this LGN? filtering affect the visual process?

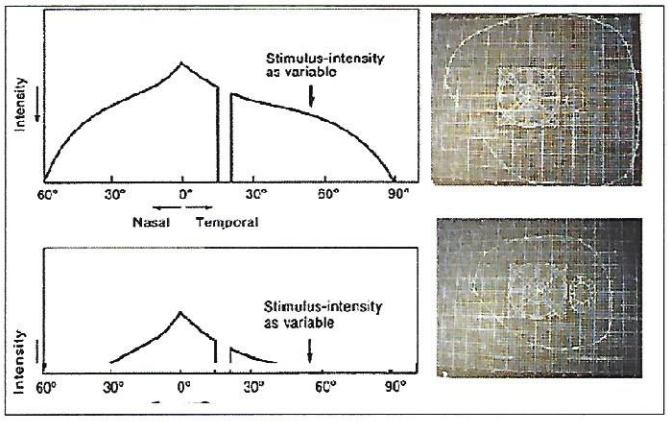
If we consider Traquairs model of vision as a measure of sensitivity across the visual field, then changing the stimulus threshold reduces the field, as a result of which the body can reduce cortical input (overload) and consequent stress. This is what we typically find when measuring the visual field in these patients!

Thus a reduced functional visual field is going to impact

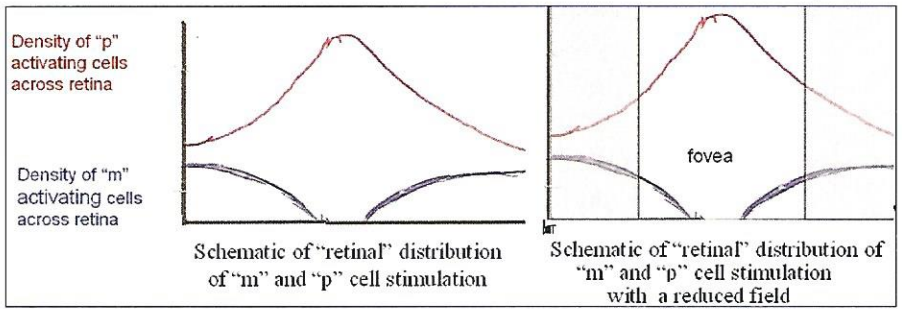


on all those areas.

Thus a reduced functional visual field is going to have an impact on all those areas involved in the "p" pathway.



That's the theory but have we evidence of this? Consider the distribution of "m" and "p" activating cells across the retina.



Schematic of "retinal" distribution of "m" and "p" cell stimulation

Schematic of "retinal" distribution of "m" and "p" cell stimulation with a reduced field

Thus the effect of reduced peripheral function will have a greater effect as a percentage of the total population of "m" cells than "p" cells. It will also reduce cortical processing, which, as demonstrated earlier, is a necessary demand to reduce neurological stress The inappropriate effect of neurological stress on the visual system causes it to shut down peripheral function in order to reduce cortical overload. This causes more impact on dorsal (motion) processing functions than ventral (static) processing functions, but both are affected as, according to Eric Hussey OD, parvo needs magno input in order to adequately function

The "m" cell pathways primarily deals with :

- Integration of visual, vestibular and proprioceptive inputs to maintain stable and upright posture and balance against gravity (Skeffington A/G).
- To attend to an object of interest by the integrated control of eye movements, convergence, accommodation, etc., (Skeffington C).
- Is involved in the processing of motion, via the dorsal stream.

Effects of **dorsal** stream dysfunction will primarily include magno driven functions :

- Convergence insufficiency.
- Reduced accommodation.
- Reduced range of clear near vision (accommodative flexibility).
- Reduced speed of focus change (accommodative facility).
- Poor eye movement control – pursuits and saccades.
- Poor motion coherence measures.
- Reduced fusional reserves.
- And related to *a reduced functional field of vision.*

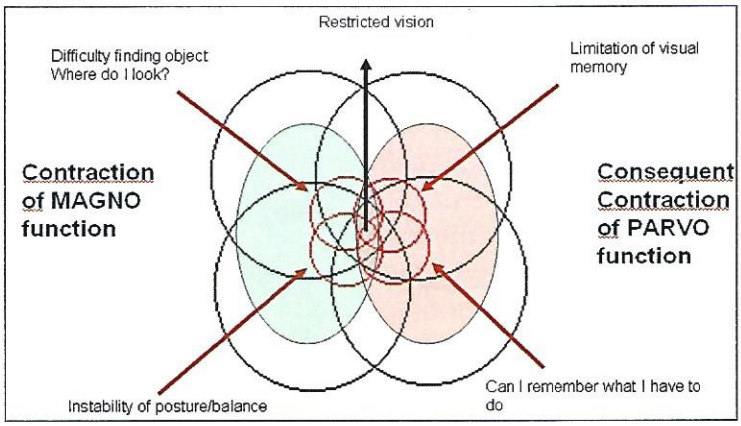
The "p" cell pathway primarily deals with :

- Detail, colour and identification of the object of attention and the utilization of visual memory (Skeffington I).
- As a result of being able to name, describe and understand the object of attention, (or have that object described to you) leads the individual to a state of cognition, (Skeffington S/A).
- Is involved in the processing of static objects, via the ventral stream.

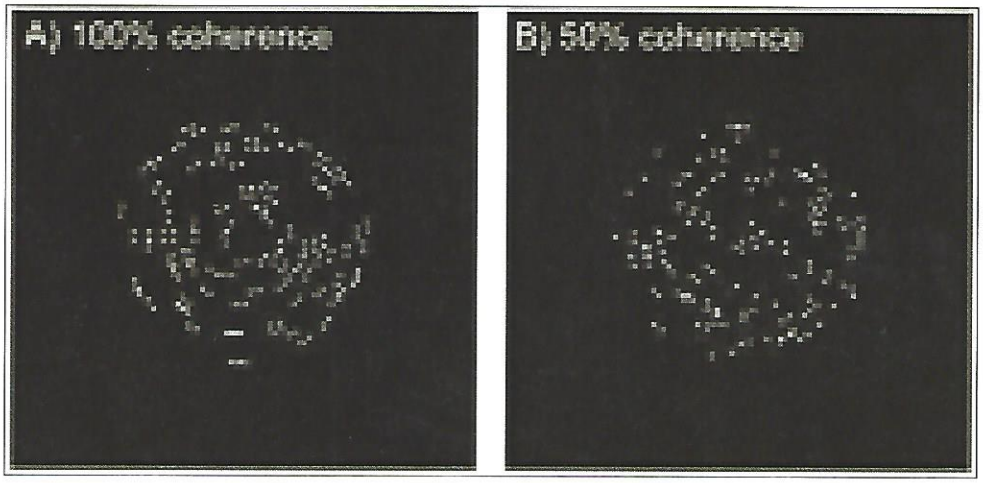
Effects of ventral stream dysfunction will primarily include **parvo** driven functions:

- Poor language and comprehension skills leading to reduced performance in school as measured by school (SATs) exam in reading, writing and maths.
- Reduced speed of reading (Wilkins rate of reading test).
- Poor fluency of reading, lack on intonation, boring to listen to.
- Behavioural problems, unable to sit still, unable to maintain concentration, disrupt other pupils.
- Poor static coherence measures.
- And also related to *a reduced functional field of vision.*
- Dis-organization of VO star.

We can consider that contraction of the visual field relates to contraction (or imbalance) of magno/parvo, leading to corresponding visual (and auditory) limitations as shown in the Skeffington four circle concept.



Static form and motion coherence testing

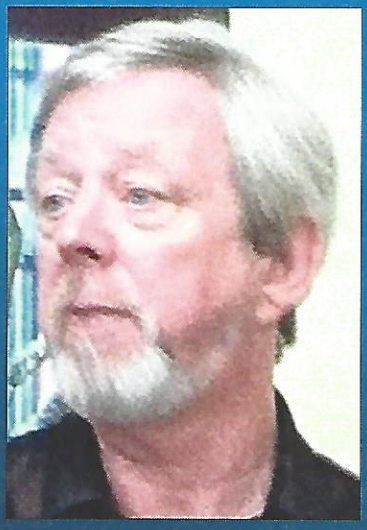


Within my practice we have been using a computer program that allows measurement of threshold processing of both static form (p pathway) and motion (m pathway) and have shown direct links between these measures and both reading ranges and visual fields. We have also shown the changes that occur both with the provision of low plus/yoked prism lenses and when using vision therapy with syntonics, see table below of changes recorded for (average) near point (np) of clear focus (accommodation), far point of clear near focus (fp), accommodative flexibility (af=fp-np), fp/np ratio, static and motion coherence testing pre/post therapy.

Conclusion

Syntonic theory and clinical testing can stand up to scrutiny. Understanding the background behind syntonics increases our knowledge of neurological function. This knowledge improves our ability to help our patients.

	age	np	fp	af	fp/np ratio	static	motion	
pre vt	10.05	14.79	22.43	7.89	1.51	25.61	50.73	n=15
post VT		8.58	80.26	51.89	7.91	16.33	24.05	n=20
improvement		174%	358%	658%	524%	157%	210%	



About the Author:

Geoff Shayler qualified as an optometrist from City University in 1973. He is in private practice in Wareham, Dorset, United Kingdom.

His special interests involve developing and utilizing new assessment and therapy techniques for conditions that are affected by dysfunction or damage to the neural pathways, such as Streff syndrome, strabismus, mild traumatic brain injury, stroke, Alzheimer's and Parkinson's diseases.

Mr Shayler is the first UK optometrist to receive Fellowship of the (US) College of Syntonic Optometry.

Low Level Light Therapy To Treat Ocular Pathology

Larry B. Wallace, O.D., PhD.

This is a follow up to the wonderful article written in the April 2011 *Journal of Optometric Phototherapy* by Ray Gottlieb, O.D., PhD. In Dr. Gottlieb's research review of photobiomodulation, we were introduced to the extensive studies being published in the Journal of Photomedicine and Laser Surgery. Many of these studies support the science of Syntonic Phototherapy and point to the many treatments for ocular pathology using low level light therapy (LLLT). This emerging field offers optometry a tremendous opportunity to treat eye disease without surgery. The College of Syntonic Optometry, as the thought leaders in light therapy for optometry, is ideally positioned to lead in this exciting new field.

Syntonic Phototherapy has for 80 years treated a wide range of visual dysfunctions and certain ocular pathologies such as cataract, corneal insults, ocular inflammation, and field loss from retinal disease and glaucoma.[1] In much of this treatment, color filters delivered specific light frequencies through the eyes in order to restore balance in the autonomic and endocrine systems. This was described as a non-local or systemic treatment to support visual health. For example, as the parasympathetic nervous system was activated, an anti-inflammatory response via the neuro-hormones would speed healing. It is this supportive role of the Autonomics that restores function in many of the neuro-motor imbalances in vision. Syntonic treatments are less common for local or specific eye conditions. However syntonic filters, typically in the indigo and blue-green frequencies, are prescribed for local effects to reduce anterior segment inflammations. In the field of photo-medicine more attention and research is focused at local or the tissue level. The downstream effects of light are only now being more carefully scrutinized by medicine.

