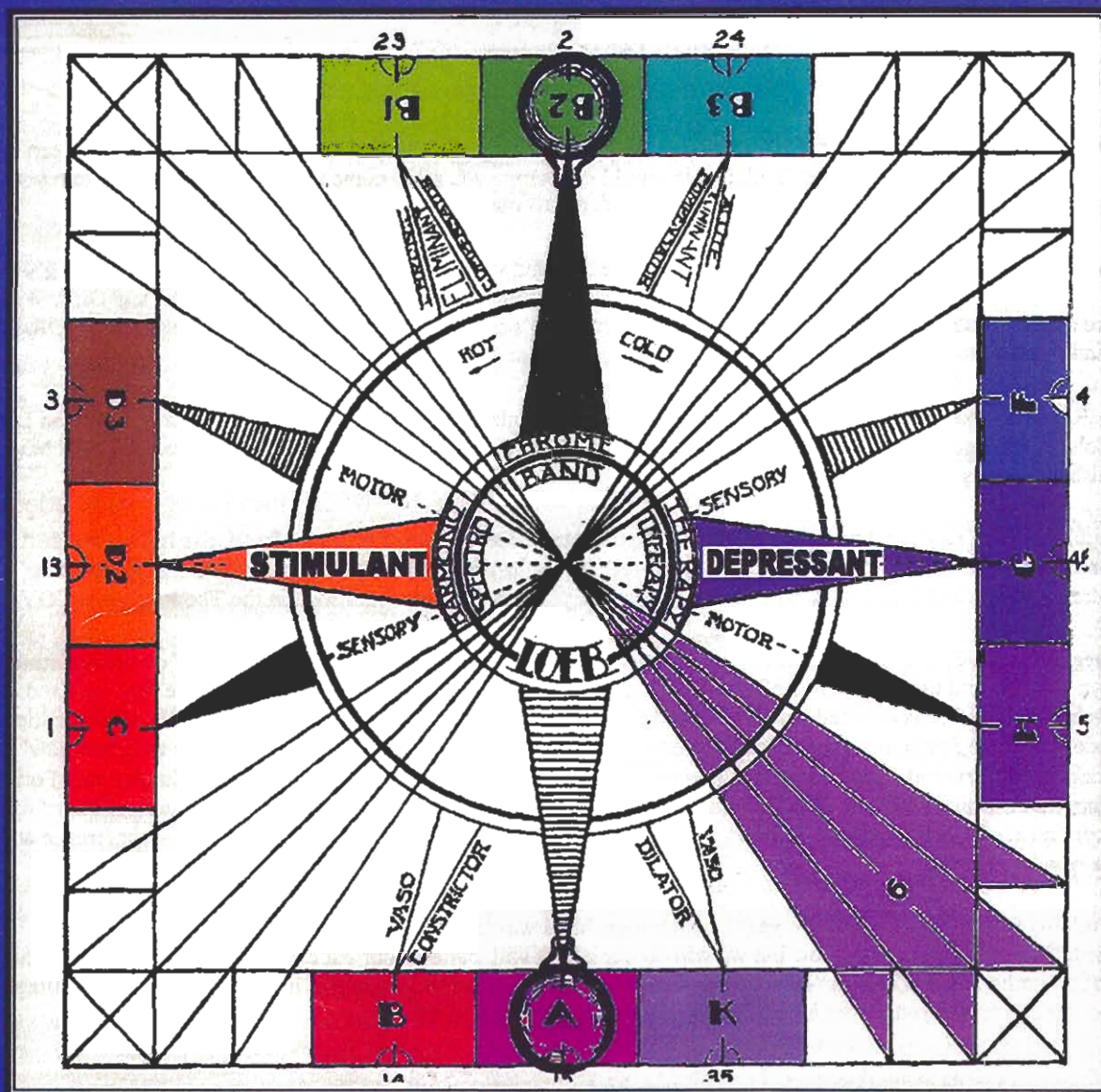


# The Journal of Optometric Phototherapy



Heart Rate Variability

Peripheral Vision

Color Fields

Syntonics as Energy Medicine

Confessions of an Optometric Innovator

Babbitt

Lecture Summaries

Loeb

March 2002

# College of Syntonic Optometry



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

Dear Colleagues,

It has been said the only constant in life is change. With the tragedy of 9-11 and the ensuing chaos, this has been the most unsettled year I can remember. With this in mind I encourage you all to come to San Francisco and rejoin your family at CSO. The solidarity we feel as a group is needed now more than ever.

Our profession continues to march towards medical eye care and vision therapy continues to struggle to assert its place in the health care arena. This adversity has brought CSO closer to our colleagues in COVD, NORA, and OEP. We hope to have as our guests the Presidents of these groups at this year's conference. Ray Gottlieb and I will attend NORA this year and again attend a unity meeting between our organizations.

Both Ray and I were presenters this past July in Cambridge England at the Annual International Conference on Light and Colour. We also taught a two-day basic Syntonics course in Birmingham. We were very well received and have established a strong CSO presence in Europe.

The publication of Ray's and my article in OEP has generated a lot of interest in Syntonics. I also had an article "Syntonics and Strabismus" published in OEP's Related Topics in Volume 42. John Searfoss and Ralph Garcia's "Children's Vision and Tunnel Vision" was chosen as the year's best article published in the The Journal of COVD.

This year has seen CSO become the most organized in its history due in large part to the efforts of our administrator Carolyn Kuraitis and the cooperative efforts of your Board of Directors. The new directory was the best ever and our new web site should be completed before you read this. David Luke has constructed a web site for the membership with the historical name Syntono-gram at [Syntonau@yahoogroups.com](mailto:Syntonau@yahoogroups.com). This will allow members to obtain new information, articles, and communications. I want to thank David for all his efforts. I also want to thank Frank Forgnoni for again running our display at COVD, Sarah Cobb for all her hard work to produce this journal, and our board for their continued efforts on our behalf. Susan Golden with the help of Steve Gold will chair this year's conference and has done a wonderful job.

I was told by several attendees at last year's conference that it was the best conference of any kind they had ever attended. That is a hard act to follow but we will do our best. I still believe our educational programs are at the cutting edge of phototherapy and offer an eclectic blend of information unmatched anywhere in our profession. I encourage you all to come and renew yourselves in our family of light practitioners.

Sincerely Yours,

Larry Wallace, O.D., FCSO  
President, CSO



## LETTERS

The opinions expressed in this section are those of the writers, and do not necessarily reflect the View of the *Journal of Optometric Phototherapy*. We reserve the right to edit letters for the sake of Address email to: Sarah Cobb, [eyeamsarah@hotmail.com](mailto:eyeamsarah@hotmail.com)

Dr. Larry,

I read with interest the J. of Optometric Phototherapy, just released. I am a chiropractor and we have some very similar paradigms of health that should be further explored to magnify or our collective understandings. Of particular interest to me is the apparent fact that the optic nerve size is many times more than necessary to form its function of simply delivering vision. Believing that there are no extra parts, what else does light do for health? Chiropractors for over 100 years have been using the term spinal subluxation, where subluxation is defined as a lack of light (sub-"lack", lux-"light"). Seems to me that you could embrace the term "visual subluxation", or a visual lack of light. As I understand your therapy and it has to do with wave forms and receiving the correct mix of these waveforms. There are several chiropractors, myself included, that have an objective tool to detect spinal subluxations. Would you be interested on doing a study to determine if vision therapy could affect these? In doing so a direct measurement of spinal myophysiology and autonomic nervous systems effects of vision therapy could be measured (actually done real time). Neat, huh? We know that the body corrects the majority of the spinal subluxations innately, maybe through the eyes, (maybe

explaining some REM sleep patterns and the deleterious effects of the health that result from not achieving REM sleep) the rest Chiropractors fix. Certainly I would be interested to see if vision therapy could be used as a method to remove these spinal subluxations. Imagine helping an individual with vision therapy to reduce spinal subluxations, proving an increase in health.

I am also interested in seeing what a chiropractic adjustment could do to improve someone's vision. Not in the 20/20 sense, but as you understand vision. I understand you have some rather objective test to measure several forms of dysfunction. If someone sees something horrific to them and the heart beats faster and the muscles tighten up (flight or fight) then could not muscle tone and the autonomic nervous system affect vision. In other words, if individuals have a lack of spinal subluxations can that affect their vision? And not in a 20/20 sense, but their "vision" or paradigm. What is the nature of, or is there a feedback loop?

Trent Camp,  
Doctor of Chiropractic  
Email: [trent@trentcamp.com](mailto:trent@trentcamp.com)

## Journal of Optometric Phototherapy March 2002

### About the cover

The diagram pictured on the cover was created by Carl Loeb, M.D. and appeared in his book, *A Course in Light Therapy*. The manuscript is in black and white. Although the diagram has been colorized, it may not actually reflect the true color. For the story see page 33.

### Submissions

Please submit articles as email attachments or on disk in text or MS Word2000 format. Hard copies are also accepted.

Please send copy and artwork no later than November 2002 for inclusion in the next issue. Send to Sarah Cobb

[eyeamsarah@hotmail.com](mailto:eyeamsarah@hotmail.com)

### Advertising

For advertising, please send camera-ready artwork. Rates are for one half page, \$200.00, full page, \$400.00. Checks made out to the College of Syntonic Optometry.

*Permission must be sought to reproduce articles.*

### Correction

An article in the last issue incorrectly spelled author, **Moses Albalas'** name. The editor apologizes.

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## HEART RATE VARIABILITY

Rollin McCraty, Ph.D. is Director of Research at the Institute of HeartMath® in Boulder Creek, California. His research interests include the physiology of emotion, with a focus on the mechanisms by which heart based positive emotions influence health.

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## AN INTRODUCTION TO SYNTONICS AS ENERGY MEDICINE

Dr. Ray Gottlieb is the Dean of the College of Syntonic Optometry . He lectures internationally, writes, and practices in Rochester, New York.

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## BABBITT IN A NEW LIGHT

Chris Terrell presented at Light and Sound 2001 in England. She creates stained glass healing windows and teaches school.

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## THE FUNCTION OF PERIPHERAL VISION

Dr. Ellis Edelman will soon finish a book entitled *Change Your Mind and See*. He practices developmental optometry and syntonics in Newtown Square, Penn.

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## CONFESSIONS OF AN OPTOMETRIC INNOVATOR:

Dr. Robert S. Fox, O.D., F.C.O.V.D. is a Trustee in the College of Syntonic Optometry. He writes, lectures, and practices in Schenectky, N.Y.

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## IDENTIFYING FUNCTIONAL VISUAL FIELD PROBLEMS IN ADULTS

Dr. Geoff Shayler was the first optometrist in England to practice syntonic phototherapy. His vision center is located in Wareham, Dorset, U.K.

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## THE PARADOX OF LIGHT

Peter Russell is a fellow in the Institute of Noetic Sciences and lectures internationally. His books include *The TM Technique*, *The Upanishads*, *The Brain Book*, *The Global Brain Awakens*, *From Science to God*, & *The White Hole in Time*.

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## A TRIBUTE TO DR. J. O. JENKINS, O.D.

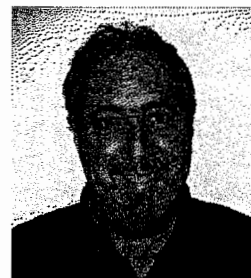
Dr. Charles Butts, O.D. Ph.D., Dean Emeritus in the College of Syntonic Optometry. He credits syntonics for a 90% success rate in 3,500 documented cases.

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## COLOR FIELDS IN SYNTONICS

Dr. Larry Wallace is the President of the College of Syntonic Optometry. He is an inventor, writer, and speaker on light and vision. He practices in Ithaca, N.Y.

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## LECTURE SUMMARIES

Dr. Frank Forgnoni is the Delaware State Director of the Optometric Extension Program and for the College of Optometrists in Vision Development. He practices in Newark.

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## DR. CARL LOEB ON EMOTIONAL HEALING

Sarah Cobb, Editor of the *Journal of Optometric Phototherapy*, has numerous publishing credits in vision and has written three unpublished novels.

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Niels Ryberg Finsen: NOBEL LAUREATE IN MEDICINE

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# Heart Rate Variability:

## A Measure of Autonomic Activity and Physiological Coherence

By Rollin McCraty, Ph.D.

HeartMath Research Center, Institute of HeartMath, Boulder Creek, CA

As phototherapy involves stimulating and balancing the autonomic nervous system (ANS), simple, noninvasive methods of measuring ANS activity and balance are needed both to assess a patient's autonomic function prior to treatment and as a tool to help validate the effects of phototherapy on the ANS. Such a tool is provided by the analysis of heart rate variability (HRV), a measure of the naturally occurring beat-to-beat changes in heart rate.

The analysis of HRV, or *heart rhythms*, is a powerful, noninvasive measure of neurocardiac function that reflects heart-brain interactions and ANS dynamics.<sup>1,2</sup> The use of HRV analysis as a clinical and research tool has been rapidly expanding over the past decade, and it is now widely used not only in cardiology, but also in a variety of other medical disciplines as well as in mental health settings. In addition to being a valid measure of ANS activity and balance, HRV feedback can also be used to help patients gain control of their autonomic nervous systems and to develop improved emotional self-regulation skills. Emotional self-regulation is important because changes in emotional state directly impact ANS dynamics, which, in turn, affect vision and overall health. This article will discuss the use of HRV as a measure of ANS activity and as a feedback tool that can facilitate clients in learning how to self-regulate their emotions and ANS dynamics.

### Heart Rate Variability: Physiological Mechanisms

The rhythmic beating pattern of a healthy heart under resting conditions is surprisingly irregular, changing, in fact, on a beat-to-beat basis. This natural beat-to-beat variability in heart rate (HRV) results from complex, nonlinear interactions between multiple neural and humoral control systems. Short-term fluctuations are primarily due to neural interactions between the heart and brain and the resulting modulation of the heart's sinoatrial node by the ANS. The sinoatrial node is dually innervated by the sympathetic system, which acts to increase the heart's intrinsic firing rate, and the parasympathetic system, which slows heart rate. Short-term inhibition of ANS activity also affects heart rate variability; for example, an inhibition of parasympathetic activity will result in an immediate increase in heart rate. In addition to the autonomically-regulated short-term variations in heart rate, much slower changes are mediated by other factors such as body temperature, metabolic rate, hormonal secretions, and sleep cycles. In turn, these diverse neural and humoral regulatory systems are continuously influenced by our interactions with our environment, including variables such as posture, physical movement, light, thoughts, and emotions.<sup>3</sup> In concert, the multiple factors determining HRV create a dynamic, interactive regulatory network that is never truly at rest.

### HRV Analysis Methods

HRV is generally analyzed by two main methods: time domain or frequency domain analysis. *Time domain analysis* provides a statistical analysis of the fluctuations in heart rate over time, defined in terms of the duration of each RR(time interval between heartbeats) interval in milliseconds. Time domain measures are simple to calculate and are primarily used for risk assessment. Although time domain HRV measures provide a reflection of the total amount of autonomic activity, they do not enable the clinician to quantify the relative balance or temporal distribution of activity in the two branches of the ANS, and therefore will not be discussed here.

*Frequency domain analysis* decomposes the HRV waveform into its individual frequency components and quantifies them in terms of their relative intensity using power spectral density (PSD) analysis. The main advantage of frequency domain over time domain analysis is that it provides a means to quantify the relative activity of the different physiological influences on HRV, which are represented by the individual oscillatory components that make up the heart rhythm. Thus, spectral analysis enables the clinician or researcher to discern and quantify the rhythms associated with sympathetic and parasympathetic activity at any given area in the recording.

Spectral analysis of HRV using Fast Fourier transformation reveals peaks at several major frequency ranges, which have been defined as the high frequency (HF) (0.15 to <0.4 Hertz), low frequency (LF) (0.04 to <0.15 Hertz), very low frequency (VLF) (0.0033 to <0.04 Hertz), and ultra low frequency (ULF) (0 to <0.0033 Hertz) regions of the power spectrum.<sup>2</sup> The HF component, which is related to respiratory sinus arrhythmia, is widely accepted as a measure of parasympathetic or vagal activity.<sup>2</sup> Power in

the LF band is related to baroreceptor activity and blood pressure control and resonance, and is dually modulated by both the parasympathetic and sympathetic systems.<sup>4,5</sup> The ratio of LF/HF power has been used as a marker of sympathovagal balance in some studies;<sup>6,7</sup> however, because LF power can reflect both sympathetic and parasympathetic activity, this interpretation can at times be misleading, particularly in short-term recordings.<sup>8</sup> The VLF rhythm is associated with sympathetic activity,<sup>9, 10</sup> while power in the ULF band reflects long-term regulatory mechanisms related to circadian activity in various hormonal systems.<sup>11</sup> Figure 1 shows an example of an HRV power spectrum obtained from a 5-minute recording.

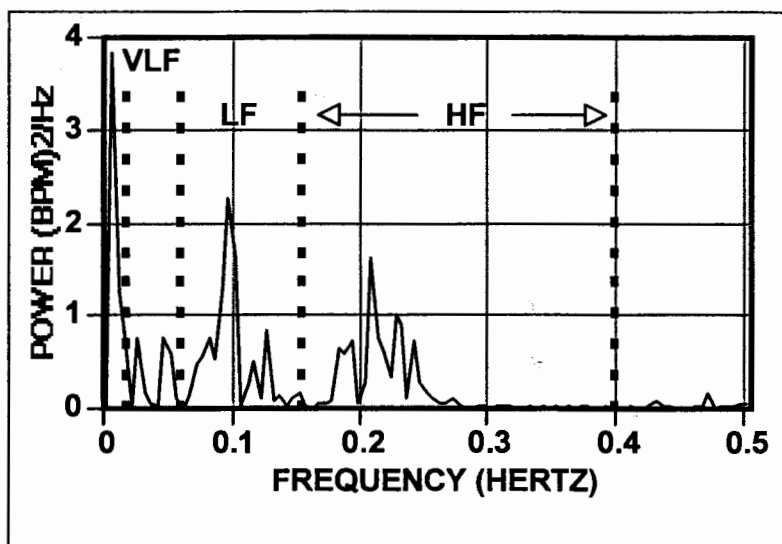


Figure 1

### Clinical Applications of HRV Analysis

In clinical settings, HRV analysis is recognized as a powerful, noninvasive tool to assess neurocardiac fitness, quantify autonomic nervous system function and balance, and aid in risk stratification. Several of its common applications include:

- (1) assessing ANS involvement in a variety of pathophysiologic conditions
- (2) predicting risk of sudden death post-myocardial infarction
- (3) predicting risk of rejection of transplanted hearts
- (4) assessing fitness levels and nervous system fatigue
- (5) screening for individuals who may be at increased risk for heart disease or premature mortality before symptoms become manifest.

The analysis of HRV is also frequently used to facilitate the choice of appropriate treatment and to monitor the effects of therapeutic interventions on ANS activity, rhythms, and balance.

One of the applications of HRV analysis in a phototherapy context is to measure the amount of HRV prior to an intervention and then again afterwards, in order to determine and quantify the effects of the intervention on the ANS. For example, if one sees increases in the HF band following treatment, the intervention has increased parasympathetic activity. It is not uncommon to find that clients initially have lowered sympathetic activity and normal parasympathetic activity, which is an indicator of the first stages of autonomic exhaustion. This is typically indicated by low VLF power, which can also reduce the power in the LF band. Because LF power is influenced by both the parasympathetic and sympathetic systems, if it is low, one should examine the HF and VLF bands to gain further information regarding which branch of the ANS is compromised. HRV analysis can then be used to monitor improvements in autonomic function and balance with treatment over time.

In addition, HRV monitoring can be used in phototherapy as a feedback tool (discussed further below). Through HRV feedback, clients can readily experience how their emotions affect their ANS, and thus their vision and overall health. They can be taught simple and practical techniques to help them self-regulate their emotions and autonomic activity. A brief HRV feedback session prior to therapy can help to quickly balance and stabilize the nervous system, thus making clients more responsive to treatment. Additionally, with the aid of portable HRV monitors, clients can practice the emotional self-regulation skills at home, which can aid them in sustaining the autonomic improvements achieved through therapy.

### Instrumentation and Recording Protocols

HRV can be derived either from the electrocardiograms (ECG) using electrodes placed on the chest or from pulse wave recordings using a plethysmographic optical sensor placed at the fingertip or earlobe. ECG recordings have the advantage of producing fewer movement-related artifacts. However, pulse wave recording devices also provide data suitable for most HRV feedback applications, and, as they require no electrode hook-up, are more easily adaptable for use in a much wider variety of settings. Of the two main types of pulse sensors available (fingertip and earlobe), the earlobe sensor is slightly less prone to yield artifacts produced by a person's movement.

Using a standardized recording protocol is very important in short-term HRV recordings to minimize the many variables that may affect HRV, including posture, movement, talking, sleeping, and emotional state. To obtain accurate short-term measurements of the various rhythmic components of HRV, the following minimum recording times are recommended: High

frequency, 1-3 minutes; low frequency, minimum 5 minutes; very low frequency, minimum 10 minutes, although 20 minutes is preferable. Importantly, it is not valid to compare HRV estimates that are derived from recordings of different time durations. Although HRV measured from short-term recordings can provide prognostic information for risk stratification, the predictive value of depressed HRV increases with the increased length of recording.<sup>2</sup> Thus, short-term HRV analysis is a useful tool for initial risk assessment screenings; however, when low HRV is detected using a short-term recording, a follow-up 24-hour HRV analysis is recommended.

### HRV Norms

In order for HRV to be a useful screening tool, it is important to know the normal ranges for each measure. There is a natural decline in HRV with increasing age, although the different HRV measures exhibit differing degrees, rates, and patterns of age-related decline. Additionally, among younger age groups there are gender-related differences in HRV; females below age 30 have lower HRV than age-matched males. The establishment of norms based on the natural age- and gender-related differences in HRV in a normal, healthy population permits clinicians and researchers to more easily distinguish low HRV that is due to pathology from that due to normal aging. We have recently published age-adjusted normal ranges for five standard time domain measures of 24-hour HRV, based on an analysis of age- and gender-related HRV differences on a decade basis in a population of healthy individuals ranging in age from 10 to 99.<sup>12</sup> Other researchers have compared frequency domain 24-hour HRV measures in healthy, middle-aged individuals (age 40-69) versus in age- and gender-matched patients with chronic coronary heart disease or recent acute myocardial infarction.<sup>13</sup>

### Heart Rhythm Pattern Analysis: A Window on Emotions

Typically, instruments used for recording HRV analyze the signal only by means of time domain or frequency domain analysis, both of which quantify the *amount* of variability in heart rate that exists in a given recording. A new approach to HRV monitoring and feedback, is the analysis of heart rhythm *patterns*. Heart rhythm pattern analysis, which analyzes the varying shape of the HRV waveform over time, shows promise to be an especially useful tool in psychophysiological research and biofeedback applications. This type of analysis can be particularly valuable in applications that aim to illuminate the physiological correlates of different mental and emotional states, assess the extensive interactions between the mental, emotional, and physiological systems in arousal-induced pathology, or examine psychophysiological responses to different interventions.

Recent research conducted at the Institute of HeartMath (IHM) has demonstrated that HRV dynamics are particularly sensitive to changes in emotional state, and that positive and negative emotions can be readily distinguished by changes in heart rhythm patterns. Specifically, during the experience of negative emotions such as anger, frustration, or anxiety, heart rhythms become more erratic or disordered, indicating less synchronization in the reciprocal action that ensues between the parasympathetic and sympathetic branches of the ANS. In contrast, sustained positive emotions, such as appreciation, love, or compassion, are associated with a highly ordered or *coherent* pattern in the heart rhythms, reflecting greater synchronization between the two branches of ANS<sup>1,14</sup> (see Figure 2).

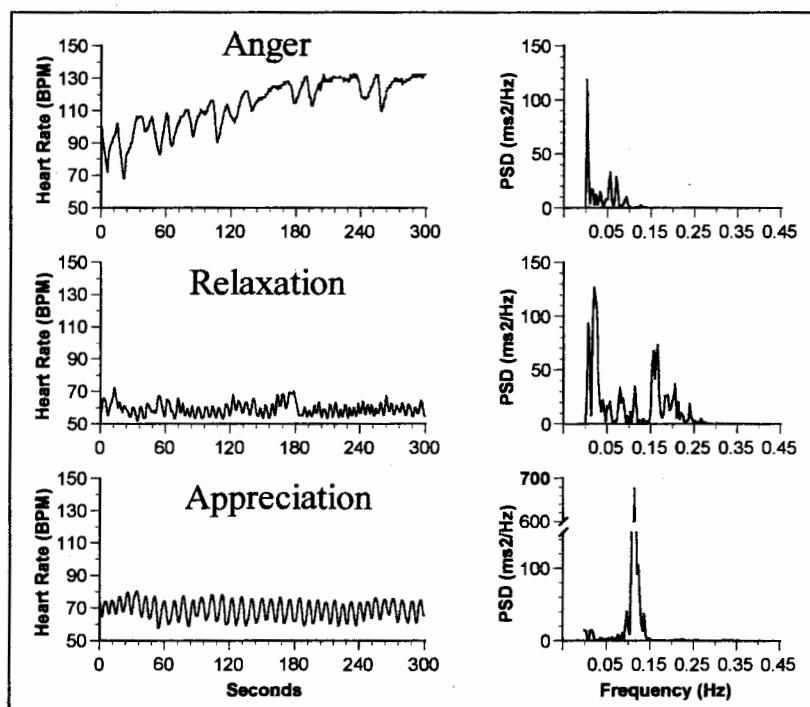


Figure 2



## Physiological Coherence

Our research on HRV and emotion has identified a distinct mode of physiological functioning that is frequently associated with the experience of sustained positive emotion. We call this mode *physiological coherence*. "Coherence" is used here as an umbrella term to describe a physiological mode that encompasses a range of distinct but related phenomena, including synchronization, entrainment, and resonance, all of which emerge from the harmonious interactions of the body's subsystems. Correlates of physiological coherence include: increased synchronization between the two branches of the ANS, a shift in autonomic balance toward increased parasympathetic activity, increased heart-brain synchronization (alpha rhythms become more synchronized to the ECG), increased vascular resonance, and entrainment between diverse physiological oscillatory systems (*i.e.*, heart rhythm patterns, respiratory, craniosacral, and blood pressure rhythms).<sup>1,15</sup> In the coherent mode, heart rhythms exhibit a smooth, sine wave-like pattern (heart rhythm coherence) and the HRV power spectrum reveals a narrow-band, high-amplitude peak in the low frequency range, at a frequency of about 0.1 Hertz (Figure 2). Methodology for computing coherence has been published elsewhere.<sup>1</sup>

During states of physiological coherence, bodily systems function with a high degree of synchronization, efficiency, and harmony. Psychologically, this mode is associated with improved cognitive performance, increased emotional stability, and enhanced psychosocial functioning and quality of life.<sup>15-19</sup> Studies conducted across diverse populations have associated the use of positive emotion self-induction methods that increase physiological coherence with a range of favorable health-related outcomes, including reduced anxiety and depression, decreased physical symptoms of stress, enhanced immunity, reduced cortisol, and increased DHEA.<sup>16,18,20-23</sup> Additionally, improvements in clinical status have been demonstrated in various medical patient populations, including individuals with hypertension, diabetes, congestive heart failure, and AIDS.<sup>18,19,24-26</sup>

## Building Coherence: Heart Rhythm Feedback Trainers

A promising new development in the field of HRV instrumentation is the recent introduction of low-cost heart rhythm feedback training devices. Heart rhythm feedback training provides a powerful tool to help people learn to self-generate states of increased physiological coherence at will, thereby reducing stress and improving autonomic function, emotional well-being, performance, and health. Technologies are currently available which enable physiological coherence to be objectively monitored and quantified. These technologies also help individuals develop emotional self-regulation skills that increase the capacity to sustain coherent states and their associated benefits.