As an introduction to LLLT, a sampling of the research will be discussed. The field of photo-medicine, therapy has been restricted to a treatment window between 600 and 1200 nm (red to infrared) that penetrates the skin. It is in this range that molecules easily absorb light for energy production and oxygen delivery. It is also in the outer skin layers that light can be accepted by Rhodopsin, Hemoglobin, Myoglobin, Cytochromes , Melanin, ATP, NADH, FADA and other molecules. Photon absorption at the cell and mitochondrial membranes increases ATP levels, membrane permeability, neurotransmitters, nerve cell potential, and axonal transport. This results in tissue repair, anti-inflammatory effects and temporary neural blockage for pain relief. It has been found that multiple treatments per day are more beneficial for cellular proliferation and metabolic rates. It is has been determined that a unique dose frequency may exist for difference tissues and cells. Variations in light exposure, irradiance, treatment frequency, regimens are needed to achieve optimal therapeutic results. It had also been found that the oxidative bursts following light stimulation are greater than are released in cell metabolism.[2] It is a bit like syntonic theory, using blue for attracting oxygen in acute conditions, and the red end of the spectrum for physiological balance in chronic states. The Society for Photobiology is an immense research resource for the effects of light on biochemistry. The Journal of Photo-medicine and Laser Surgery is available for members of the American Society of Photobiology at photobiology.org. The sheer number of publications in this field is very exciting for the light therapy community.

Most studies in photo-medicine utilize non thermal lasers in the 630nm to 760nm (near infrared) range, with a power of 7.5mW when applied to the eye for 30 to 40 seconds, administered 2 to 3 times during one week.[3] Deeper penetration is achieved with similar wattage but longer wavelengths in the 830nm to 880nm range. The most common source is the helium-neon laser. Two recent landmark studies by BT and T. Ivandic, and Hogue have successfully lowered intraocular pressure and treated macular degeneration with similar low level la-

[1] Wallace, L, "Ocular Pathology and Syntonic Treatment", The Blue book, College of Syntonic Optometry, 1995, www.collegeofsyntonicoptonetry.com.

[2] Lanzafame, R. , An Overview of Photobiology and Photobiomodulation, Presented at the 78th Annual Conference on Light and Vision, St Pete's Beach, April 2010.

[3] Gottlieb, R, Abstracts of Clinical Investigation of Low Level Laser therapy used on Various Ocular Pathologies, Dean's Corner, CSO Syntonogram, March 2, 2002.

sers.[4] Much of the ground breaking low level research was done in Russia from the mid 1970's to 80's using low wattage devices in the .05mW to .5mW range with longer exposure (1 to 2 minutes) administered several times a week for a few months. These researchers proved that the laser treatment increased DNA synthesis in retinal ganglion cells, restoring function in amblyopic and myopic degeneration. This was verified by ERG's. LLLT applied to retro-bulbar tissue drained metabolic waste during treatment of optic nerve dystrophy. Low level laser therapy also was found to increase epithelium and endothelium cellular function in the cornea and lens. In addition, therapy impacted circulation in the retinal vasculature and vitreous· Studies also were successful in treating corneal dystrophies, keratitis, ulcers, uveitis, and chorio-retinal dystrophies.[5] The therapy also reduced pain in over 90% of these inflammatory conditions and accelerated corneal wound healing following thermal burns, chemical burns, and cataract extractions.[6] Studies based on lymphoangiographic research also discovered that low level laser therapy intensifies lymphatic circulation increasing its flow and speed. The flow rate has been found to increase by 2x and the lymphatic volume by 37 to 60x after short durations of treatment.[7] This effect increases lymphatic drainage in retinal regeneration and lowers intraocular pressure, thereby facilitating regeneration of visual functions. Russian studies also found improvement in visual acuity, and reduced angioscotomas. Visual field deficit reductions varied from 10 to 75% with Humphrey Fields gaining an average 120 points.[8] Accounting for all these low level laser effects has created a broader perspective in treating eye disease. Researchers are now working with several wave bands (infrared, red, green and blue and various frequency modulations in the low hertz range. These lower frequencies (1 to 10 Hertz) allow the light to synchronize ocular therapy with physiological functions such as heart rate, respiration, and visual perception. This points to a treatment process with simultaneous physiological effects. It also opens the door to combining broad band color phototherapy such as Syntonics with low level light therapy for a more integrative or holistic approach.

Russian research, conducted by photo-biologist Tina Karu , investigated in depth the biochemistry of applying laser light to cellular function. Dr Karu's many years of research has paved the way to understanding the biochemical mechanisms of light therapy on cells and tissue. Her latest research has proven that colored light does not have to be coherent or laser like. The cells respond to non -coherent and LED light sources in the same patterns as long as monochromatic colored light is used.[9] This has made the cost of administrating light therapy fall dramatically. There are now hundreds of inexpensive LED therapy devices available on the internet. LED lights have wavelength widths up to 150 nm versus 10nm for laser light sources. The narrow band of monochromatic light has been shown to affect the cell's DNA, the mitochondria, and to drive at least five vital processes: cell motility, nutrient transport, ATP synthesis, immune response, and cell cycles. Monochromatic light has also been shown to normalize redox potential, act as an antioxidant, improve metabolism via enzyme stimulation, regenerate neuronal tissue, and increase dendrite connections to improve brain function. LED therapy is used for wound healing, relaxing muscle and nerve transmission, increasing blood circulation, stimulating connective tissue growth and fibroblastic activity, increasing RNA and DNA synthesis, increasing the formation of new capillaries, and for photo-rejuvenation of skin.[10] LED therapy may be administered for 10 to 20 minutes. Most devices treat with colors in the red and infrared range. Infrared has the advantage the deepest penetration into tissue. Infrared has been used for brain injury, cataract reversal, and retinal damage. Newer LLLT devices such as the Delta Laser combine infrared laser with red-blue-green-yellow LED's along with ultrasound to treat a wide range of conditions including optic neuropathies.[11] This appli-

[4] Ivandic, BT & Ivandic, Low Level Laser Therapy Improves Vision in Patients with Age-Related Macular Degeneration, Photomedicine and Laser Surgery, (2008)26(3): 241-245. Glaucoma: Infrared Light Treatments Reduce Intraocular Pressure , Photomedicine and Laser Surgery, (2009)27(4): 571-575.

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cation applies the light to facial points penetrating into the brain. LLLT is also applied to points around eye corresponding to acupuncture points.

In her research, Sarah Cobb found that applying color to acupuncture points on the face, head, and spine is being used to treat binocular dysfunctions including strabismus, refractive error, glaucoma, macular degeneration, optic atrophy, and conjunctivitis. She has created a quartz incandescent light torch using colored glass to apply to these points. This therapy can also be applied in conjunction with syntonics to enhance clinical outcomes. Treatment points have also been found that systemically stimulate cortical and neurological points.[12] LLLT is also used to prevent ocular damage and rescue cells that have been damaged by ultraviolet light and toxic poisoning. A landmark study in this area was done at the University of Wisconsin.

The study by Janis Elles demonstrated that methanol poisoned rat retinas could be rescued from certain blindness using near infrared light. Treatment of two and half minutes each day for three days reduced the inflammation and rescued the retinal cells.[13] The light could reverse damage to the DNA and cellular mitochondria. This research was funded in part by NASA to develop LLLT to treat astronauts in space. The success of this therapy supports the use of LLLT for treatment of macular degeneration, retinal damage protection from bright light exposures and hypoxia. The success of treating with infrared was reported by Dr. Barbara Ann Kogan in Primary Care Optometry July 2005. An editorial supported the use of Infrared Therapy by optometrists as a means of expanding the scope of practice without rewriting optometry laws. Because LLLT is non-surgical, it provides OD's with a new array of treatment options.

Syntonic optometrists have been using phototherapy for 80 years to treat a wide range of ocular conditions. Therapy has included treatment of the underlying causes of ocular pathology such as inflammation, vascular congestion, autonomic and glandular imbalances. Syntonics has historically been used as therapy for cataracts, corneal disease, and glaucoma. Therapy for glaucoma has involved lowering Intra-ocular pressure and visual field restoration. The use of broad band visible light frequencies has been documented in the CSO Blue Book in treating 26 categories of ocular pathology.[14] Syntonic therapies typically prescribe blue colors to reduce ocular inflammation, pain, nerve irritability, and depress motor function. Red colors are used to stimulate nerves, motor function, and increase vascular circulation. Blue is emphasized for acute and red for chronic conditions. These colors are also frequently combined with green, which stimulates cellular metabolism, decongestion and waste elimination. At times the red-end and blue-end colors are alternated to stimulate and relax the sensory and motor systems to activate restoration. Certain conditions, like glaucoma, have a chronic and acute presentation and therapy will be different depending on the progression of the disease. Historically, early stages with high intraocular pressure will be treated with indigo or blue-green, and chronic stages with red and yellow-green frequencies.

R. Brooks Simpkins developed a series of diagnostic and therapeutic light therapy instruments for the treatment of functional and pathological eye conditions. For example, his ocular therapy protocol for glaucoma used red (10), green (10), and blue (5) for the chronic stages. He used green (10), red (5), blue-green (5), and blue (5) in acute stages.[15] This alternation and color combining varies from the syntonic approach to either stimulate or inhibit with one end of the spectrum at a time.

Another practitioner who used a slightly different approach is Edward Kondrot, MD. In April 2011, he wrote a paper "Homeopathic Syntonic Light Therapy in the Treatment of Glaucoma". In his paper on treating open angle glaucoma, Dr Kondrot found the best results by using red end of the visible spectrum. His patients were treated with yellow-green light for 10 minutes. This resulted in lowered pressure in 82% of the patients, of 5 mm HG for 5 hours. The light source was used at a very low level of 1.4 Lux. The combination of a homeopathic light exposure with a mild photonic stimulant had the most profound therapeutic effect compared to previous studies using brighter color and allopathic light sources.[16]

This study and one entitled "Early Diagnosis of Ocular Hypertension Using a Low Intensity Laser Irradiation Test" (Ivanic, BJ et al), stimulated this author to try low

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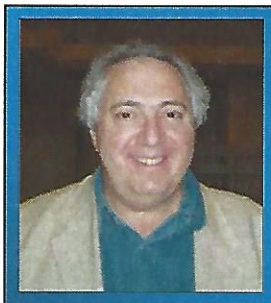
level light therapy on some glaucoma patients.[17] Tina Karu, at the October 2011 International Light Association Conference in Quebec, presented the latest research on low level light therapy and photobiology. As in previous research she confirmed that laser, LED, and broad band monochromatic light had equal biochemical effects. So I chose to treat using a "Photon Stimulator" produced by Lightforms in Prescott Arizona. This device consists of a light box, generating white light from a Xenon bulb, delivered by a fiber optic tube providing a narrow beam of light. Between the light source and the fiber tube is a space to place colored filters. I used a broad band red filter. Following the treatment protocol of the Ivanic study, I treated four patients for 40 seconds circling the limbus with red light. Recent research has concluded that the brain is most receptive to light stimulation at a frequency of 4 Hz.[18] Red light was pulsed at this frequency. The results were similar to Dr. Kondrot's study. Intra-ocular pressure was reduced 4 to 5 mm Hg as measured with a Goldmann Tonometer that lasted least at 4 hours. One glaucoma patient has been seen three times with the same results on each treatment. She was tested two weeks later and pressures returned to pretreatment levels. All patients treated were currently taking glaucoma meds and the therapy lowered pressures below 10 mm Hg is each case, on average from 12mm to 7 or 8 mm.