One such device is the Freeze-Framer™ heart rhythm monitoring and coherence-building system (HeartMath LLC, Boulder Creek, CA) (Figure 3). Using a fingertip or earlobe plethysmographic sensor to detect the pulse wave, this interactive hardware/software system plots changes in heart rate on a beat-to-beat basis in real time. The system can be used in conjunction with breathing techniques or other interventions that affect autonomic activity and balance.

Step-by-step instruction in the HeartMath positive emotion refocusing techniques,<sup>27</sup> which guide people in intentionally generating sustained positive emotional states and coherent heart rhythm patterns, is provided in an on-line tutorial and materials included with the Freeze-Framer system. As people practice the coherence-building techniques, they can readily see and experience the changes in their heart rhythm patterns, which generally become more ordered, smoother, and more sine wave-like as they enter the coherent mode (Figure 4). This process enables individuals to easily develop an association between a shift to a more healthful and beneficial physiological mode and the positive internal feeling experience that induces such a shift. The software also analyzes the heart rhythm patterns and calculates a coherence ratio for each session. The coherence level is fed back to the user as an accumulated score or success in playing on-screen games designed to reinforce the coherence-building skills. The program includes a multi-user database to store results and track clients' progress.



Figure 3

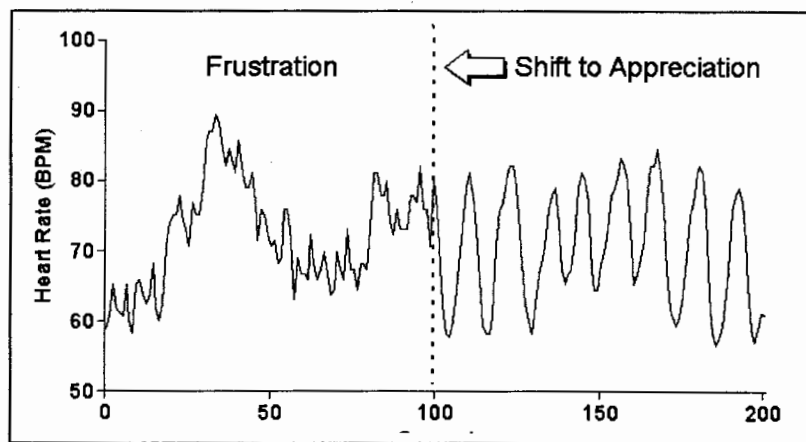


Figure 4

Because this technology uses a pulse wave monitor and involves no electrode hook-up, it is extremely versatile, time-efficient, and easy to use in a wide variety of settings (e.g., workplaces, homes, schools, etc.). Heart rhythm coherence feedback training has been successfully used by mental health professionals, physicians, educators, and corporate executives to decrease stress, anxiety, depression, and fatigue, treat children with ADD/ADHD and asthma, improve academic, work, and sports performance, lower blood pressure, and facilitate health improvements in numerous clinical disorders.<sup>26,28-30</sup>

Many health professionals have found heart rhythm monitoring and feedback to be an effective tool to support and facilitate a wide variety of therapies, both conventional and complementary. For example, this technology is increasingly being used by neurofeedback and syntonics practitioners to calm clients and stabilize the nervous system before sessions; this preparation often allows for more effective sessions. Many clinicians have found heart rhythm feedback to be an effective addition to treatment programs for chronic conditions that are associated with or exacerbated by emotional stress, including fibromyalgia, chronic fatigue, hypertension, asthma, environmental sensitivity, sleep disorders, diabetes, and cardiac arrhythmias, among many others. Practitioners also use heart rhythm feedback devices to monitor the real-time psychophysiological effects of various therapeutic interventions that affect ANS dynamics.

Because of the sensitivity of HRV patterns to changes in psychophysiological state, many psychologists utilize heart rhythm monitoring effectively as a "camera on the emotions." Continuous monitoring of clients' HRV throughout a therapy session is easily accomplished and can give both therapist and clients immediate insight into clients' emotional responses, often enabling a more efficient and effective session. This technology often proves helpful in identifying subconscious feelings, reactions, and emotional triggers that operate at a level below an individual's conscious awareness but are nevertheless reflected in physiological patterns and processes. The sensitivity of heart rhythm monitoring to psychological variables is clearly illustrated by the account of one psychologist who uses this technology with clients with multiple personality disorder. This clinician finds that he is able to reliably distinguish between the different personalities his clients manifest on the basis of distinct changes in their heart rhythm patterns.

### The Promise of HRV

In summary, HRV analysis and heart rhythm feedback are powerful and versatile technologies that can facilitate the practice of syntonics phototherapy. In addition, these tools have broad-based applications in diverse clinical, workplace, and academic settings for the enhancement of health and human performance. In the future, we foresee that HRV analysis and heart rhythm feedback will be increasingly incorporated in programs for the prevention and treatment of cardiovascular diseases and arousal-induced pathologies. We also expect that the use of these tools will increase in education, as more schools incorporate programs that seek to educate students in emotional awareness and emotion regulation skills. Furthermore, we anticipate that future developments in research, heart rhythm monitoring technologies, and pattern analysis methods will enable an even more refined electrophysiological discrimination of emotion than is currently possible. This may help practitioners guide clients in developing a greater awareness of how their conscious and subconscious emotional responses impact their physiology, and ultimately to achieve greater control over their emotional well-being and health.

HeartMath and Freeze-Frame are registered trademarks of the Institute of HeartMath. Freeze-Framer is a trademark of Quantum Intech, Inc.

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## FIGURE LEGENDS

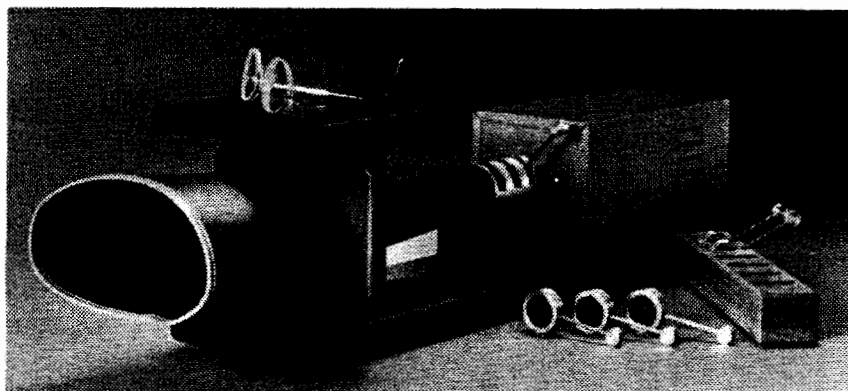
**Figure 1. Typical HRV power spectrum** obtained from a 5-minute heart rate tachogram. The power spectrum displays how power in the HRV waveform is distributed as a function of frequency. By revealing the individual oscillatory components that make up the complex heart rhythm, power spectral analysis provides a means to quantify ANS activity and balance. The horizontal axis of the power spectrum plots the frequency or rate at which each individual rhythm repeats, while the vertical axis indicates the amplitude or power of the rhythm. The spectrum is divided into three main regions or frequency bands, which reflect activity in the different branches of the ANS. Power in the high frequency (HF) band (0.15 to <0.4 Hertz) reflects the fast changes in beat-to-beat variability that are due to the parasympathetic influence on the heart, while the very low frequency (VLF) band (0.0033 to <0.04 Hertz) is reflective of sympathetic activity. Power in the low frequency (LF) band (0.04 to <0.15 Hertz) is related to baroreceptor activity and blood pressure control and resonance, and is dually modulated by the parasympathetic and sympathetic systems.

**Figure 2. Emotions and heart rhythm patterns.** Heart rate tachograms, showing beat-to-beat changes in heart rate (left) and heart rate variability power spectra (right) typical of different emotional/psychophysiological states. Anger (top) is characterized by a lower frequency, disordered heart rhythm pattern and increasing mean heart rate. As can be seen in the power spectrum, the rhythm is primarily in the very low frequency band, which is associated with sympathetic nervous system activity. Relaxation (center) results in a higher frequency, lower-amplitude rhythm, indicating reduced autonomic outflow. In this case, increased power in the high frequency band of the power spectrum is observed, reflecting increased parasympathetic activity (the relaxation response). In contrast, sustained positive emotions such as appreciation (bottom) are associated with a highly ordered, smooth, sine wave-like heart rhythm pattern (coherence). As can be seen in the power spectrum, this physiological mode is associated with a large, narrow peak in the low frequency band centered around 0.1 Hertz. This indicates system-wide resonance, increased synchronization between the sympathetic and parasympathetic branches of the nervous system, and entrainment between the heart rhythm pattern, respiration, and blood pressure rhythms. The coherent mode is also associated with a shift in autonomic balance toward increased parasympathetic activity, thus encompassing a key element of the relaxation response, yet it is physiologically distinct from relaxation because it also requires increased harmony and synchronization in nervous system and heart-brain dynamics. In addition, the coherent mode does not necessarily involve a lowering of heart rate per se, or a change in the amount of variability, but rather, a change in heart rhythm pattern. Also note the scale difference in the amplitude of the spectral peak during the coherent mode.

**Figure 3. The Freeze-Framer™** heart rhythm monitoring and coherence-building system takes the guesswork and randomness out of practicing emotional self-regulation skills by providing real-time physiological feedback. Using a fingertip or earlobe sensor to record the pulse wave, this interactive hardware/software system records beat-to-beat changes in heart rate and displays heart rhythm patterns in real time as one practices tools and techniques to increase *physiological coherence*—a highly efficient and regenerative state associated with increased synchronization and harmony among physiological systems, increased emotional stability, and improved cognitive performance. Using the Freeze-Framer, clients can readily see and experience how their autonomic nervous system activity and heart rhythm patterns change with different emotions, and watch their heart rhythms become more harmonious, smoother, and sine wave-like as they enter the coherent mode. The system can also be used to determine the effects of various interventions on ANS dynamics by quantifying autonomic activity and balance pre- and post-treatment. The software includes an HRV power spectrum display, screens that quantify one's coherence level in real time, instruction in the HeartMath coherence-building techniques provided in an on-line tutorial, three enjoyable on-screen games designed to reinforce the use of the coherence-building skills, and a multi-user database to store clients' results and track their progress.

**Figure 4. Shift to coherence.** Real-time heart rate variability (heart rhythm) pattern of an individual making an intentional shift from a state of frustration to genuine feeling of appreciation by using HeartMath's Freeze-Frame positive emotion refocusing technique. Note the immediate shift from an erratic, disordered heart rhythm pattern associated with frustration to a smooth, harmonious, sine wave-like (coherent) pattern as the individual uses the positive emotion refocusing technique and self-generates a heartfelt feeling of appreciation (at the dotted line).

## Hancock Home Therapy Syntonics Unit



A light, portable, low heat/low temperature unit to complement the College Syntonics Unit. Designed by Professor Walton M. Hancock, Professor Emeritus, Department of Industrial Engineering, University of Michigan and Dr. Betsy Hancock, O.D., as a patient rental unit. This sturdily constructed unit uses the same glass filters as found on the College Unit which are numbered to correspond to a syntonics color for easy patient use. An instruction manual, which includes a patient instruction sheet and record sheet, is included.

To order please contact Dr. Betsy Hancock at [visdiff@btd.net](mailto:visdiff@btd.net).



# AN INTRODUCTION TO SYNTONICS AS ENERGY MEDICINE

By Ray Gottlieb, O.D., Ph.D.

From all indications, the 21st Century will be the *century of light*. New applications of light used in communication, chemistry, physics and medicine are already impacting our lives. Increasing numbers of science and technology articles contain reference to light. The surface of light's use has barely been scratched. A recent invention, for example, will allow scientists to flash light at one ten-millionth of a millionth of a second, fast enough to stop the action of an electron being knocked out of orbit, or to examine the shape of a light wave. Yet as nature's secrets unravel, the mysteries of our existence increase. Ideas rejected in the past by hard sciences as beyond possibility are now attracting serious consideration in clinics and laboratories around the world. Color healing, psychic communication, and the energy bodies that surround life seem less fantasy and more reality as the quantum sciences move from theoretical conjecture to scientific understanding.

Yet biological sciences continue to be dominated by 19th Century chemical concepts as researchers and practitioners of the allopathic model still calculate body energy in chemical terms. This review explores electrical aspects of syntonics.

## SPITLER: THE LEAK IN POTENTIAL

Throughout the syntonics literature one reads that blue light increases the leak in potential (electrical charge) and red decreases it. After decades of wondering just what this means, I looked in *The Syntonic Principle*, Chapter X, Body Potential, Brain Waves and Action Currents. Here Spitler describes how electric voltage develops across a semi-permeable membrane separating two dissimilar solutions of salt. Living cells actually generate charge across their membranes. A cell's nucleus is positively charged compared to its surrounding cytoplasm and a cell's exterior is positive compared to its interior. This potential is generated by metabolic activities within the cell and nucleus. The greater the metabolic rate the stronger the charge. If a cell is stimulated by external sources, the charge increases. If a cell is starved or has compromised membranes, its charge drops. This weakens the vitality of the cell. When the charge falls to zero, the cell dies.

In healthy animals, according to Spitler, similar voltages exist between the brain, organs and other body parts. The brain, like the cell nucleus, is positively charged compared with the rest of the body. He found the greatest polarity between the liver and the brain and described how a rabbit appeared to die when he reversed the normal brain/liver polarity by inserting electrodes into its brain and liver. The rabbit's breathing and heartbeat ceased and medical examiners pronounced it dead. When Spitler reversed the electrodes to restore the normal liver-brain polarity, the rabbit suddenly regained consciousness, had normal vital signs, and appeared fully alive.

These cellular and mass body voltages must respond to and predict changes in the external environment and to internal drives such as the four F's -- fight, flight, food and reproductive drives. The senses, stimulated by light, sound and chemical signals, are the primary controllers of adaptive variations in the body's oxidation (metabolic) rate. Thus, according to Spitler, the stimulation of light on the retina directly influences general metabolic processes.

Spitler describes a simple photo-electric circuit diagram to demonstrate how ocular light therapy might alter biological energies. The circuit includes a battery, photocell, and charge-sensitive on-off switch. The photocell responds to light by sending charge to the switch. This turns the switch to its on position, thereby closing the circuit, discharging the battery, turning it off and breaking the circuit. The switch then recharges, turns on, and the process repeats itself as long as the battery stays charged and the photocell receives light. In stronger light the switch charges faster and increases the frequency of on-off cycles. Thus the frequency of discharges measures the intensity of the photocell response just as in animals stronger signals increase the frequency but not the amplitude of action potential spikes flowing along nerves. In the photocell circuit, each discharge taps the battery a little. The stronger the light stimulus, the faster the frequency of discharges, and the sooner the battery drains. In darkness there is no response, no leak, and the battery stays charged. Dim and red light produce a weak photocell response and very slow frequency of discharges and slight battery drain. Green light increases the frequency slightly but blue-violet light, the strongest stimulus, quadruples the frequency of discharge causing rapid drain on the battery.

Spitler proposes a similar circuit in animals. He demonstrates this parallel in a diagram showing a retinal photoreceptor, the sub-retinal choroid, optic nerve, brain, vagus nerve, liver, and blood stream. The photoreceptor and brain are positively charged and the choroid and liver are negative. The brain and liver have the greatest polarity and, according to Spitler, compose the animal's 'battery.' If the brain-liver polarity runs down, the animal weakens and at zero charge, the animal dies.

In this model, centrifugal nerve fibers from the brain via the optic nerve stimulate a positive retinal charge relative to the electrolytes circulating in the blood plasma of the choroid. When short-wavelength light enters the eye, it passes through the retina into choroid to ionize these electrolytes. The negatively ionized electrolytes are attracted toward and move into the positively

charged retina thereby neutralizing the retina/choroid polarity. Because of the retina's connection to the brain and the choroid's to the liver via the blood stream, this leak diminishes the brain/liver polarity and hence the vitality of the organism.

Stimulating the eye with red light does not ionize the choroidal electrolytes so the charge between the brain and liver is stays strong. Red light allows the vital charge in the body to build while blue light depletes it. Thus, red light decreases the leak in potential and blue light increases it.

Spitler cites an experiment to confirm this hypothesis. He inserted a galvanometer between the brain and the liver of a rabbit to measure the voltage changes in response to red and blue light. When he flooded the eye with red light he recorded an increase voltage over time. Blue light produced the opposite result. The brain/liver charge drained faster than the body could replenish it.

In syntonio phototherapy, red light is prescribed for amblyopia because red allows retinal charge to build. Then when the retina fires in response to light, it does so with an increased vigor capable of overwhelming resistant synapses in the retina and visual centers in the brain.

Blue light depletes excess charge in the body. When a body builds too much charge, muscles will tighten in spastic knots and senses will be hyper reactive. Increased pain, for example, would result from lowered thresholds and increased sensation. By reducing charge, blue light relieves acute pain and tension.

This conception of the healing effects of red and blue light is in line with color therapy advocates who had written this decades before Spitler.

#### WORK BY LIGHT THERAPISTS PRECEDING SPITLER

##### SETH PANCOST, M.D.

Seth Pancost, in his book: *Red and Blue Light: or, Light and Its Rays as Medicine* (Philadelphia, J. M. Stoddart & Co. 1877) wrote that: "... These two rays produce the two opposite forces, or principles of light -- the Red the positive, polarizing, integrating force or principle, the Blue the negative, depolarizing, disintegrating force or principle. ... Relaxation of the nervous system means the relaxation of its tension, or the depolarization, disintegration of the centers or conductors of vital force. ... Excessively accelerated tension means the excessive polarization, integration of the centers or conductors of vital force. So to counteract the former we employ the *positive ray* (red) and to relieve the latter we employ the *negative ray* (blue)."

And "...to *accelerate* the nervous system, in all cases of relaxation, the Red ray must be used, and to *relax* the nervous system in all cases of excessively accelerated tension, the Blue ray must be used.

But Pancost advised "... In light as in medicine there can be no invariable standard for doses determine alone by the symptoms; in each case, the physician must take into account the tone of body, the normal tension of the individual nervous systems and the entire temperament of the patient in health. ... A proper dose for one often proves insufficient for a second and an overdose for a third, even where the symptoms are identical. "

He used blue to relax specific areas of the body for such conditions as sub-acute rheumatism, sciatica, and stiffness in shoulder, tingling in fingers, moving pains in the back. Red light was used starting in small doses and increasing for physical and mental strain leading to exhaustion (pains in back of the head, shortness of breath, fluttering of heart, compressible pulse, loss of appetite, constipation and phosphoric urine).

##### EDWIN BABBITT, M.D.

In *The Principles of Light and Color* (1878) (see *The Principles of Light and Color: The Healing Power of Color*, edited by Faber Birren, University Books, New Hyde Park, NY 1967) Edwin Babbitt recommended blue for: All nervous and excitable conditions, fevers, inflammations and hemorrhages; all conditions with a surplus of the red element; diarrhea and visceral excitement; nausea, pleurisy, palpitation; excessive menstruation; points of acute pain, or too great heat; neuralgia, headache, spinal irritation.

He recommended red for: all cold, dormant and chronic conditions; all anemic or impoverished states of the blood; all pale, sallow complexions with poor arterial blood; constipation of the bowels; suppressed menstruation; dormant liver, kidneys and lower spine; all hard, chronic tumors and negative inflammations; bronchitis, ulceration of lungs, paralysis, chronic rheumatism, chills; despondency, stupid brain, dropsy, exhaustion, etc.

##### WILLIAM HENNING, N.D., O.D.

William Henning in his book, *The Practice of Modern Optometry* (Actino Laboratories, Inc. Chicago, 1939), described two fundamental responses: contraction and expansion. Although all frequencies are stimuli, application of the *blue-indigo-violet* frequencies induce expansion; disinhibition; dilation; relaxation; decreased secretions; increased absorption; pleasure, relief, etc. *Red-yellow-orange* frequencies elicit contraction; stimulation; constriction; tension; spasm; increased secretions; increased metabolism; decreased absorption; and increased pain and discomfort.

##### CARL LOEB, M.D.

In his *A Course in Specific Light Therapy* (Actino Laboratories, Inc. Chicago, [1939]), Carl Loeb described the use of

filter #1 (flame-red) as a "liver and renal energizer and sensory stimulant. Red typifies the basic principle of life. It stands for blood, heat, and expansion." He rarely used red alone but in combination with yellow or orange. He called attention to initial reactions of "buoying action and mental exhilaration but excess exposure lead to negative responses of irritation and depression and a form of pent-up pressure which accumulates and may be set off explosively in the form of violent tantrum, and contrariness.

In Loeb's system he makes distinction between #4 (etheric-blue with no red frequencies) and #5 (blue-violet includes blue frequencies) (Spitler does this too with  $\nu = \#4$  and  $\omega = \#5$ .) Loeb calls them 'velocities' and the #4 velocity for drying (as in runny noses), cooling (as in fevers and burns), calming (as in nervousness), pain reduction (as in headache), anti-inflammation (as in conjunctivitis) and sedation (as in insomnia). Loeb points out the difference between #4 as sedative and cooling to the blood and #5 as sedative to the nerves. So #5 would be used to slow all the body's responses, also as a mental and emotional relaxant as well as a motor depressant.

"#5 is one of the most important frequencies in the treatment of 'Americanitis' expressed in hyperirritability, hurrying, speed mania, the desire to do many things in a limited amount of time, and over-activity of many kinds without plan or reason. Continuous over-exposure to various stimuli of light, sound, and motion has created hyper-irritability of nervous response in inhabitants of our big cities, and most of those coming for treatment suffer more or less from conditions which require lowering of tonus and relaxation, where #5 is indicated." And this was in 1939!

#### COLONEL DINSHAW P. GHADIALI

In Dinshaw's *Spectro-Chrome Metry Encyclopaedia* (Spectro-Chrome Institute, Malaga, N.J., 1934, 1940), he refers to blue as "the refrigerant wave" and assigns to it the following attributes: Antipruritic, an agent that prevents or relieves itching; Diaphoretic, an agent that increases the perspiration; Febrifuge, an agent that dispels or reduces fever; Counter-irritant, an agent that allays irritation; Anodyne, an agent that soothes suffering; Demulcent, an agent that allays the irritation of abraded or scratched surfaces; and a Vitality Builder, an agent that builds the life principle. Indigo, the "semi-radio-active wave," he describes as the "opium antagonist" with the following properties: Parathyroid stimulant; Thyroid depressant; Respiratory depressant; Astringent, an agent that causes contraction and arrests discharges; Sedative, an agent that allays activity and excitement; Pain reliever, an agent that allays suffering; Hemostatic, an agent that checks the flow of blood; Inspissator, an agent that dries or thickens; and Phagocyte builder, an agent that builds cells which destroy harmful micro-organisms. He used it for excessive menstruation, for reducing tumors both cancerous and otherwise, and to stop bleeding and pain.

"The color of the liver is red; it selects from the spectrum the red wave to build itself." The attributes of red include: Sensory Stimulant, an agent that increases the activity of the sensory nervous system; Liver energizer, an agent that activates the liver; Irritant, an agent that irritates; Vesicant, an agent that blisters; Pestulant, an agent that produces or discharges puss; Rubefacient, an agent that reddens the skin; Caustic, an agent that burns or corrodes; and is a Hemoglobin builder. Although scarlet looks red (but has some added violet, as does  $\alpha\omega$ ), Dinshaw assigns to it different attributes including: Arterial stimulant; Renal energizer; Genital excitant; Aphrodisiac; Emmenagogue, stimulates menstruation; Vasoconstrictor; Ecboic, an agent that accelerates the expulsion of a fetus (and placenta); Sex builder in subnormal, an agent that builds the sex powers by enhancing the sensitivity.

#### THE CONTRIBUTION OF GEORGE W. CRILE, M.D.

In addition to the influence of these earlier color therapists and authors, Spitler's ideas about the electrical charges in the cell and body were also supported by the research and writings of George W. Crile. (See *The Phenomena of Life: A Radio-Electric Interpretation*, W.W. Norton & Co., NY, 1936.)

George Crile was a world-renowned medical researcher, inventor and pioneering surgeon who performed this country's first successful thyroidectomy operation and the first successful direct blood transfusion for humans. In medical school he became interested in why a fellow medical student died as a result of an accident that damaged his legs. The student did not suffer great loss of blood, low blood pressure or injury to the head or any organ. According to the medical knowledge at that time, the young man should not have died. This fascinated Crile. He spent the next 50 years researching the biology of life and death. He compared morphologic changes of cells and tissues from brains, livers, adrenals, and other organs before and after injury, infection, surgical trauma, insomnia, emotion, hemorrhage, asphyxia, narcotics, gland and organ excision, anaphylaxis, poisons and other causes of depression and death. "We examined all the cells of all the organs of foxes which had been pursued by hounds; of salmon before and after they had made a 1000 mile swim; of electric fish before and after discharge of their electric energy; of woodchucks in hibernation. . ." His investigation of different properties of anesthetics led to important changes in emergency medical procedures used during and since WW I.