The German researchers, Ivanic et all, also used an infrared laser (780nm) to irradiate a 3mm sq. area on the conjunctiva for 40 seconds to treat macular degeneration.[19] This author followed their protocol and irradiated the macula area of AMD patients as they fixated towards their nose in order to expose the macula. The red fiber optic light was applied for 40 seconds at 4 Hz. One long term patient with visual loss from macular degeneration immediately improved two lines of acuity. The patient has retained this improvement for 3 months following two 30 second treatments given two days apart (acuity improved form 20/80 to 20/60). Three more patients have been treated, with two showing a one line improvement. The most dramatic result was a long term AMD patient whose acuity changed from right eye 20/800 to 20/200 and the left eye from 20/100 to 20/60 after one treatment. She was tested with 2 different charts at different distances to verify results.

A significant therapeutic aspect of all LLLT is the reduction of inflammation. Most dry eye patients have inflammatory tissues in and around the eye, especially in meibomian gland disease. I have begun using the fiber optic light device on these patients. Treatment involves irradiating the lid margins for 40 seconds, upper and lower. In almost all cases there is an immediate report of increased ease and comfort in and around the eyes. Biomicroscopy reveals an increase of up to 100% in tear breakup time and a significant increase in oil and discharge onto the cornea from the meibomian glands. These anecdotal case reports are very encouraging.

I have prescribed home syntonic filters for macular degeneration, glaucoma, and cataracts for 30 years and have seen the progression halted and stabilized for countless patients. The success in treating macular degeneration and retinitis pigmentosa led to my receiving the first patent to treat these diseases with micro current therapy, a therapy that uses low frequency electromagnetic energy.[20] My clinical experience has been that syntonic phototherapy has prevented progression of the disease and vision loss. The emergence of low level light therapy as a major treatment modality offers optometry a tremendous opportunity to expand our scope and help our patients, many for whom traditional medicine has no treatment. Syntonic phototherapy also may prove to be invaluable when used in conjunction with locally administered light therapies. Using LLLT with narrow band color on the eye tissues creates an immediate effect. Research will demonstrate the therapeutic longevity of such treatment. I encourage the reader to explore this modality and lead our profession to a new and more healthful approach than is now offered by pharmaceuticals and surgery.



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Is UV Good or Bad?

Health Benefits and Risks Involving Ultraviolet Light

Donald L. Barniske, OD, FCSO

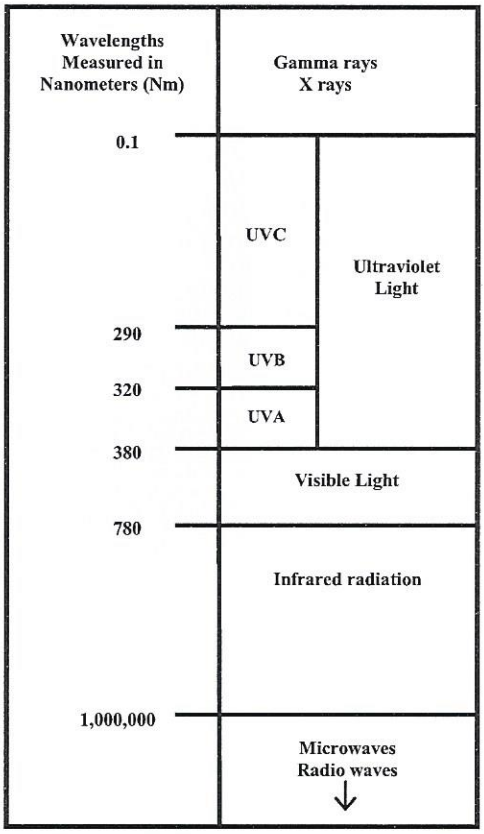
Patients ask their doctors every day about protection from the sun. They ask their optometrists, ophthalmologists, dermatologists, general practitioners and other healthcare professionals if and how much should they protect themselves from harmful rays. As optometrists, we are at the entry for many patients into the health care system. The media inundates us with information almost daily about harmful rays of the sun and their effects on skin and our eyes. But sunlight is absolutely necessary for life. It helps our physiology, mental balance, and is necessary to grow food. So what is all this fuss about sunlight and especially ultraviolet radiation (UVR)?

Ultraviolet radiation has been divided into UVA, UVB, and UVC. UVA is also called short wave ultraviolet and is in the range of 320 to 380 nanometers. UVB is called mid-range ultraviolet and extends from 290 to 320 nm. UVC is far range ultraviolet and extends from 0.1nm to 290 nm. So, the range of all UV is from 0.1 nm to 380 nm. Sunlight contains all UVR visible light, and IR (infrared radiation) that reaches the earth. About 8% of sunlight is UVR. All man made lamps emit less than full spectrum from the sun. Some of the newer "full spectrum" lamps are a close approximation of sun light. Researchers have proven that UVR is the most biologically active part of the spectrum related to human physiology affecting health.

Ultraviolet and the Eye

Our eyes use visible light and UVR for visual and non visual aspects of functioning. As optometrists, we study extensively the visual aspects, but not much on the non visual portion, or our reaction to UVR. But let's start with the anterior portion of the eye beginning with the tears, progress through the various ocular tissues and the effects of UVR upon them and finish with the retina and the non-visual aspects of our response to UVR mediated through the eyes.

The Spectrum of Electromagnetic Energy



Tears have negligible effect on UVR entering the eye, but when the tear film is compromised, the conjunctiva and cornea can be more acutely affected. Normally, the conjunctiva when overexposed with UVR can develop pingueculae and/or pterygia, the conjunctival tumors. The cornea is a filter to all wavelengths below 295 nm. Overexposure to UVR can result in actinic keratitis, band shaped keratopathy, and recurrent erosions. It can also trigger Herpes Simplex Keratitis.

The lens, aqueous humor, iris, trabecular meshwork, vitreous, and fundus are the only intraocular tissues that are continuously exposed to UVR longer than 295nm throughout life. Continuous exposure to UVR photochemically generates chromophores (pigments) in the lens which are responsible for the yellow and brown coloration (brunescence) due in aging. This alters the perception of color and some of the effects of UV/blue light on the intrinsically photosensitive retinal ganglion cells (ipRGCs) and systemic effects. The aqueous has tryptophan which absorbs UVR but because the aqueous composition and its rapid replacement, UV damage is thought to be insignificant. The iris and trabecular meshwork appear to be protected from UVR damage between 295-400 nm due to its absorption by the cornea and aqueous.

The vitreous is protected from deleterious effect of UVR by the filtering effects of the cornea and the lens. Aphakic patients risk shrinkage of the vitreous gel and denaturation of the collagen network from UVR up to 420nm. Intraocular lens design and inherent UVR filtration properties protect the vitreous after cataract surgery.

The retina is very sensitive to UV radiation between 295-400 nm, but is mainly protected by the cornea, lens, and vitreous. Cystoid macular edema was a problem with aphakic eyes due to loss of the UVR-absorbing lens. Current IOLs have the ability to filter

UVR and protect the delicate retinal cells. However, the non-visual receptors in the ganglion cells need stimulation for their systemic effects and should be remembered when selecting IOL lenses. Excessive UVR exposure can also be limited with selective eyeglass lenses.

In the retina intrinsically photosensitive retinal ganglion cells (ipRGCs) respond to the blue end of the spectrum that peaks at 460 nm and influence brain function through the retinal hypothalamic tract. They do not terminate in the visual cortex for sight recognition. The ipRGCs are located in the ganglion cell layer of the retina, whereas the rods and cones are in the outer plexiform layer. The ipRGCs innervate directly with the suprachiasmatic nucleus (SCN) in the hypothalamus and influence photostimulation for entrainment of our circadian rhythms. These ipRGCs have a very large dendritic arbor and have the largest receptive field of all ganglion cells in the retina. They contain melanopsin which is photosensitive to short wave blue light. When the ipRGCs are photostimulated, a polysynaptic circuit from the SCN suppresses melatonin release from the pineal gland and regulates circadian entrainment. Stimulation (via ipRGCs) also induces pupillary dilation,, increases heart rate, and alertness as measured by changes in frequency of EEG brain waves.

With UVR exposure the hypothalamic pituitary axis provides stimulation that releases various other hormones. Corticotrophin Releasing Hormone (CRH), ProOpio Melano Cortin (POMC), AdrenoCorticotrophic Hormone (ACTH), Thyroid Stimulating Hormone (TSH), and Gonadotropic Releasing Hormone (GnRH) are produced by the pituitary. And as production of these hormones is increased, the production of melatonin in the pineal gland is suppressed.. So, the pituitary and the pineal gland are antagonistic organs in the brain, via energy entering the eye through photoendrocrinology and other physical and emotional systems.

Visual light closest to UVR is violet in color. It is the highest energy of all visible light. The blue appearance of the sky is due to scattering of UVR in the atmosphere called the Rayleigh phenomenon, Blue light awareness is decreased due to the yellowing of the crystalline lens in the eye and is evident in the paintings of the aging artists. The UVR and shorter wavelengths of the visible spectrum are filtered by the crystalline lens and shift our perception towards the reddish end of the spectrum. The subjective sensation of color is only slightly altered by wearing clear UVR absorbing spectacle lenses, especially when viewing pearlescent paint colors of automobiles. The visual centers of the occipital lobe seem to adapt and survive with the diminished violet-blue perception.

Health Benefits from Ultraviolet

1. UV light on the skin (dermal phototransduction) starts a multiphasic process of nutrient production. Cholesterol concentration in skin is converted to pre vitamin D. Pre-vitamin D is changed to vitamin D by the normal heat of the body. Blood carries vitamin D to the liver for conversion to 25-HCC vitamin D then to the kidney that changes it to a more active 1, 25-DHCC vitamin D that is its most active form. Vitamin D is necessary for absorption of calcium in the intestines. The 1, 25-DHCC form enhances intestinal calcium binding proteins that are essential for calcium absorption, transportation, and collagen formation in the bones. Calcium is necessary for nerve function and helps prevent osteoporosis.