#### THE BIPOLAR THEORY OF LIVING PROCESSES

According to Crile, living animals are based more on energetic forces than material structures. (See the rainbow paragraph at the end of this article.) Life forms are distinguished from non-living material by electrical charges produced in the protoplasm. Electrical forces arrange the atoms and molecules to construct the component structures inside and outside of cells. In each of the trillions cells in the body there is created an electric strain, the vibratory discharges of which serve as the catalyst for oxidation. Oxidation in turn renews the electric charges on the countless interfaces within the cells. The structure and function of

cells are both dependent upon the maintenance of the normal electrical potential. Anything that diminishes this electric charge will reduce the frequency and force of the vibratory energy released and lead to a progressive loss of vitality, fatigue, vulnerability to disease, and, if not remedied, exhaustion, unconsciousness, and finally death.

"The nucleus of the cell is comparatively acid. The cytoplasm of the cell is comparatively alkaline. The nucleus and the cytoplasm are separated by a semi-permeable membrane. Therefore the cell is a bipolar mechanism or an electric battery, the nucleus being the positive element, the cytoplasm the negative element. The rate of oxidation in the nucleus is greater than the rate of oxidation in the cytoplasm and therefore as the electric tension increases in the nucleus, the electricity passes through the nuclear membrane; the electric potential in the nucleus falls and in consequence the current is interrupted. Since the potential is again immediately restored by oxidation, radiation and other chemical activity, we conceive that an interrupted current passes continually from the positive nucleus to the negative cytoplasm. . ." George W. Crile

Crile probed living cells with tiny electrodes and discovered a voltage across the semi-permeable membrane separating the nucleus and cytoplasm. He also discovered a similar charge between parts and organs of the body and that the brain, like the nucleus of the cell, exhibits the highest charge while the liver, like the cell cytoplasm, is the least charged part of the body. He pointed out that the liver is composed of molecules similar to those found in cytoplasm and performs a similar function for the body as the cytoplasm serves for the cell. In further experiments he ran a wire between the cell's nucleus and cytoplasm causing the charge to vanish and the cell to die. If within a certain time period he removed the wire to allow the charge to rebuild, the cell came back to life. And when he neutralized the liver/brain charge by inserting wires in the liver and brain, the animal appeared to die but then came back to life after the electrodes were removed. This is similar to what Spittler described in his rabbit experiment and Spittler makes reference to Crile's research.

#### OXIDATION, NITROGEN AND ULTRA VIOLET LIGHT

How is this bio-electrical energy created? Crile believed that oxidation produces this charge. Oxidation is the most universal chemical reaction in nature. Oxidation is the burning of oxygen and carbon (e.g., in sugar and fat) to create  $\text{CO}_2$  and water. So basic is oxidation to life's fundamental process that the intake of oxygen and output of carbon dioxide equals the body's basal metabolic rate. Nitrogen is also important to the process. Ammonia ( $\text{NH}_3$ ) is a product of animal metabolism and the amount of  $\text{NH}_3$  in the blood and urine is also an accurate measure of metabolic rate.

Carbon compounds are very stable and oxidize too slowly to produce the dynamic, bioelectrical energetics required for life. Crile saw that a more explosive ingredient than carbon is required so he investigated nitrogen, which, along with carbon, is a major component of protein. Nitrogen and carbon, with oxygen, are used to make explosives such as nitroglycerin and gunpowder, a mixture of nitrate, sulfur and charcoal (carbon).

The nitrogen in animal cells comes from eating vegetation. Plant nitrogen comes from the soil. The nitrogen in the soil comes from the air. Air is mostly nitrogen plus a little oxygen and trace amounts of other substances. The nitrogen in air,  $\text{N}_2$  (N-N), is extremely stable and biologically inert. It must be converted, or fixed, in order to become biologically useful. This conversion happens naturally by two means – lightning flashes or via nitrogen-fixing bacteria. This is where ultraviolet light comes into the picture. Only ultraviolet light has the power to ionize the nitrogen atoms to fracture the N-N bond. Nitrogen-fixing bacteria emit ultraviolet radiation in the process of nitrogen fixation. Lightning flashes, more than twice as hot as the  $6000^\circ\text{C}$  surface temperature of the sun, radiate much more ultraviolet light. During lightning storms, ionized nitrogen combines with oxygen and water (rain) to become nitric acid,  $\text{HNO}_3$ . This falls to earth to couple with potassium in the soil forming potassium nitrate ( $\text{KNO}_3$ ), ubiquitous in animal protoplasm and a chief ingredient of plant protein.  $\text{KNO}_3$  is also the base of the nitro-explosives. Nitro-explosives radiate intense, high-energy (ultraviolet) light, and free  $\text{CO}_2$  and  $\text{N}_2$  when detonated.

"Lightening and terrestrial electricity, which fix nitrogen, form the nitrates. The nitrates in the soil represent a pre-plant phase of living things. Solar radiance added to the nitrates generates plants. Plants generate animals. Thus solar radiation generates man. Animals, like plants, grow by virtue of solar radiation and re-radiate solar radiation. Much of the body of animals, the lungs and the circulatory system, is related to the fact that it is through oxidation in animals that the sun's radiance is re-radiated in protoplasm; that is, oxidation causes the sun to 'shine' again in protoplasm." George W. Crile

#### THE RADIOGEN

Just as the sun is the primary generator of energy via electromagnetic radiation for Earth, Crile postulated that billions of tiny suns in the nucleus of each cell radiate light and that this light is the source of bioelectricity. Radiogen is Crile's descriptive term to denote the theoretical units of protoplasm in which oxidation occurs and from which radiation is emitted. Each radiogen, each infinitesimal sun, is an atom of iron burning at the temperature of lightning. Powered by the oxidation of nitrogen and carbon, the radiogen radiates ultraviolet and visible light. The idea is that the portion of light from each spectral band (e.g., visible colors, infra red, ultraviolet) changes to meet the requirements of the cell and the organism as a whole. Particularly important is the



radiation of ultraviolet (UV) light because only UV light has the energy to remove an electron from its existing orbit, thereby ionizing or creating charge in otherwise neutral atoms and molecules. These tiny charges accumulate in the nucleus to create the electrical potential across the membrane between the nucleus and cytoplasm. The charge builds until the membrane capacitance is exceeded. When this happens the membrane resistance breaks down and the stored energy discharges into the rest of the cell. The membrane recovers, the charge builds again, and wave after wave of energy is released to power the cell. The more UV light the radiogen radiates, the quicker the charge builds, the faster the cycle of energy release, and the greater the vitality of the cell. The mix of chemical elements present at the moment of oxidation determines the amount of UV radiated.

#### THE ROLE OF THE ENDOCRINE AND AUTONOMIC

A living cell's energy must match the changing needs of the organism. For example, during fight, flight or hard work, muscle cells require extra energy. Crile's research lead him to conclude that the thyroid is the governor of UV radiation and thereby controls the ongoing activity level of all cells. The thyroid concentrates iodine and secretes thyroxin, a compound containing iodine and a nitrogen fraction. Adding this to the oxygen and carbon at the radiogen brightens the fire and shifts the spectrum of radiation toward ultraviolet. Crile measured the radiation from thyroid and organ tissues oxidized with and without added thyroxin. Only the tissue high in thyroxin emitted high levels of UV light. Recall that human metabolic rate is commonly measured by thyroid function and that hyperthyroid people are energetic, mentally quick and slender while the symptoms of hypothyroidism are sluggishness, weight gain, and lack of vitality. Increased bioelectricity correlates with increase in ultraviolet.

Thyroxin also stimulates the adrenal medulla (adrenalin) and sympathetic nerve ganglions (noradrenalin). These substances increase the body's energy to prepare for and deal with emergencies. The adrenal/sympathetic hormones bring emergency powers to animals by increasing the intensity of ultraviolet radiation in the radiogens and also lend anaerobic support to sustain oxidation (after the depletion of oxygen from the blood that is supplied by the lungs). Animals that die from asphyxiation can be resuscitated by injection of adrenaline and artificial respiration.

#### THE RADIANCE OF LIFE

Crile describes four bands of light radiation important for life. Ultraviolet light is important because it ionizes matter to create structure and growth as well as the electric energy for life. Visible light drives the sense of sight and directs movement through space in fight, flight and attraction. Long-wave infrared light maintains body heat within its critical range. And since plants use near-infrared for the photosynthesis of carbohydrates, Crile links near-infrared to insulin.

#### THE RAINBOW OF LIFE

The body of life is an energy form. What seems to be solid structure is in constant flux. The atoms, molecules and cells of our body are short lived, yet we look, feel and act as if nothing has changed. What remains are the fields of energy that hold and guide life's developmental process. Crile paints an image of life as a rainbow "To a child and to a primitive man, a rainbow would seem to be an object that could be felt and measured and weighed. . .Neither the energy, nor the matter that forms the rainbow, nor the energy and matter that form the living state, is constant. It is only the pattern that is constant. The entrance of each creative wavelength into the pattern of the living is the "birth" of that fraction of the living state; while the passing of that wavelength out of the pattern of the living is the 'death' of that infinitely small fraction of the living state. So, too, is the rainbow being constantly 'reborn.' So, too, is the rainbow 'dying' -- dying in quanta or wavelengths. It is only the apparition caused by the unseen velocities of wave and electric energy which our senses experience as a solid form."

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# Edwin D. Babbitt

## In A New Light

By Chris Terrell

*"In nature all about us is color. It is the most beautiful thing on earth, illuminating the glories of the world, with cosmic light flowing from the universe of stars to illuminating the smallest objects seen through the microscope. Light is always present."*

Edwin Babbitt *The Principles of Light and Color* 1878

Over a century ago Edwin Dwight Babbitt, M.D., proposed that colors and sunlight had luminous, magnetic, electric and thermal qualities that carried a vital healing force and when correctly applied, had profound therapeutic affects on the body. Babbitt was one of the few medical practitioners who used color and light to heal the body and believed that light was a marvelous storehouse of power to vitalize and heal mankind. Babbitt was a great humanitarian and great healer.

His work with color and light inspired many people, among them, the well-known color therapist Dinshaw Ghadiali, PhD, MD. Dinshaw gave credit to Babbitt for changing his views on medicine, when, early in his career, he was treating a woman dying from intractable dysentery with no success. When he applied a Babbitt treatment of indigo light, she felt instant relief and made a rapid recovery. Amazed with his own results, Dinshaw developed his own medical practice using light and color that we are familiar with today.<sup>1</sup>

In 1878 Babbitt wrote *The Principles of Light and Color*, a deep and intensive study that covers many topics from a scientific point of view. Yet some could argue that the book is also metaphysical in nature, due to the fact that Babbitt was clairvoyant as well as deeply religious. Without a doubt, *The Principles of Light and Color* has become a classic and a valuable contribution to the present study of light and color. This article will present an over-view of two chapters, titled *Chromo-Chemistry* and *Chromo-Therapeutics*. It is the intention of this article to impart knowledge and to give Babbitt recognition for the major contribution he has made in the ever-growing field of color therapy.

In Babbitt's words:<sup>2</sup>

*"...My ideas have been brought to maturity to crystallize the subjects of Light, Color and other Fine Forces into a science, and learn of their chemical and therapeutical potencies as well as many of their mystic relations to physical and psychological action...It is quite time that the wonderful world of light and color which is invisible to the ordinary eye, and which is capable of being demonstrated by spectrum analysis and otherwise, should be made known, especially as so many mysteries of nature and human life are cleared up thereby, and such marvelous powers of vital and mental control are revealed."*

Babbitt was fascinated with color and light and was determined to scientifically demonstrate that color and light had therapeutic qualities.

*...The seven different colors of sunlight are each composed of a different style and number of vibrations and each has special properties and chemical powers. Everything possesses a finer positive principle and coarser negative principle...each color has its balancing opposite and plays a critical role in color healing."*<sup>2</sup>

### Chromo Chemistry

Dr. Babbitt developed his theory of color therapeutics from his intense investigation and important discovery that each metal and element in our atmosphere, when viewed through the *spectroscope*, (Figure 1.) gave off a dominant and specific color. Our atmosphere is composed primarily of oxygen, nitrogen, hydrogen and carbon. Sodium is two-thirds the earth surface and is continually released into the air. These elements throw off a chemical action, and when solar rays or artificial light strike these particles, they are illuminated and give off light and color. Figure 2. provides a list of metals and their predominant colors.

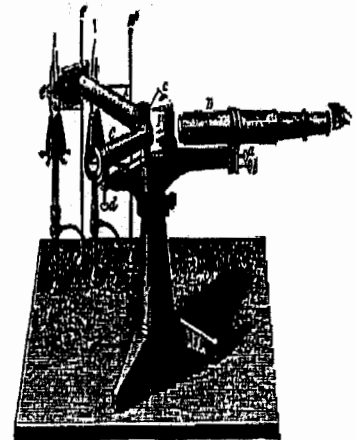


Figure 1. Spectroscope

### Atmospheric metals and their colors

<b>Sodium</b> yellow-orange, yellow-green, blue-green	<b>Iron</b> orange, blue-green, indigo-blue, violet	<b>Zinc</b> red, orange, yellow-orange, yellow, blue-green and blue	<b>Hydrogen</b> red-orange, blue-green, indigo-blue, dark violet
<b>Calcium</b> red-orange, orange, yellow-green, violet-indigo, dark violet	<b>Chromium</b> yellow, yellow-green, blue, indigo-blue	<b>Strontium</b> red, red-orange, yellow, yellow-green, blue, indigo-blue, violet	<b>Manganese</b> violet, yellow-orange, yellow, yellow-green, blue-green, blue, violet-indigo, violet
<b>Barium</b> red, red-orange, yellow, yellow-green, violet	<b>Nickel</b> orange, yellow-orange, yellow, blue-green, blue	<b>Cadmium</b> red, red-orange, yellow-green, blue	<b>Aluminum</b> orange, yellow, yellow-green, blue, dark-violet
<b>Magnesium</b> yellow-green, blue	<b>Copper</b> red-orange, yellow, yellow-green, blue-green, blue	<b>Cobalt</b> orange, yellow-orange, yellow, yellow-green, violet-indigo	<b>Titanium</b> orange, yellow-orange, blue-green, blue, indigo-blue, violet-indigo

The following information reveals the connection that man is made of the same minerals. Take into consideration that the *chemical elements* of a 160 lb. man are composed of approximately 90 lbs. oxygen, 36 lbs. carbon, 14 lbs. hydrogen, 3 lbs. 12 oz. calcium, 3 lbs. 8 oz. nitrogen, 1 lb. 4 oz. Phosphorus, with other elements less than a pound: chlorine, potassium, sodium, fluorine, magnesium, silicon, iron, iodine, and manganese. 3

In addition, let us examine the *chemical needs of* the body. (Figure 3)

**Figure 3**

Thyroid: <i>Iodine</i>	Adrenals: <i>Zinc</i>
Bowel: <i>Magnesium</i>	Pituitary Gland: <i>Bromine</i>
Heart: <i>Potassium</i>	Stomach / Digestive: <i>Chlorine, Sodium</i>
Kidneys: <i>Chlorine</i>	Tissues and Secretions: <i>Potassium, Chlorine</i>
Spleen: <i>Fluorine, Copper</i>	Lungs / Respiratory System: <i>Oxygen, Iron</i>
Liver: <i>Sulphur, Iron</i>	Teeth and Bones: <i>Fluorine, Calcium</i>
Skin / Circulation: <i>Sulphur, Silicon, Oxygen</i>	Brain / Nervous System: <i>Phosphorus, Magnesium</i>

In conclusion, a direct correlation between solar metals and elements to the human body exist, and because each reflects its own color, color can affect the body. Furthermore, Babbitt discovered that colors, being thermal or electrical in nature, when joined together, would affect each another either by attraction or repulsion, depending upon their color. The chemical reaction either gives off heat energy or cool electrical energy.

In Babbitt's words:

*"All things manifest their potencies and their qualities by means of color. There is tremendous power in color repulsions and color affinities. From these facts an exact material medica can be constructed."*

With further investigation into the chemical action of color, he found that contrasting substances and forces naturally tend toward each other and develop each other by means of *Chemical Affinity*. A spectrum color wheel (Figure 4) provides each color and its compliment, or opposite and gradation. The real harmonic contrast of any color is by simply getting its compliment, said Babbitt.

"Thus, a triad of colors have red, forming a contrast with the other two colors, yellow and blue, which is green. Yellow forms a contrast with red and blue, which is purple. Finally, blue with yellow and red, produces orange. The trinity of colors, the red, yellow, and blue, find representation in the three great elements of Hydrogen, Carbon, and Oxygen, which make up so much of our world, including the vegetable kingdom, sugars, gums, starches, ethers and alcohols."

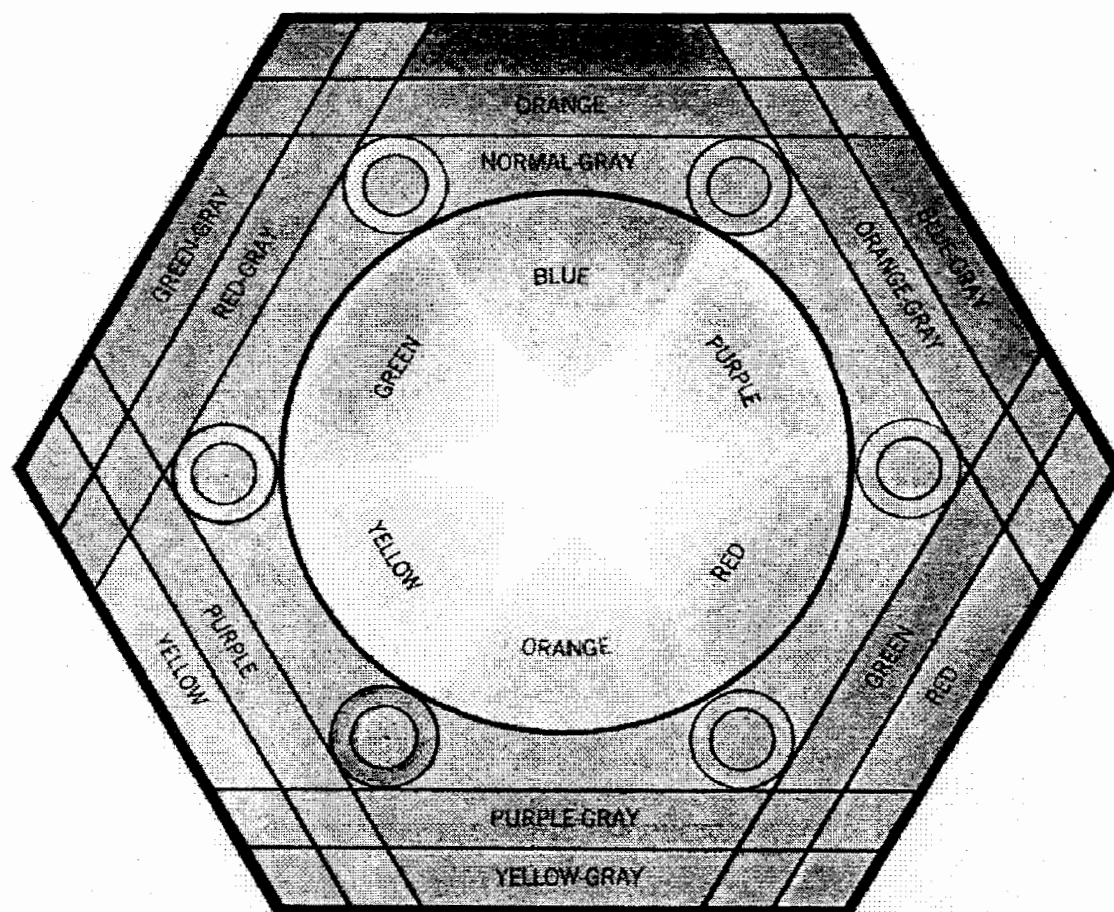
Because color and light now had a scientific explanation, Babbitt was confident that color would restore and bring balance to the body for self-healing, without using man-made drugs. The "celestial heavens" as he called them, provided sunlight to flood our atmosphere, where each and every metal, with their color properties, could interact with body chemistry, and with the correct application of color, the person would find relief in an effortless and painless manner.

A brief and simple overview of the color spectrum reveals the primary colors red, blue, and yellow. Color has chemical properties of which red is described as thermal and exciting in nature, and is at the center of *heat*. Yellow is a medium color, of medium thermal intensity, and is at the center of *luminosity*, Blue is a finer color, which is *cold*, *soothing* and *electrical*.

When the body is out of harmony, a dis-ease state occurs. Babbitt used the scientific principles of *chemical affinity* to assist the body to correct any imbalance and return it to a state of health and vitality.<sup>4</sup>

## Chromo Therapeutics

A brief explanation of each color and its therapeutic qualities are provided below, along with certain allopathic drugs that could be used, with each drug corresponding to the appropriate application for disease. Of special interest is the fact that these drugs, without exception, are of the same color that Dr. Babbitt prescribed. One or two case studies are included for each color, each taken from Babbitt's book *Principles of Light and Color*. For those interested in more case studies, further reading from this text is recommended.



**CHROMATIC HARMONY OF GRADATION AND CONTRAST.**



## THE HEALING POWER OF RED

Red stimulates the blood and is the warming element of sunlight. It acts as the harmonizing affinitive element of the cold blue principle that causes blueness of the veins and pale countenance. Red alleviates paralysis and other dormant chronic conditions.

Drugs, which are red or reddish, produce the same stimulating effects, such as *Musk*, *Red Cedar*, and *Capsicum*.

*Balsam of Peru* – Tonic, expectorant

*Cayenne Pepper Ammonium Carbonate* – Arterial stimulant

*Cloves* – Aromatics

*Bromine* – Tonic, diuretic

*Iron* – Builds red blood cells

## THE HEALING POWER OF ORANGE AND YELLOW

Yellow is the central principle of nerve and brain stimulus. In drugs, emetics are yellow with some red and orange, such as *Indian Hemp*, *Lobelia*, *Tartar Emetic*, and *Bloodroot*. Laxatives and purgatives have yellow as their chief color, for example *May Apple*, *Senna*, and *Colocynth*. Stimulants are: *saffron*, *mustard*, *dandelion*, *figs*, *gluten*, *castor oil*, and *ginger*.

## THE HEALING POWER OF BLUE AND VIOLET

Blue and violet sooth inflammatory and nervous conditions and are cold, electrical and penetrating. Blue with violet acts as an astringent, antiseptic, narcotic, and on all nervous conditions. Blue animates the venous blood. If the red arterial blood becomes over active and inflammatory, blue is the balancing and harmonizing principle. This applies to the nerves of the cranium, stomach, bowels, and kidneys when conditions of delirium, diarrhea, and diuresis occur through overheating.

Drugs used for this purpose include *aconite*, *belladonna*, *foxglove*, *ergot*, *cranesbill*, *logwood*, *blackberry*, *nitric* and many others. Blue, indigo and violet light heal on the same principles as the drugs but with a more delicate and less harmful effect.

## Therapeutic Devices

Babbitt developed several devices that used color and light for healing the body. He called these were the *Chromo-Disc*, the *Chromo-Lens*, and the *Chromulume*. A brief description of each invention is offered with its practical use.

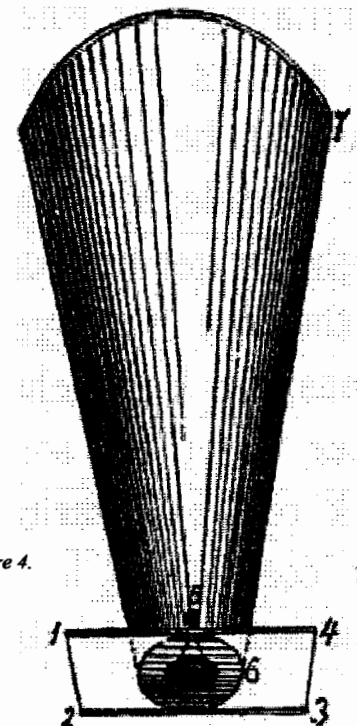
### The Chromo Disc

This device used a cone to concentrate light down to a color filter, to be held over a specific body area for ten to twenty minutes. The lens was blue, red, yellow, purple, and opalescent white, each 5 inches in diameter. Specific treatments were diseases of the brain and nerves, respiratory system, organs of circulation and skin, diseases of the stomach, liver and bowel. Dr. Babbitt believed the Chromo-Disc was four times more powerful than ordinary light. A small magnifying lens was provided to intensify the light when dormant and stubborn conditions existed. (See Figure 4.)

Babbitt often gave a prescription using two colors, usually its complement. For example, when treating bronchitis, he would prescribe blue over the upper lungs, alternating with yellow; the same over the cervix. In cases involving blue, he used yellow as the complement, explaining that red was usually too extreme, and that yellow had the ability to stimulate and enhance the blue power most effectively. Sour throats needed blue in the front, yellow on the cervix.

### The Chromo Lens

These were small vials made of convex crystal glass approximately 5 and one-half inches in diameter and one and half inches through the middle with the capacity to hold eight ounces. The colors were blue, yellow-orange or amber, and



the transparent. Babbitt said this instrument was the most convenient, cheapest and exerted the greatest power in a short time than the other healing instruments.

The solution in the lens, charged in sunlight, became medicated with an "exquisite principle that was more gentle, enduring and far reaching in its effect than ordinary drugs." The dose consisted of one or two teaspoonfuls to several tablespoons. A patient could either concentrate a certain color upon any desired portion of the body by holding the lens of that color in the sunlight or charge pure water in the vial and ingest the water.