2. UV radiation lowers blood pressure. Normal blood pressures were lowered on an average of 6mm Hg systolic and 8 mm Hg diastolic after exposure to light. The patients with high blood pressure had a drop 2.5 times greater than the normal BP patients that lasted up to 5-6 days. Before pharmaceutical agents were developed, patients were treated with UV light very successfully by physicians.

3. UVR increases cardiac output from the heart. Research at Tulane School of Medicine indicates cardiac output was increased 39% in 18 of 20 subjects exposed to UVR.

4. UV radiation reduces cholesterol. Cholesterol concentration in the skin is higher than in other organs. When the cholesterol in the skin is converted to pre-vitamin D then the cholesterol lost is replaced by cholesterol in the blood stream. This cholesterol moves back and forth between the skin and bloodstream. Two hours after UV exposure 97% of the subjects tested had almost 13% decrease in blood cholesterol levels in a study of ultraviolet irradiation and cholesterol metabolism..

5. UV radiation therapy is an accepted treatment for people with psoriasis and for neonatal jaundice in newborn babies.

6. UV radiation resulted in improved EKG readings in patients with cerebral atherosclerosis. A study with 169 patients with cerebral atherosclerosis received UVR treatments, and at one year follow-up evaluations better EKG readings were present than initially.

7. UV light increases hormone levels. The production of various hormones, including CRH, POMC, ACTH, TSH, GRH is influenced through the hypothalamic pituitary axis. Melatonin production of the pineal gland is decreased with UVR stimulation and is increased in darkness.

8. Seasonal Affected Disorder (SAD) or winter depression, is affected by UVR entering the eyes. UVR affects the balance of melatonin from the pineal gland and serotonin, a hypothalamic neurotransmitter. The amount of UVR entering the eyes affect both hormones related to SAD.

9. Immune system is influenced by UVR. The white blood cell count is affected by lack of stimulation. The lymphocytes are increased with the UVR which helps produce interferon that help our immune function.

Consequently, the health benefits from UVR (and sunlight) are related to our daily exposure. So minimum daily requirements (MDRs) would be from ½ hour to 2 hours of exposure on 40% of our body each day. Very lightly pigmented people, at least ½ hour per day and very heavy pigmented skin would require about 2 hours to absorb the UV necessary for optimum health. Inadequate illumination may result in decreased energy levels; craving for carbohydrates, sugar and caffeine; tiredness and need for more sleep; lower sex drive; decreased attention and concentration; and mood disturbances.

Health Risks of Ultraviolet

Many health risks are obvious with too little UVR exposure as indicated by the health benefits list. But too much exposure will have deleterious effects on humans. So, moderation with UV exposure is recommended just like for food, water, and other nutrients for health. For example, to much oxygen given a baby can cause retinopathy of prematurity and blindness. That is what happened to Stevie Wonder! So, what happens with over (or under) exposure to UV?

1. Skin cancer and sunburn are associated with over exposure to UVR. Too much time in the sun will damage the skin. UVA can contribute to cutaneous malignant melanoma through DNA damaging molecules such as hydroxyl and oxygen radicals. Sunburn is caused by too much UVB radiation, which also leads to DNA damage and various skin cancers such as basal and squamous cell carcinomas. UVA and UVB over exposure can damage collagen fibers and accelerate aging of the skin. Unfortunately, some of the earlier sunscreen lotions with PABA were found to be cancer-causing when exposed to UVR while being used during sunlight exposures. The new lotions are more protective.

2. Over exposure to tanning beds also causes skin changes – not related to tanning but due to DNA and collagen changes if the time of exposure is too much or protection is not used. Eye cups are very important to prevent keratitis and cataracts due to over exposure.

3. Snow blindness from too much UVR exposure while skiing or in the snow for extended periods when the sun is out and the person is not using eye protection. Over exposure results in keratitis, conjunctivitis, and cataracts.

4. Welders, people working with photo flood lamps in the TV and movie industry, people working around carbon arc lamps are risking UV induced eye changes from keratitis, conjunctivitis, cataracts, and retinal damage. Eye protection is a must for prevention.

5. "Mal-illumination" due to artificial lighting affects human physiology. Circadian rhythm disruption and SAD are the most obvious physical changes due to lack of UV light caused by unbalanced illumination. Full spectrum lighting is recommended in sufficient intensity to prevent these problems. Exposure to sunlight and its UV qualities will help restore health.

6. Viewing Eclipse and Sungazing. Direct sun viewing will cause UV-induced retinal damage and corneal and lens changes.

7. Certain medications causing systemic photosensitization. There are several commonly prescribed medications when taken cause exaggerated sunburn through phototoxic and photoallergic reactions. Some of them are:

    a. Sulfonamides for chemotherapy and antibacterial Tx.
    b. Sulfonylurea for diabetes.
    c. Chlorothiazides for hypertension.
    d. Phenothiazines as tranquilizer and antihistamines.
    e. Broad-spectrum antibiotics used for infections.
    f. Griseofulvin for antimycotic Tx.

8. Some medications cause intraocular photosensitization. Phenothiazines, psoralens, and the tetracyclines are capable of causing enhanced photochemical damage to the choroid, retina and the lens.

9. Cosmetics and soaps may cause increased skin sensitivity and exaggerated sunburn. Halogenated antiseptic compounds used in soaps, cosmetics, and other consumer products applied to the skin may result in increased photosensitivity and photoallergic reaction to UVR.

The health risks can be minimized with awareness of the effects of over or under exposure to UVR. We can counsel our patients about the medications being used that may create increased sensitivity and reaction to UVR. The ocular and cutaneous responses can be prevented or minimized with sensible actions.

Using the logical method based upon research in vision, health, and medicine the conclusion is that we need UVR to help promote optimal health. The balance of physiology and our psychological health is enhanced with UVR. We all need differing amounts of UVR due to our general health, age, skin color, medications, life style, culture, and the geographic zone we live in. High in the mountains or below sea level (where I live, minus 150 ft) or northern Alaska with months of darkness or near the equator with 12 hour days and nights will determine what is available to use naturally. Artificial light exposes us to different wavelengths of light that alters our health.

Behind filtering windows or in front of computer screens and TV give us exposure to unbalanced electromagnetic radiation that physiologically changes us and our moods. But no one should go outside and overdo it in sunlight. Don't overcook your food or yourself! Sunlight and the UV effects on the body should start with short exposures increasing slowly relative to skin pigmentation and medications. Mid-day sun exposure in Southern California should be only 10 minutes of exposure on 40% of skin and eyes without protection. The UV index is published in many newspapers daily and gives the amount of time to stay in the sun at various times of the day. So UVR in moderation is necessary for optimum mind-body health. Figure out your personal level necessary and make it your goals. Your patients and family will appreciate you more with your knowledge and advice about UVR.

The ophthalmic industry has provided us with the absorptive curves for all lenses manufactured. We prescribe them everyday. Make yourself knowledgeable about the various lenses so you can make the best recommendations for your patients' optimum health and preventative care.

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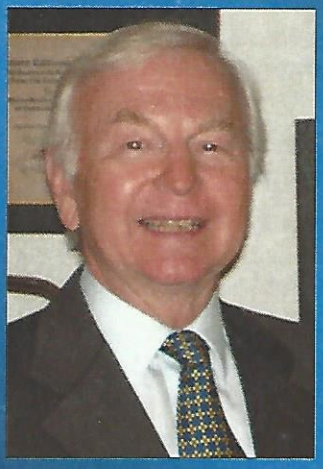
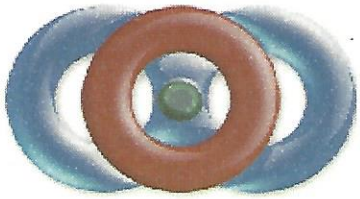


About the Author:

Donald L. Barniske, O.D. 1974 SCCO graduate, has a full scope rural optometry practice that includes Low Vision, OrthoK, V.T., Dyslexia, Syntonics, and Theraputics. The practice started in 1919 and was the first private O.D. practice with an Optical Coherence Tomographer (OCT) in California.

He is President of the College of Syntonic Optometry for 2010-2011 and is also a fellow of the CSO.

Editorial Letter from the President of BOAF



Dear Members,
Dear Colleagues,
A child is born.

Starting a new foundation for Behavioral Optometry is one thing. But, creating it is another. So the first question that pops up in my head is why, what, for whom? Well, why make things easy when it's also possible to make them difficult.

It is like having a new born child. You're thrilled during the pregnancy and making a lot of arrangements and decisions. It all looks easy and hopeful. Then the great moment of truth arrives, and you are aware that there are still a lot of things that have to be done. This is the feeling we have for the moment with BOAF.

Some colleagues and I got the idea to make a Behavioral Optometric baby and we are very proud to announce that a new European Behavioral Optometry family has been created. We choose to call this Foundation "Behavioral Optometry Academy Foundation" (BOAF).

The purpose of our foundation is to improve and advance Behavioral/ Functional Optometry, Syntonic Optometry, Neuro-Optometric rehabilitation (here after called Behavioral Optometry) towards the goal of better serving humanity in the care of the precious gift of vision.

BOAF wants to provide to their members post graduate seminars, meetings, workshops, articles and much more, for spreading the word about this wonderful profession. Invest in education in Behavioral Optometry is very important to our professional daily work. Since technology advances so fast, we also have to stay updated.

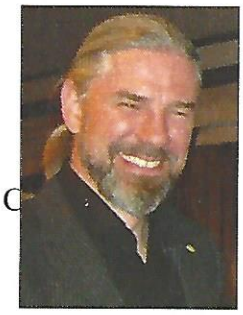
BOAF supports those needs for beginning and experienced practitioners. We can count on established entities and already successful programs. However, still we have to look outside of our own discipline and not forget the importance of an interdisciplinary approach. Therefore BOAF has already established liaisons with WVAO, CSO, OEPF, NORA and COVD.

As our dean said and I quote "The key word I think that defines our organization is visionary. Not as the idealistic or impractical meaning, but as a futurist and creative force in behavioral optometry of the next millennium. Optometry is experiencing unparalleled growth, driven in large part by technology that is more diagnostic than therapeutic. But it is the art and skill of the practitioner that is most important in giving care".

The family of behavioral optometrist continues to grow with the support of you all.

I hope to see you all at the BOAF continuing education programs.

Sincerely yours,



C
hausen
President BOAF

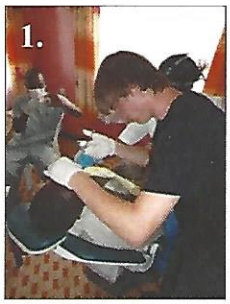
Members In The News

Donald Barniske, O.D., FCSO

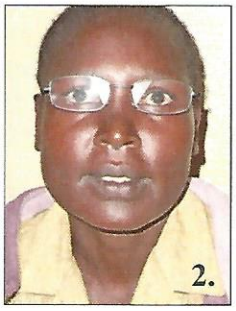
Dr. Barniske has received an appointment as Clinical Assistant Professor for Western University of Health Sciences College of Optometry effective January 27, 2012. This appointment is an auxiliary faculty position conferred upon volunteer clinical preceptors who supervise Western University of Health Sciences College of Optometry students participating in clinical education experiences.