Some solutions for the Transparent Lens were used with sunlight: for example, sodium salicylate and tincture of iron placed in the amber vial, were used for cold and dormant conditions. Cupro-diammonium sulphate and tartaric acid was used in the blue vial, or Solution of Indigo, to use over the brain or for an excitable nervous system. A fluorescent mixture exposed to the trans-violet forces was quinine sulphate and dilute sulphuric acid. Dr. Babbitt explained that as sunlight partakes more or less of the nature of that which it passes through, "*it must carry the effects of the solutions of this mixture into the system receiving it, and thus have a refined tonic character, just as the first solution named above carries the effect of iron, sodium, carbon, hydrogen and oxygen, and is exceedingly animating.*"

*"A small assortment of these lenses will constitute a little drug store in miniature, a home doctor, capable of drawing down from the skies those fine celestial medicines which penetrate softly and deeply into the human system, which act radically upon both mind and body, and which must save great suffering and many doctor bills."*

### *Principles of Light and Color*

## THE CHROMOLUME

The Chromolume, which means *color-light* in Greek and Latin, was a beautiful 4 ft. stained glass window built on the principle complimentary colors and the balancing or harmonizing principle of *color affinity*. Babbitt said that energetic imbalances in the body could cause disease and manifest in outward physical disturbances. Remember that Babbitt believed that each of the color rays were substances with chemical and therapeutic potencies, which could be strained off by using colored panes of glass, which transmit certain rays that are required and absorbed by the other. The window was to be placed in a southern exposure, held by a suspended cord from the top which could be let out to catch the sunlight where desired. The cord was tied down at the bottom of the window and the invalid chair, lounge or rocking chair would be placed at different angles to achieve the desired results.

The colors are described as follows:

- Light yellow (silver) in the top circle surrounded by light colored violet. (manganese)
- With red-orange (silver) as the outer color.
- The top middle is cool blue, colored cupro-sulphate of ammonia and below, is mazarine blue, (cobalt), to give a less cooling effect, surrounded by the color ruby red. (gold)
- In the middle of the window is purple (manganese and gold) with light greenish yellow (uranium oxide). Below this is yellow, colored with iron or other metal, surrounded by deep violet (manganese)
- Next we find green, the balancing color, with dark red as its border.
- In the bottom half of the window is a large pane of orange, for the lower extremities, surrounded by light violet, and red-orange (silver) at the bottom, with a blue border.

Dr. Babbitt describes the arrangement based on the law of harmonic contrast, as well as according to the principles of chemical affinity, and it:

*constitutes one of the most beautiful ornaments imaginable for a drawing-room, or bed-room window, and certainly one of the best of all instruments for vitalizing, healing and toning up the human system.*

Manufactured stained glass has coloring agents in the glass. It is made from pure mix of silica, soda and limestone. Oxides are then added to produce the desired colors, of which the exact amount lies with the chemist and is of utmost secrecy to protect the formulas.

Some common minerals added to glass to produce the color :

**AMBER-** Carbon, sulfur, manganese oxide, cadmium sulfide, selenium, and uranium.

**RUBY-** Selenium and cadmium sulfide react with each other to form cadmium sulfo selenide.

**Copper,** when used under oxidizing conditions while controlling the reduction with carbon, produces a beautiful red.

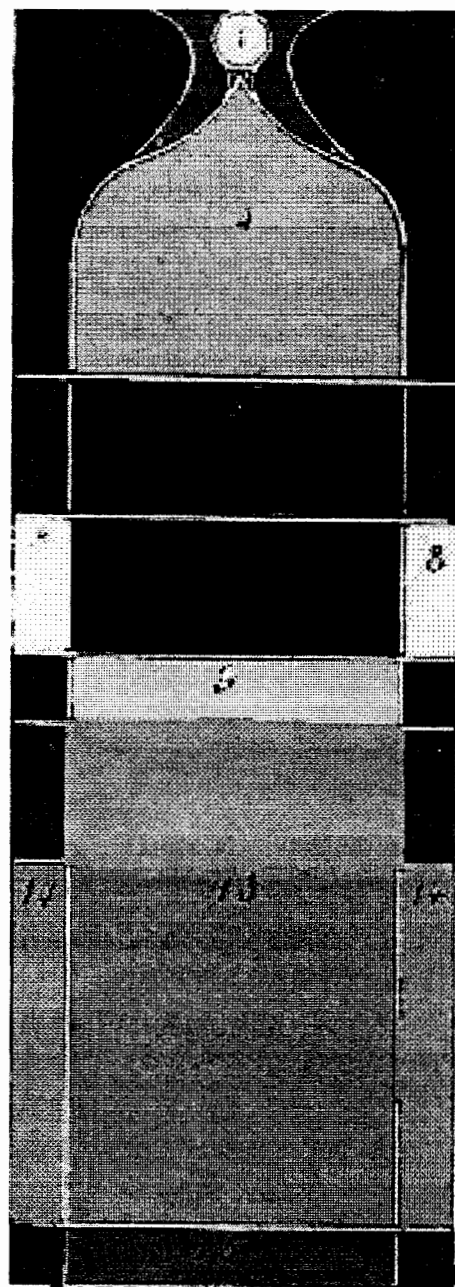
**GOLD RED AND GOLD PINK-** This color is made with the metal *gold* in the form of gold chloride.

**BLUE-** Cobalt oxide and copper oxide forms all range of blues.

**PURPLE-** Neodymium and Manganese oxide is responsible for this amethyst color.

**GREEN-** greens can be obtained from chromium, iron oxide, sulfate of iron, or copper oxide.

**YELLOW-** uranium, cadmium sulfide, titanium oxide or cerium oxide. 5



In closing, here is a final and eloquent quote by Babbitt:

*We see, then, that every color has its own peculiar power, different from all the colors as combined in white, or from each of the other colors when taken singly. To say that each or all of the colors have pretty much the same character, and that none of them have any very special potency, as is too generally done, is to assert that the universe has been filled with a meaningless array of hues which are quite worthless except as they gratify human fancy... We have thus in light, color and other fine forces, the basis of a nobler philosophy of cure which must rule in the future, from the fact that refined elements alone can be adapted to the higher nature of man, who is himself the most refined portion of the known universe.*

*Principles of Light and Color*

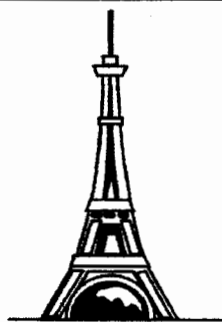
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# Function of Peripheral Vision

By Ellis S. Edelman, O.D.

The internal awareness of photic stimulation and processing of the peripheral areas of the retina, primarily initiate changes in skeletal-muscular movements contributing to one's "orientation in space". Where am I? Visual fields actually represent a "comfort zone" for how much and what information a person is willing to process cognitively at any given moment. Some other functions of the peripheral field include:

- Peripheral vision acts as an "alerting system," of movement within our environment. It can be thought of as a survival mechanism.
- The periphery processes visual information extremely fast with minimal clarity.
- The peripheral retina is an active part of the anti-gravity system along with the cervical spine, inner ear, and the proprioceptive impulses from the balls of our feet and buttocks.
- The peripheral retina guides our eyes during saccadic and pursuit movements, which tells where one **Was** (past), where one **IS** (present), and where to go **Next** (future).
- The peripheral retina is intimately related to establishing a "rapport" with our environment. The greater the size of the peripheral visual fields that actively participates in one's movements and thinking, the more appropriate is one's rapport.
- The simultaneity of both visual fields gives depth of focus (3-D). Central vision contributes very little to our understanding of distance and size within our environment.
- The peripheral retina has over 120 million nerve endings (rods), which respond to movement within the environment. The rods process visual information very quickly with minimal clarity.



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# **Confessions of an Optometric Innovator: My Journey into Syntonic Optometry**

**By Robert S. Fox, O.D., F.C.O.V.D.**

Optometry is a dynamic profession in which what is considered mainstream is always changing. On one hand we are trying to create a new breed of vision care providers that practice "primary care" optometry by utilizing pharmaceutical agents and eventually surgery. On the other hand we are trying to maintain the uniqueness of our heritage by providing, near point lenses, vision therapy services, nutritional counseling, and making lifestyle recommendations to our patients. Though we all share a common optometric education, the resulting divergence of optometric practice has resulted in an ever-growing schism within our profession.

When I first began to practice optometry, I wanted to make working with children a large part of my practice. I made it a point to offer vision therapy/orthoptics to my young patients with binocular vision disorders. I stayed within the confines of basic orthoptic-like vision therapy for accommodative and convergence disorders. The goal of my therapy was to increase base-out and base-in ranges and to build accommodative reserves. I believed that perceptual and learning problems were not part of the practice of optometry and distanced myself from those optometrists that felt that way. Practicing this way I relieved many a patient's near point symptoms. Some kids even improved in academic performance.

Over the course of my first few years of practice I came to understand that vision has a tremendous effect on a child's ability to perform in a classroom setting. I started going to meetings to learn how to practice "behavioral" optometry. I started treating patients, not conditions. I suddenly had a new array of tools at my disposal. These included yoked prism, trampolines, balance boards, and binasal occlusion. (Of course in optometry school, we learned to ridicule optometrists that used trampolines and the like.) These "new" tools also allowed me to become much more effective not just with children, but also with the brain injured patients, autistic children, and many other special populations. I became very aggressive with the prescription of near point lenses, often prescribing lenses as weak as +0.37 (a placebo-like prescription in my previous mode of practice).

While I was expanding my scope of practice by practicing more behaviorally, I began to notice that where I was with respect to "conventional" optometry was changing, as well. Though I felt as if I had moved a few yards from where mainstream optometry was when I graduated, I suddenly realized that mainstream optometry was now miles from that starting point. The "vision care" profession was now becoming mainly concerned with dilated examination, therapeutic pharmaceuticals, and co-management of laser surgery. Entering middle age, I was quickly becoming an outsider within my own chosen profession. The fact of the matter was that as I continued to embrace behavioral optometry, I felt as if my patients were receiving better care.

One part of behavioral optometry that I was initially opposed to trying was syntonics. The concept of using different colored lights to change one's visual function did not fit into my view of vision as a system where the patient actively takes part in the therapy process. I soon learned that just as we use lenses to manipulate light in a dioptric manner, we could use colored filters to control light chromatically. Prisms, lenses, and syntonic filters all alter the distribution of light on the retina; they just do it differently. They all affect physiology and the autonomic nervous system. The work of Spitler merely categorized the effect of the different frequencies of light on the organism in terms of sympathetic and parasympathetic stimulation and depression. The works of Butts and Wallace simplified the use of use of colored filters in to a few specific "syndromes" so that even the novice syntonic practitioners can effectively treat the majority of cases that might present themselves.

Behavioral optometry devotes much of its energy to evaluating and treating vision problems related to poor peripheral processing. I started down the road to syntonics by first evaluating the peripheral fields in the manner taught by the College of Syntonic Optometry. I found many interesting field defects: mostly I found many patients with normal threshold fields showing extremely constricted fields when asked to make decisions based on color and motion. By abdicating the testing of visual fields to computerized equipment, optometry had lost the "art" of visual field testing. This is most evident in the head injured population. These patients frequently had tunneled color fields and associated complaints, such as poor balance, problems seeing cars in traffic, reading disturbances, and photophobia, despite normal automated visual fields. After three months of testing these fields, I decided to treat them

and started doing syntonics in my office. The results have amazed me, and syntonics is now an integral part of vision care at my office.

More recently, the development of home syntonic equipment by Drs. Tessler, Hancock, Levine, and me has allowed syntonic optometry to reach even more patients. Specifically, home syntonic therapy allows us to reach many pediatric patients for whom coming in several times a week is impractical if not impossible. Color field testing is now routine at my office and most of my patients undergo three to six weeks of home syntonic therapy prior to starting a vision therapy program. The effect on my practice has been extremely positive with many parents now coming in to ask if their child will be getting color treatment, too.

#### CASE REPORT #1

DM was an adult woman who had suffered a closed head injury in a car accident. She was extremely photophobic, often wearing two pairs of sunglasses to function. She could not read or even watch TV without discomfort. She could not stay in her living room where red curtains hung at the windows. I instructed her family to avoid the room with the red curtains, and to try to find some dark blue drug store sunglasses to wear as much as possible until she could get into my office.

At the visit DM thanked me greatly for helping her get through her vision crisis. She needed to wear sunglasses indoors at all time due to photophobia. The use of upsilon-omega proved extremely beneficial to DM. After 20 sessions during which I gradually increased the time of treatment, and then added mu-epsilon, her photophobia entirely disappeared. Following syntonics, vision therapy allowed DM to return to preinjury levels of vision.

#### CASE REPORT #2

ES was a 9 year old girl with many school problems. She complained of headaches, double vision, and she avoided all close work. Visual acuities were 20/40 at far and 20/80 at near. Her responses on the analytical part of the vision examination were inconsistent, at best. She refracted to plano in each eye. The most significant finding was that her form fields were less than 5 deg in each eye. Due to a number of factors, in-office syntonics was not possible. ES was started on a home program of syntonics using mu-delta for 20 min a day and returned in four weeks.

Retest results were dramatic. ES now had a form field of 20 degrees. Near acuity was 20/40, and schoolwork was improving. An enlarged blind spot could now be measured, so alpha-omega was added to the home regimen (10 min. each), ES returned three weeks later symptom free. Acuities were now 20/20 at far and near, unaided. I could now perform an analytical examination with most of the data at or near desired levels. Plus lenses for near were prescribed. As I discussed findings with the mother, ES juggled beanbags while bragging about her new-found peripheral vision. She was very much aware of her earlier lack of periphery now that her vision was improved.

#### CONCLUSION

Though these cases could have been managed without syntonics, it is clear that the use of light had a rapid, dramatic affect on each of these patients. While it is possible to use syntonics as a stand-alone therapy modality, I use it as one of my arsenal of tools for treating vision problems. Visual fields testing give much insight into the processing of visual information. It also serves to show parents why their child is struggling and unable to read or copy fluently.