Dr. Barniske was also recognized in the January/ February 2012 issue of California Optometry for his leadership role as Membership Chairman in California Optometric Association (COA).

Marisa Kruger, O.D., FCOVD



1. My 18 year old son was a dental assistant!



2. A woman with constant double vision sees a single image with glasses and binasal occlusion!

3. A visit to the Maasai village!
4. My Kenyan Daughter, Ivy!
5. Male lion only a few feet away!

Last summer Dr. Kruger took a small medical mission to Children of Hope Children's Home, Kitalale Kenya...and then went on safari! "We brought clothes, flip-flops, crafts, nurses and medical supplies, dentists and dental care supplies, me and 400 pairs of glasses and 19 people ready to do whatever work was needed. Over 1000 in the community came to Children of Hope. In three days my team saw 333 patients and dispensed 237 pairs of glasses. What would be interesting to anyone in the vision care community is that this population of 5 different tribes had some interesting preferences for prescribing. Although retinoscopy found most to be quite farsighted, the preference was for only a fraction of what was measured. Typical retinoscopy was +5 or more. Typical prescription was +1.25. Similarly those that were myopic were in the order of -8 or more. They only wanted -2.00. This population has a respect for education and reading is a big deal. Only one child is afforded an education while all the other children work as soon as they are able. They have almost nothing. We gave some people their first pair of shoes. They were happy gracious people. To God Be the Glory." Marisa

Edward Kondrot, M.D.

Dr. Kondrot will participate in a Microcurrent Research Project at Department of Ophthalmology at the University of Rome. He recently met with Prof. Mateo Russo and Marcella Nebbiosa to finalize plans to research the effects of microcurrent on an animal model of macular degeneration. He will have access to the University of Rome's research facilities for this exciting project which will begin in March 2012. Professor Russo has a very interesting theory on how microcurrent works to restore vision.

Shown above, Dr. Kondrot and Professor Russo at the University of Rome discussing their future microcurrent project.

Hans F. Lessmann, O.D., FCOVD, FCSO

Dr. Lessmann has been asked to run as a Candidate for the House of Representatives in the US Congress 2012, Pennsylvania District 14 on the republican ticket.

Slogan: ***"Less man more God, vote Lessmann"***

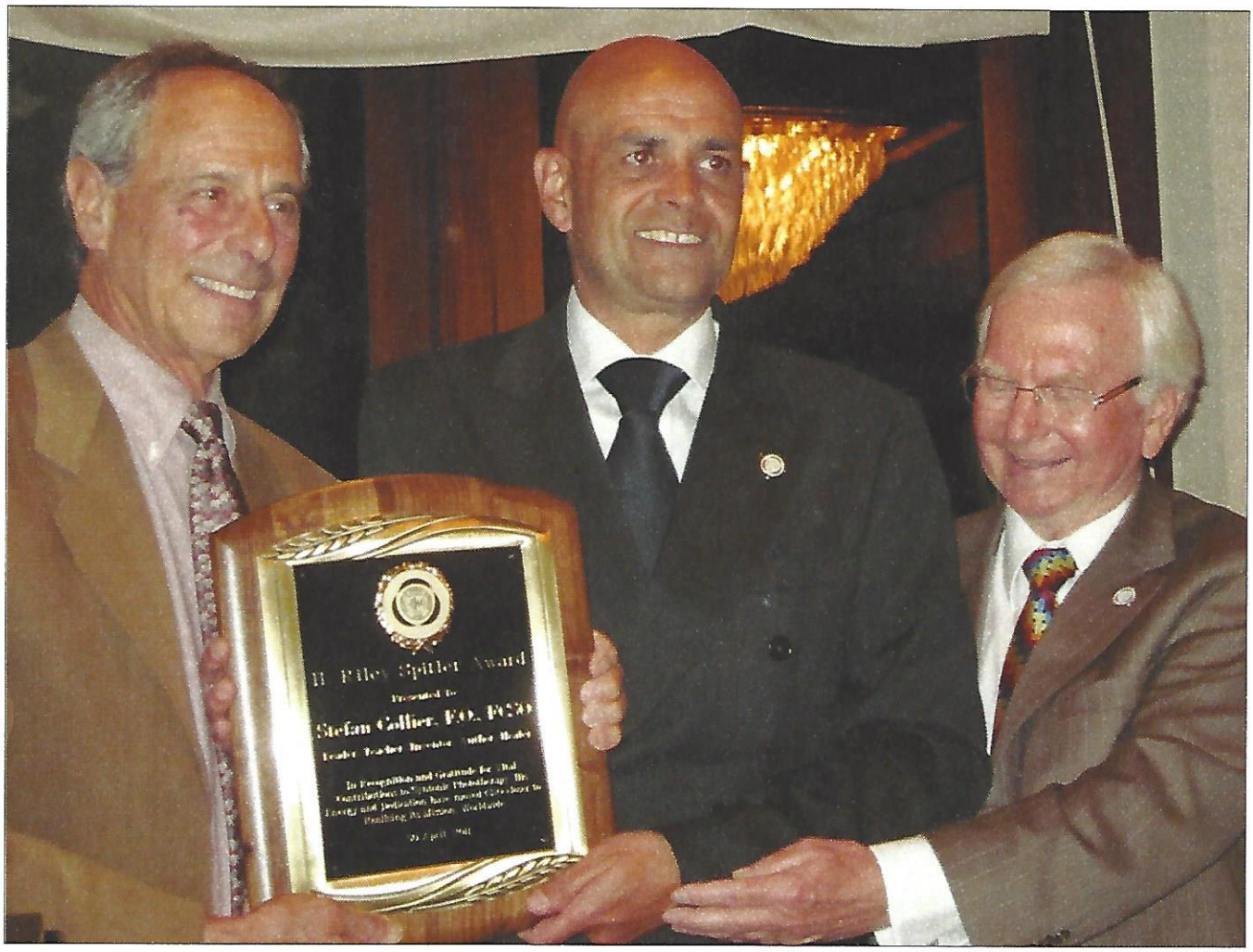
The Lessmann Family at daughter, Nicoles' Boot Camp Graduation 2006 Fort Lenard Wood Missouri.

College of Syntonic Optometry
H. Riley Spitler Award
presented to
Stefan Collier, F.O., FCSO

Leader, Teacher, Inventor, Author, and Healer.

In Recognition and Gratitude for Vital Contributions to Syntonic Phototherapy. His energy and dedication have moved CSO closer to realizing its mission, worldwide.

Congratulations and thank you for your service Stefan Collier!



Ray Gottlieb, OD, FCSO, Dean of CSO; Stefan Collier, F.O., FCSO; Don Barniske, OD, FCSO, CSO President.

Dean's Report: Phototherapy Research Update 2012

Ray Gottlieb, O.D., PhD, FCSO, CSO Dean

This year's review of research articles again extends the range of potential phototherapy applications via the syntonizer. It also makes us think about adding low level laser, LED and other light therapy devices to our optometric/ophthalmologic phototherapy tool kit. Photobiology and clinical phototherapy articles continue to increase in number and quality. It appears more than ever that we are moving toward a time when syntonists and other light therapists will no longer have to spend time, energy and emotion attempting to convince colleagues, patients, and sometimes employees, friends or family members that we are not self-deluded optometric nut cases.

Low-Level Laser Therapy Improves Visual Acuity in Adolescent and Adult Patients with Amblyopia

The Ivandics are at it again. In last year's phototherapy update I reported on their two pilot studies that examined the effects of near infrared light on macular degeneration and glaucoma. Their newest study suggests that low-level laser therapy (LLLT) can improve the visual acuity of adolescent and adult amblyopes. One hundred and seventy eight (mean age 46.8 years) and twenty control patients were followed over a seven-year period. The 231 treated eyes were nearly equally divided between strabismic and ametropic etiology.

The experimental group was treated with a low power near-infrared (780nm, 7.5 mW) diode laser held 1cm from the eye. A 3mm spot was directed onto the sclera toward the macula as the eye turned inward toward the nose. The treatment lasted for 30 seconds (0.22 J) and was repeated for a total of 3 or 4 times during the following two-weeks. The controls received mock treatments aimed at the nose.

Acuity for about 90% of the treated eyes increased by at least one line and more than half of these improved by three or more lines. The severity of the amblyopia made a difference. Whereas only 5% of amblyopes with 20/100 or better did not respond, 20% of those with 20/200 or 20/300 did not improve. Of the 130 eyes initially between 20/30 and 20/80, 48 or 37% improved to 20/20 or 20/15. Results for strabismic and refractive amblyopes were similar but adolescent improved more quickly than older patients. No improvements were reported for the controls.

Treatment effects maintained for at least six months but when acuity had dropped, additional LLLT treatment brought the initially improved acuity gains back. The authors suggested that treatment be repeated every 3 months and then every year to stabilize the gains. While they are unclear of the mechanism that caused the improvement, they suggest that the infrared light causes a hyperpolarization in the retina.

The traditional syntonic prescription for amblyopia is also red to infrared. Indeed alpha-delta is called the "Lazy Eye" filter combination. Spitler said it worked by "decreasing the leak in potential" (increasing the charge or hyperpolarization of the cells) as described by in *The Syntonic Principle* (1941). Interesting!

These results were surprisingly positive, especially given that the great majority of patients were adults and that the total treatment time was only 2 minutes or less, spread over two weeks. One wonders whether more treatment would bring even greater improvement.

"Low-Level Laser Therapy Improves Visual Acuity in Adolescent and Adult Patients with Amblyopia." B.T. Ivandic & T. Ivandic, *Photomed Laser Surg*. 2012, Jan 11. [Epub ahead of print]

Stopping Dry AMD in its Tracks with Retinal Rejuvenation Therapy - 2RT™ Ellex

Retinal Rejuvenation Therapy (2RT™) is an exciting new phototherapy approach for age-related macular degeneration (AMD), diabetic retinopathy and macular edema (DM) and other neuroretinal disorders. Until now, medicine has had little to offer patients with early signs of AMD to prevent late stage dry or conversion to wet forms of this increasingly common disease.

For many decades, laser cauterization was the only tool used to stop retinal bleeding in wet AMD and proliferating diabetic retinopathy. The lasers were used to cauterize retinal blood vessels but also destroyed retinal tissue,

sometimes with devastating results for patients. Similarly, late stage DM treatments used a "pan" laser procedure that left patients with a pockmarked retina that disrupted their visual function.

In the mid 2000's, intraocular injection therapy entered the picture. Anti-vascular endothelial growth factor (anti-VEGF) drugs were originally developed to prevent new vessel growth in order to stop cancerous tumors. These were modified and injected into eyes to prevent retinal neovascularization, the source of retinal bleeds in wet ADM and DM. This was a Godsend for many patients who saw their visual acuity increase, sometimes by several lines. Many of my patients reversed their legal blind status allowing them to drive and read again. Though these improvements were often temporary, it saved patients from having to suffer the scars caused by thermal laser treatments. (For a review of recent work with stem cell and genetic modification approaches for AMD see: Stopping Dry AMD In Its Tracks Christopher Kent, *Review of Ophthalmology,* 40-49 (August 2011): http://www.revophth.com/content/d/features/i/1599/c/29626/ .

See also:
Irv Arons' Journal, January 2012:
http://irvaronsjournal.blogspot.com/2012/02/current-resources-use-of-stem-cells-and.html.

The problem with these approaches is that they do not address the disease until the later stages, when significant vision is already lost and can no longer be fully restored. Patients with early stage AMD and DM were not candidates for anti-VEGF or laser cauterization. They were advised to make lifestyle changes (smoking cessation, exercise, stress reduction, and diet) and take nutritional supplementation with mixed results. But now, 2RT™ seems poised to help patients with early stage ADM before they start to lose vision.

Treatment

Ellex 2RT™ uses a 532-nm (blue/green)* laser technology to send light energy to nano-sized targets within ailing cells of the retinal pigmented epithelium (RPE). The power is 500-1000 times lower than traditional lasers and pulsed in a series of 3-nanosecond bursts. The light is also tweaked to create speckles or nanopoints of extreme energy that create nano-second, nano-bubbles in the cytoplasm of individual RPE cells. These explode and ablate the cell without harming nearby cells or retinal tissue.

Patients were treated either with a series of 12 pulses of 3 -ns duration placed in a "clock face" pattern around the mid-macula or in two linear patterns of six shots following the superior and inferior arcades above and below the macula. The procedure took about15 minutes to administer.

THEORY

It is believed that AMD, DR and other neuro-retinal degenerations are due to a blockage of metabolite flow across Bruch's Membrane. When waste products from the highly metabolic rods and cones fail to pass through Bruch's Membrane they accumulate at its surface as drusen. Bruch's Membrane separates the photoreceptor cells and pigment epithelium from the highly vascular choroid at the back of the retina. The choroid supplies the blood that feeds and detoxifies the rods and cones. Drusen, fatty deposits in the retinal pigment epithelium layer (RPE), are an early sign of macular degeneration. They often appear even before patients experience symptoms of visual loss. As Bruch's Membrane becomes more compromised, more drusen form, retinal tissue degrades and becomes more disorganized, and visual acuity falls. Eventually as retinal cells are increasingly deprived of blood and oxygen, tiny blood vessels begin to grow into the area. These new capillaries are extremely fragile and when they leak the retina fills with blood and the patient experiences a sudden loss of central vision due to "wet" AMD.

In studies using isolated retina of drusen-prone animals, researchers measured significant increases in transport across Bruch's membrane after irradiating with the low power, nanosecond-pulsed laser. How does this occur? Researcher believe that the ablated cells stimulate a healing response in the RPE where in protective enzymes and growth factors are released from neighboring healthy cells as they grow and migrate to replace the ablated cells. It is believed that these enzymes and factors digest the drusen-like deposits on Bruch's Membrane and increase trans-Bruch's Membrane conductivity to restore the vitality and health of the retina.

CLINICAL STUDIES

Does it work for human eyes? Results of ongoing clinical studies on human subjects are very promising. In an initial pilot study, more than 90% of diabetic patients with macular edema improved visual acuity and their macular thickness normalized. Preliminary results in another study, this one with 50 patients with early signs of dry

macular degeneration (drusen and geographic changes) considered at high-risk for progressing to late stage AMD. They received 2RT™ treatments in their highest-risk eye only. Six-month follow-ups found that nearly 70% of the patients had improved visual function (dark adaptation, flicker, color thresholds, visual acuity) and/or reduced drusen in the treated eye. For some patients, the changes did not occur until months after the treatment. Interestingly, the greatest improvements took place predominately in the regions of greatest dysfunction and not at the laser-treated areas. Another unexpected result was that most patients measured similar improvements in their other, untreated eye. According to the researchers, the effect is clearly systemic, because of the improvements in the fellow eye. There was no decrease in function in the treated areas, and no adverse effects were noted. A long-term, formal, randomized clinical trial is underway to determine whether 2RT™ actually can reduce progression to advanced and wet AMD. 2RT™ studies are also planned for treating diabetic macular edema.

"Laser stops, may partially reverse AMD Using nanosecond laser-based for AMD treatment." Robyn Guymer, *Ophthalmology Times Europe.* Apr 1, 2011, Volume 7, Issue 4

"Nanosecond Pulse Lasers for Retinal Applications." John P.M. Wood, *Lasers in Surgery and Medicine* 43:499–510 (2011)

Also search for: 2RT™ Ellex on the web for more details

* According to it's inventor, the wavelength of the light is not important. What matters is the pulse time and the phase manipulation. For more details see Irv Arons' Journal:
irvaronsjournal.blogspot.com/2011_02_01_archive.htm.
Scroll down to: An Interview with Professor John Marshall.

The Effect of 670-nm Low Laser Therapy (LLLT) on Herpes Simplex Type 1

A recent article confirms that low level light therapy speeds healing and lengthens the time between recurrences of Herpes of simplex type 1 (HVS-1). HVS-1 can effect the lips, face or cornea. Herpes keratitis is a leading cause of blindness. Herpes simplex in the genital area is known as Herpes simplex type 2.

When HSV-1 lesions occur on the lips they are called "cold sores" or Herpes labialis. An outbreak starts as a feeling of irritation or discomfort called the prodromal stage. The sensations quickly develop into blisters that crust in a few days that eventually heal after about two weeks without treatment. At the crusting stage they can become vulnerable to secondary infections. After a herpes outbreak, the HVS-1 virus is reported to hide or go in a dormant state in the spinal ganglions at cervical C2-C3. After a few weeks, months or years they reappear, much to the discomfort and embarrassment of the patient. Stress, high levels of ultraviolet light and spicy food are among the triggers for subsequent attacks.

This study followed 438 patients diagnosed with Herpes labialis for 5 years. To create a semi-blinded procedure, one dentist diagnosed, another treated and a third evaluated the speed and comfort of healing and time until subsequent attacks. Active lesions were treated daily with a low power (40mW) 670-nm (red) diode laser; a 0.8cm^2 spot was shined on the lesion without physical contact until they were clinically and subjectively asymptomatic. Patients in the prodromal and blister stages were treated for 40 seconds per lesion, those in the crust stage and/or with secondary infections for 2 minutes. In addition the C2–C3 vertebrae area was irradiated for 30 seconds. Control patients were offered topical and oral antivirals, palliative therapies (anesthetic cream) and advised to stay away from spicy foods.

An initial, one-year pilot study was followed by another 5-year study. The two studies confirm that labilia HSV-1 active outbreaks become more comfortable and healing time shortened using LLLT. In addition, light treatment prevented recurrences or delayed the time until next outbreak compared to controls. Given the large number of patients and the high level of improvement between the treated and control groups, no statistical analysis was considered necessary. None of the LLLT patients experienced negative side effects.

This confirms a number of previous LLLT reports on humans, animal subjects and virus cultures. The red and infrared wavelengths and the light energy used was different in each of these studies. Most used higher levels of energy than was used in this study. Therefore, it seems that the treatment is not wavelength sensitive or very sensitive to the amount of energy applied. Two of studies found LLLT also effective on HSV-2 and one study found the best results when patients received both antiviral medications and LLLT than when either was used alone. This study's main finding is that light therapy can

significantly delay or stop subsequent outbreaks.

On a side note, several articles on the other Herpes, Herpes zoster ("shingles") have reported that infrared LLLT can reduce or eliminate post herpetic neuralgia (chronic pain following an attack). One study used a 60 mW infrared laser (830 nm) for 10 sec. per pain point for 2-6 times per week for eight weeks. For many patients the light therapy brought immediate and long-lasting relief. Results were similar for acute stage patients treated after just a month and chronic patients treated after suffering pain for five years after their shingles. (Double Blind Crossover Trial of Low Level Laser Therapy (Lllt) in the Treatment of Post Herpetic Neuralgia. Kevin C, et. al., *Laser Therapy*. 1: 7, 1988).

Whether LLLT or syntonic phototherapy will work for ocular HSV-1 or zoster remains to be seen. I suspect, given the different wavelengths and range of intensities reported, that chances are good that light treatments for ocular Herpes will be effective either by itself or as a compliment to pharmaceutical therapy. It will take innovative and brave syntonists like Larry Wallace (see articles in this and earlier issues of this journal) to start us in this new direction.

"The Effect of 670-nm Low Laser Therapy on Herpes Simplex Type 1". Pedro Jose Muoz Sanchez, et. al., *Photomedicine and Laser Surgery. 30 (1) 37-40* (2012).

Transcranial near-infrared laser therapy applied to promote clinical recovery in acute and chronic neurodegenerative diseases.

Abstract: One of the most promising methods to treat neurodegeneration is noninvasive transcranial near-infrared laser therapy (NILT), which appears to promote acute neuroprotection by stimulating mitochondrial function, thereby increasing cellular energy production. NILT may also promote chronic neuronal function restoration via trophic factor-mediated plasticity changes or possibly neurogenesis. Clearly, NILT is a treatment that confers neuroprotection or neurorestoration using pleiotropic mechanisms (genes that effects multiple traits). The most advanced application of NILT is for acute ischemic stroke based upon extensive preclinical and clinical studies. In laboratory settings, NILT is also being developed to treat traumatic brain injury, Alzheimer's disease and Parkinson's disease. There is some intriguing data in the literature that suggests that NILT may be a method to promote clinical improvement in neurodegenerative diseases where there is a common mechanistic component, mitochondrial dysfunction and energy impairment. This article will analyze and review data supporting the continued development of NILT to treat neurodegenerative diseases.

"Transcranial near-infrared laser therapy applied to promote clinical recovery in acute and chronic neurodegenerative diseases". Paul Lapchak, *Expert Rev Med Devices,* 9(1) 71-83 (2012).

What's new in blue

Most articles about LLLT focus on red and infrared light. However, blue light has been shown to significantly influence biological systems. In 2011, the journal *Photochemistry and Photobiology*, organized an entire issue to the subject: Symposium-in-Print on ''Blue Light Effects to "bring attention to biological receptor systems related to blue light. The first article: "Old Chromophores, New Photoactivation Paradigms, Trendy Applications: Flavones in Blue Light-Sensing Photoreceptors," by Aba Losi and Wolfgang Gärtner, (*Photochemistry and Photobiology*, 2011, 87: 491–510) reviews recent discoveries of blue light signaling pathways and related molecular mechanisms. To quote the authors:

> "The last decade has seen an enormous growth in our understanding of the function of blue light photoreceptors, both with respect to their inherent photochemical reactivity and also related to their role in regulating physiological functions. This knowledge is now starting to be extended by investigations into the role of (blue) light as an important and regulatory function . . . one can expect in the near future, that novel research directions, e.g. the regulation of physiological processes by blue light . . . will become a rapidly growing research area with outstanding potential in biomedical applications." The availability of quality inexpensive blue LED sources has brought more opportunity for clinical application.

Light therapy by blue LED improves wound healing in an excision model in rats.

This Austrian research compared low-power blue and red LED light effects on wound healing in mice. An earlier study found that blue light increased nitric oxide (NO) levels as a result of light-induced release of hemoglobin bound nitrogen. More available oxygen and greater local blood flow (NO dilates blood vessels) facilitated better wound healing. Systemic blood pressure did not change.

In this study, surgical wounds were inscribed on mice (using humane procedure). Immediately after the incision the wounds were photographed, treated with antibiotics, bandaged with a transparent material, and then illuminated for 10 min. using a low intensity (50 mW/cm^2) blue (470 nm) or red (630 nm) LED light. This treatment was repeated for the next five consecutive days. On day seven various healing parameters were measured and compared between the red and blue irradiated groups and untreated control mice.

Blue light brought the most positive wound contraction and reepithelialisation from the margins. In skin injury these parameters play an important role in wound closure. Wounds treated with blue but not red light led to a significant decrease in the wound area vs. controls on day seven.

The authors suggest that beyond the influence of blue light on NO metabolism and local blood and oxygen supply, the blue light facilitated the healing by inducing recovery of injured mitochondria and mRNA gene expression (release of healing growth factors).

"Blue Laser Light Increases Perfusion of a Skin Flap Via Release of Nitric Oxide from Hemoglobin". Rainer Mittermayr, et.al. *Molecular Medicine*, 13 (1 - 2) 22-29 (2007).

"Light therapy by blue LED improves wound healing in an excision model in rats". Natalia Adamskaya, et. al., *Injury*. 42 917–921(2011).

Blue and Red LEVL (Low-Energy Visible Light)

Another study compared the biological action of red and blue using low-energy visible light (LEVL) also found a blue light advantage. The therapy light was from a conventional light bulb filtered with broad-band blue (400–505nm) and red (600–800nm) glass filters, one of the very few studies using a light + filter source similar to the syntonizer. The study investigated whether the numerous known biological effects of light stimulation are due to light-induced increases in ROS (reactive oxygen species) production. The biological effects mentioned include: increasing cell proliferation, inducing cell differentiation, inducing respiratory burst in neutrophils, changing action potentials, inducing regeneration and recovery of damaged cells, enhancing the fertilizing capacity of sperm cells and sperm motility, and stimulating the release of growth factors and cytokines.

The goal of the study was to determine whether the light took place in the cell cytoplasm or in the cell membrane where photoactivated elements increase the ease of transfer of metabolic molecules into and out of the cell. Red (30mW/cm^2) and blue (10 mW/cm^2) light (described above) was shined on ram sperm cell membranes and on sperm cell contents with membranes removed. Light induced changes in ROS were measured with electron paramagnetic resonance (EPR) spin trapping technology.

The sperm plasma membrane and the no membrane samples were analyzed and compared in order to 1) compare the ability of blue vs red light to elicit oxygen radicals and 2) to determine in which substrate the action happened, the membrane or resulted in the cell matrix, independent of membrane enzymes. Blue light brought immediate changes in ROS that increased through the 5 min. light-on period and rose even more when illuminated for 7 min. periods. Furthermore, blue was found to be 1000% more effective in ROS generation than red light (in spite of its lower power).

The findings also showed that the action took place in the membrane. The results support the idea that the redox state of the membrane is important for regulation of cell function and growth and that these alterations in oxidation and reduction (redox states) function as a molecular switch that triggers various signaling pathways.

"The Plasma Membrane is Involved in the Visible Light–Tissue Interaction". Ronit Lavi, Ph.D., et. al., *Photomedicine and Laser Surgery* 30 (1) 14–19 (2012).

Vitamin B1 as a Scavenger of Reactive Oxygen Species Photogenerated by Vitamin B2

Vitamins are essential for sustaining normal physiological activity and healthy life quality. The biological roles of some vitamins change according to factors such as temperature, extreme pH values, reactions with intrinsic or externally added molecules and light exposure. This article suggests that Vitamins B1 (thiamine) and B2 (riboflavin) are mutually interactive when exposed to visible light. As a flavin, the riboflavin of Vitamin B2 is one of the most important absorbers of visible-light, especially in the blue range. Vitamin B2 is well known to produce reactive oxygen species (ROS) upon adequate photoirradiation. The light-driven release of ROS serves

to open communication channels across cell membranes to allow access for biological molecules important for cell life. The B1 thiamine is transparent to light but acts as a scavenger for the elimination of excess light-generated B1 ROS that otherwise could damage proteins, DNA and other cell matrix components.

"Vitamin B1 as a Scavenger of Reactive Oxygen Species Photogenerated by Vitamin B2". Jose´ Natera, et. al., *Photochemistry and Photobiology*, 87: 317–323 (2011).

Laser Dentistry, Current Advantages, and Limits

Phototherapy is gradually making its way into many branches of health care. The expanding interest in phototherapy for eyes is also happening in dermatology, psychiatry, neurology, physical medicine/chiropractic, and dentistry.

In this editorial article about dental phototherapy, Samir Nammour lists applications and advantages of low-level laser therapy such as: LLLT is often the best alternative for the treatment of mucositis, a common side effect of chemotherapy and radiotherapy in cancer patients and is the only treatment allowing the complete healing of oral osteonecrosis and exposed bone in patients receiving bisphosphonate medication. LLLT can also induce a delayed production of reactive dentin that can dramatically decrease the dental hypersensitivity. Teeth bleaching by means of LLLT brings an immediate teeth lightening instead of the delayed effect produced by home bleaching techniques. In cavity prevention cavities, specific LLLT wavelengths under particular irradiation conditions and fluoride applications has been proven to increase the resistance of lased enamel to caries attacks.

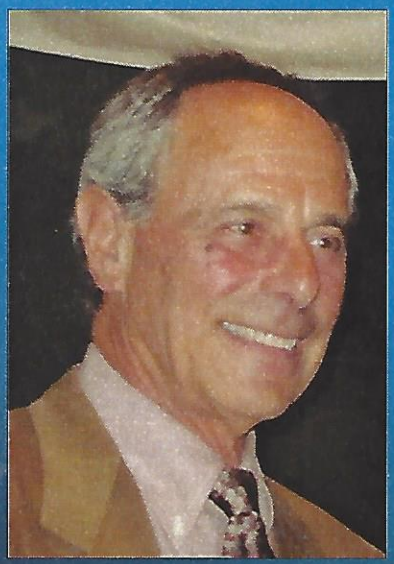
Author Samir Nammour's statement applies to all areas of healing:

> "We are convinced that the laser beam will become an important tool in the near future in all fields pertaining to dental practice. Many efforts are and should be made and extensive research is and should be conducted to fulfill this aim."

"Laser Dentistry, Current Advantages, and Limits". Samir Nammour, *Photomedicine and Laser Surgery*, 30 (1): 1-4 (2012).

The above are just a few of the many articles I could have included here. Light's central impact on life and health have been proven over and over again. Proof is no longer the issue, finding the best ways to improve health and well-being with light therapy is. Syntonics has stayed vital through many dark decades and as we move into more enlightened days, we have much to be proud of and grateful for.

~ Ray Gottlieb



About the Author:

Ray Gottlieb, O.D., Ph.D., FCSO, FCOVD, is the Dean of the College of Syntonic Optometry.

Now retired from optometric practice, he lives in Florida where he conducts classes and consults about natural vision improvement. He is an OEP Clinical Regional Seminar Presenter. In summer he serves on the piano faculty of the Chautauqua Institution (NY) where he applies vision training to improve playing and learning skills of piano students.

His writing includes *Attention and Memory Training: Stress-Point learning on the Trampoline* (OEPF 2005), *The Neurophsychology of Nearsightedness* (PhD dissertation 1977) and many articles and chapters. His presbyopia reduction exercise is available on DVD as *The Read Without Glasses Method.* He is a recipient of CSO's Spitler Award and NORA's Advancement of Science Award.

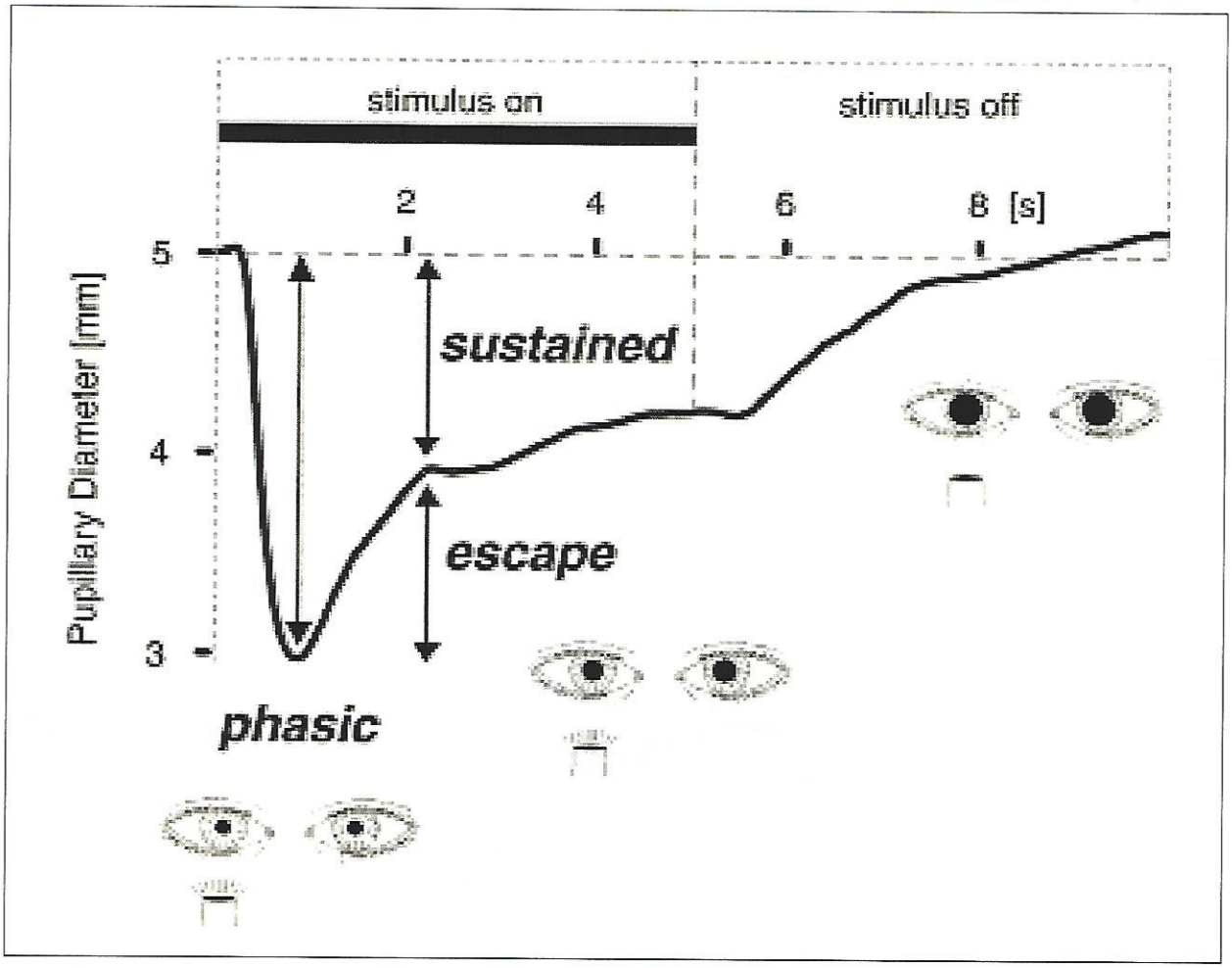
New Practitioners Forum

Alpha Omega (αω) Pupil Review

Cathy Stern, O.D., FCOVD, FNORA, FCSO

The "Alpha Omega Pupil" is seen when a penlight is directed at the eye continuously and the pupil of the eye constricts but fails to hold the constriction. In general, the faster the pupil dilates following the initial constriction (with the light still present), the smaller the extent of the functional visual field. The response of one eye may differ from that of the other eye. Alpha Omega (αω) is also the combination of color light frequency recommended to stimulate the autonomic nervous system and bring the pupil (and visual field) back into proper balance.

A penlight is pointed directly at the pupil of the right eye while the patient fixates a distant non-accommodative target. Normally when the sympathetic and parasympathetic systems are in balance, the pupil will constrict down, reopen partially in the first two seconds and then maintain a steady diameter for at least the next fifteen seconds (and even up to one minute) and then it will return to its original size. As you can see from the diagram below, the initial redilation is termed "pupillary escape" and the pupil then maintains its diameter as long as the light stimulus is present (in this case up to the 5 second time frame) and then the pupil requires about another two seconds to return to its original diameter.



With an Alpha Omega pupil the pupil will constrict and then continue to redilate without maintaining the expected sustained response. . In general, the faster the pupil dilates following the initial constriction (with the light still present), the smaller the extent of the functional visual field and. the more dominant the sympathetic nervous system. While this is generally true, remember there are individual differences so the best course of action is the following:

1. Note the size of the pupil.

2. Shine your penlight at the pupil (as close as possible to the patient's line of sight) while the patient looks at a distance target such as the big E.

3. Watch for one of the following responses:
   a) The normal response is for the pupil to hold constriction after the brief initial fluctuation for at least 15 seconds. You will likely plot a normal visual field.
   b) The pupil constricts, fluctuates slightly and then fails to maintain a steady con-

striction. It may reopen slowly as seen with stress and low adrenal function or it may immediately release and remain dilated. When the pupil releases quickly and remains dilated, you will likely plot a constricted visual field of 20 degrees or less.

4. Repeat for the other eye.

Some doctors will test the pupil reaction under both normal ambient light and dim light. The patient should have the same reaction under both conditions. The German Functional Optometrists (WVAO) use the following scale to quantify the pupil reaction:

0 = Light stimulus - Pupil constricts - Pupil remain constricted
1 = Light stimulus - Pupil constricts - Pupil dilates-Pupil constricts again - Pupil stays constricted
2 = Light stimulus - Pupil pumps constantly
3 = Light stimulus - Pupil constricts - Pupil dilates - Pupil remains dilated
4 = Light stimulus - Pupil remains dilated - Pupil shows no reaction (blind eye)

They recommend the test be repeated:

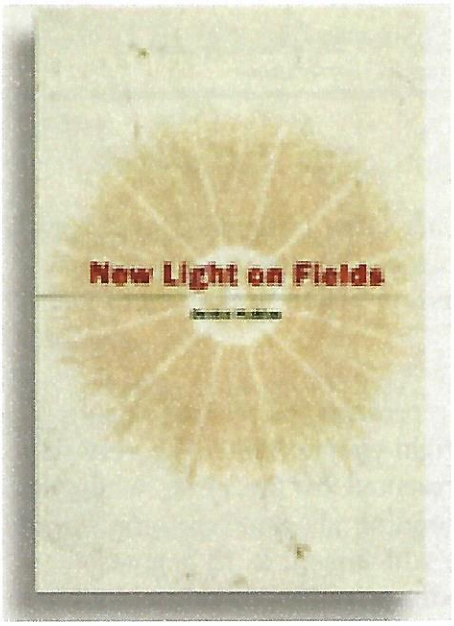
1. normal ambient light - Far (looking at the big E)
2. normal ambient light - Near (near reading chart)
3. dim room - Far
4. dim room – Near

The Alpha Omega Pupil is an important test for assessing pupil function, visual field and for determining Syntonic Phototherapy. You should observe pupil function with every patient and soon you will master the observations necessary to determine if an Alpha Omega Pupil is present.

BOOK REVIEW

New Light on Fields

By Denise Hadden



New Light on Fields describes a unique diagnostic tool that allows a deeply healing interpretation of the informational fields that surround us. It may be used to advance knowledge on the effects of light and energetics on humans.

Using a new method of iridology analysis and combined with somatic and systemic coaching tools, it allows an empowered and extraordinary level of healing to occur. Visual fields of awareness are the key to understanding human potential.

In revealing these neurological mind maps to clients, in presenting and exploring a new way of seeing themselves, co-created with light, it became apparent that people's greatest need is to feel empowered and in charge in their life journeys. Includes a clear iridology chart overlay. Full colour softbound. 112 pages.

Denise Hadden practices in South Africa.

College of Syntonic Optometry

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Resources for Syntonic Equipment and Books

The College of Syntonic Optometry has the following books and pamphlets for sale:

- *The Syntonic Principle* by Harry Spitler
- *The Principles of Light* and Color by Edwin Babbitt
- *New Light on Fields* by Denise Hadden
- *In Syntony* by Stefan Collier
- *Light Therapy* brochure
- *Practical guide for Charting and Interpreting the Visual Color Fields* by Dr. Wm Arthur Mendelsohn (on a CD).

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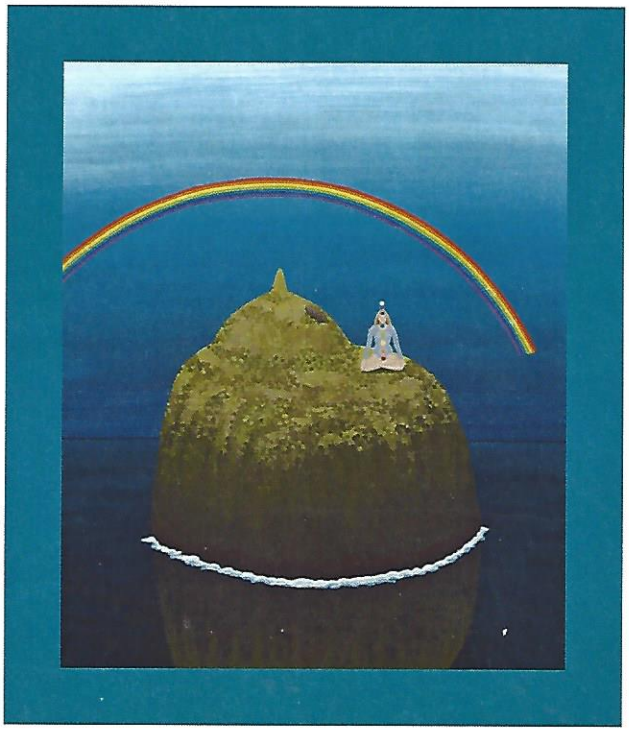

About the Cover

Lisa Harvey, O.D, and her artist husband, David Linkhart, teamed up to give us an illustration of Traquair's Model of Vision as an Island of Vision in the Sea of Darkness.

The island's topography represents the relative sensitivity of the eye, in this case the right eye, to light. The very sensitive macula/fovea is represented by the peak, while the optic nerve and its corresponding absolute scotoma (blind spot) are shown by the hole which is 10 to 15 degrees away and very slightly inferior to the macula. Visual field testing in the form of perimetry or campimetry is used to plot the contours of each eye's visual island.

As we heal ourselves and others with light, it might be interesting to note that the colors of a primary rainbow are reversed or reflected in the major chakras of human beings.

College of Syntonic Optometry
80th International Conference on Light & Vision

May 1st-5th, 2012

Colorado Springs, Colorado

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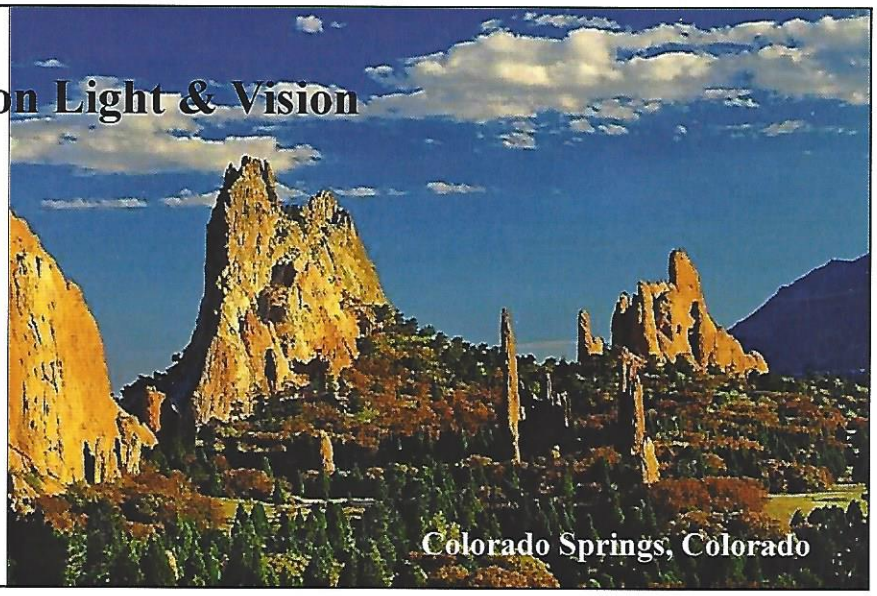

International Light Association
Light Colour and Vision Conference

October 14th-18th, 2012

Berlin, Germany

Contact:
Larry Wallace, O.D.
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Australian College of Syntonics
Light Colour and Vision Conference

March 3rd-4th, 2012

Venue: Novotel-Brighton Beach in Sydney

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College of Syntonic Optometry
81st International Conference on Light & Vision

April 30-May 4, 2013

St. Pete Beach, Florida

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