Though many in mainstream optometry may regard me as a maverick, I will continue to offer what I feel is the best vision care available. The Internet and other new sources of information are making syntonics and vision therapy more accessible than ever to the public. Hopefully, as optometry re-discovers pediatric vision care and functional vision care, those who practice as I do will find greater acceptance. Regardless of where optometry moves in the future, I intend to keep moving, too.

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# Identifying Functional Visual Field Problems in Adults

By

Dr. Geoff Shayler

Following research into the problems of children with specific learning difficulties, it became apparent that a number of adults encountered similar problems and my knowledge of visual processing "see-sawed" between these two groups. Research in the USA<sup>1,2,3</sup> and confirmed by ourselves in the UK<sup>4</sup> indicated that as many as 20% of children in education have restricted functional visual fields.

- A *functional field* is that peripheral field in which we can react to a given moving stimulus as opposed to an *absolute visual field*, which is the threshold field of reaction of the eye to a flashing stimulus.
- A functional visual field relates to the brain's processing function of the visual image.
- An absolute visual field relates to the ability of the eye to respond to a stimulus and send that information to the brain.

Dr. Wayne Pharr from Okeechobee, Florida, introduced me to the concept of functional visual field testing with an instrument called a *campimeter*.<sup>5</sup>

## The Campimeter

As a result of this introduction, I initially compared my results of testing between the campimeter and Bjerrum screen whilst gaining confidence and experience with this new instrument. The campimeter is an instrument that is rather like a miniature Bjerrum screen, which is focused through a plus lens for clarity and comfort.

The targets like those used on a Bjerrum screen are made with white, red, blue and green targets of various sizes, the major difference being that the target is inset into a black ring. In this article I am looking only at using the white target. (More information on the neurology or etiology of a field restriction can be discovered with the use of the colour fields).

## The Wayne Pharr Method of Campimetry<sup>6</sup>

This is the way that I was initially taught the techniques of campimetry using just the normal white target supplied by Rex Cross. This two degrees wide, white target is inset into a black ring.

The three levels of testing are:

Level 1) *The awareness field*: the field is plotted by moving the 5mm (2 degree) white target in towards the centre from non-seeing to seeing with the patient advising as soon as they first see the test target whilst concentrating on a small cross at the centre of the target. The point at which they first observe the target is marked on the chart. The vertical, horizontal and oblique meridians are measured. This is the field that you have the potential to use at this time - that is actively wired up to the brain, ready for use!

Level 2) *The perceptual field*: place the target near the centre and ask the patient to notice that there is a black ring around the target. Explain that their job this time is to again concentrate on the centre, but as they notice the white spot coming in, they are to tell you when they are first aware that the white spot has a black edge to it. Mark the chart and continue to test as before. This is the field you use when walking, being aware of things and reacting to them, mind that dog, where is the curb, etc.

Level 3) *The activation level*: place the target near the centre and ask the patient to notice that there is a complete black ring around the target. Explain that their job this time is to again concentrate on the centre, but as they notice the white spot coming in, they are to tell you when they are first aware that the white spot has a complete black ring around it. This is the field that is used for detailed viewing such as reading.

In my experience, in a normal field, measured on the campimeter, levels 1, 2, and 3 are generally reduced about 5 degrees between each level with the diameter of level 1 about 55 degrees. Consider the situation when you are sitting in the car, waiting at traffic lights. If you are looking straight ahead, the traffic lights are within your peripheral vision range, but, without looking more directly at the lights, you are unable to see the lights change - a simple comparison of level 1 and level 3 fields. (In this particular example, peripheral vision obviously also includes colour fields.)

### The Physiological Blind Spot

The physiological blind spot, the area relating to the optic nerve insertion into the back of the eye is also measured during campimetry. The blind spot is measured using the 1 degree white target moving from inside the expected blind spot, moving from non-seeing to seeing and marked on the chart.

Whenever I have found the level 2 and 3 fields restricted, the measured physiological blind spot has been enlarged. As therapy takes place and the fields expand, so the blind spot reduces to normality; i.e., an enlarged blind spot is an indicator that these more subtle fields are restricted. In many children with restricted fields, (less frequently in adults), the level 1 field is too small to measure the blind spot, but as the fields recover to allow this measurement, the blind spot will be enlarged.

How is this relevant to children's vision? Many children with educational difficulties have substantial restrictions, at all levels: 20% of all children, up to 85% of those with educational difficulties,<sup>7</sup> affecting their ability for smooth eye movements, convergence, accommodation, accommodative facility, etc.

### Focus Limitations and Accommodative Flexibility

As a result of this work I became aware that those children who had a small level 3 field also had a restricted range of clear, near focus. They were unable to see clearly at intermediate distances despite having an ability to focus in to a nearpoint. However, their accommodation measurement would frequently be measured at below normal. When asked they will tell you that the computer is difficult to see and you will observe that they will lean in close to the screen causing postural problems.

Over the years it has always been a puzzle to me that mature patients requiring the same add had different "depths" of focus. The term "depth of focus" is inappropriate as this is a defined term for an optical instrument which depends on the lens, aperture, etc. I have there called this range accommodative flexibility. On examining their functional fields, it became apparent that those with a large level 3 field had a good accommodative flexibility whilst those with a small level 3 had a very restricted accommodative flexibility.

I therefore carried out a study on a group of adults who were supplied with a +2.25Add. This I felt would be a typical addition for a presbyopic patient with no useful accommodation and normal visual acuities. The near and far points of clear vision through the add for these individuals was measured. The near points were selected as appropriate for their postural requirements. The distance between near and far points whilst reading n7 print (the print provided on the Howell near chart), was measured. Thirty-four individuals were included in this study with an age range of 51 to 80 and an average age of 64.56 years. The range of near clear vision for the 33 patients ranged from 14 to 49 cm. with an averaged mean of 27 cm. I then plotted for each patient the difference between their result and 27 cm. (See Figure 1.)

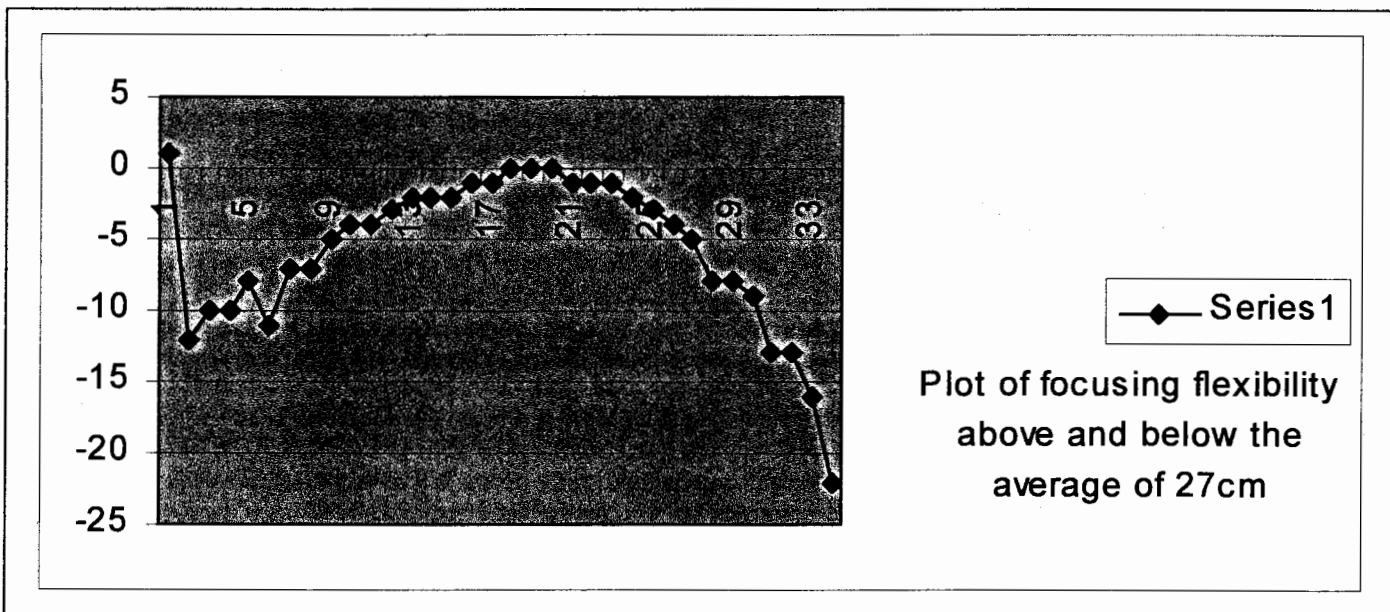


Figure 1. The graph shows the measurements of range above and below this point.

From the graph it can be seen that the majority demonstrated an accommodative flexibility of 27 cm + / - 5cm (22 - 32cm). On examining their functional fields, it became apparent that those with a large level 3 field had a good accommodative flexibility range whilst those with a small level 3 field had a very restricted range.

From this investigation, it would suggest that patients with accommodative flexibility less than 22 cm, should undergo further investigation of their functional fields. This investigation also demonstrates that functional fields are 3 dimensional.

✱

### **Pre Presbyopia**

It is generally considered that presbyopia starts to become a problem at around age 45, however, we all experience those in their 30s, for example, with these problems. These patients will, in general, also be found to have restrictions in Level 2 and Level 3 testing.

### **Varifocal Intolerances**

In the past patients with a restricted depth of focus with bifocals would be considered an ideal candidate for varifocal lenses, however these same people were often intolerant and complained of difficulty finding the right part of the lens to use, would often use odd head postures, and complained of only being able to read a small area of print. These same patients may have large normal level 1 fields but level 2 or 3 may be severely restricted to sometimes as little as 2 - 3 degrees! As a result of this small "reading field" exacerbated by the additional restriction imposed by the varifocal, it is no wonder that these patients find difficulty with their varifocal lenses.

### **Subnormal Visual Acuities**

Visual acuity of 6/6 or 20/20 is considered normal. When the VAs are 6/9 (20/30) or below with no obvious reason, the functional fields will frequently be restricted.

### **Eye Diseases<sup>8</sup>**

Some patients with eye diseases of maturity, such as cataract, macular degeneration, glaucoma, etc., may experience greater difficulty than would be expected from their observed condition. If their functional fields are examined, they may be found to be substantially reduced.

### **Closed Head Brain Injuries**

As an example, patients who have suffered closed head brain injuries may experience difficulties with reading and driving following their accident. Investigation by College of Syntonic Optometry president Larry Wallace, O.D., of 46 patients with head trauma revealed all 46 had visual field loss. Seventy percent responded with field expansion after treatment with syntonic phototherapy.<sup>9</sup>

In my experience, many of these patients have also indicated restrictions in Level 2 and Level 3 fields despite, in many instances, the Level 1 field being normal. Thus, conventional automated field screeners may not indicate a problem in these patients. What does this mean? If we check the functional fields of adult patients when they experience difficulties not expected for their age or visual potential, we can at least have an idea of the origin of their difficulty and take steps to remediate the problem.

Dysfunctional functional visual fields can be expanded by the appropriate use of lenses, yoked prisms, vision therapy and syntonic phototherapy, or in ignorance can be ignored.

### **Comment on Prism Thinning**

One of my major concerns is the indiscriminate use by lens manufacturers in supplying "thinning" (or yoked) prisms without it being prescribed. In some cases the uses of prism in this way on a patient with restricted field will increase the risk of their intolerance. I have often found existing varifocal wearers who are intolerant to new lenses, have been supplied a different thinning (yoked) prism. It seems to be exceedingly difficult to obtain varifocals without these prisms. The manufacturers of these lenses seem to have developed computers that cannot calculate a lens without prism. This seems to be an area on which we need more research.

### **Syntonic Phototherapy**

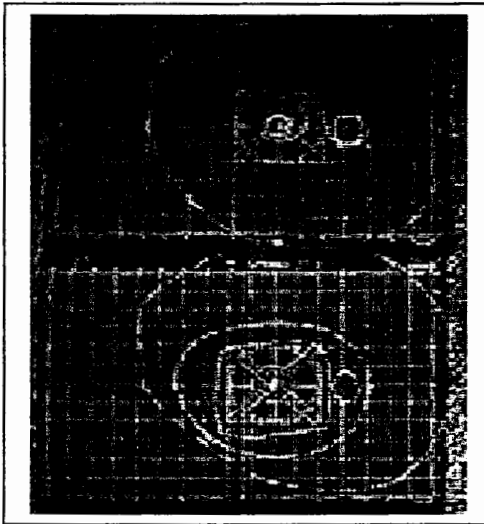
The College of Syntonic Phototherapy has been promoting the provision of "light" therapy to help expand these fields for over 70 years. I have been using their techniques to good effect the past 4 years. Having successfully treated many children with learning difficulties with a combination of syntonic phototherapy in association with leaning difficulties, I recently examined a 78 year old patient diagnosed more than five years ago with macular degeneration and registered partial sight. Her vision standard was RE counting fingers, the LE just hand movements both at ½ metre. There was early bilateral cataract and "early" macular degenerative changes. Her peripheral retina looked normal. Her functional visual field was too small to measure. Following about 12 sessions of syntonic phototherapy, her field expanded to normal and in doing so improved her acuities to R 6/9, L 6/12. From this exceptional case it can be readily seen the importance of assessing this aspect of vision and the effect of its remediation.



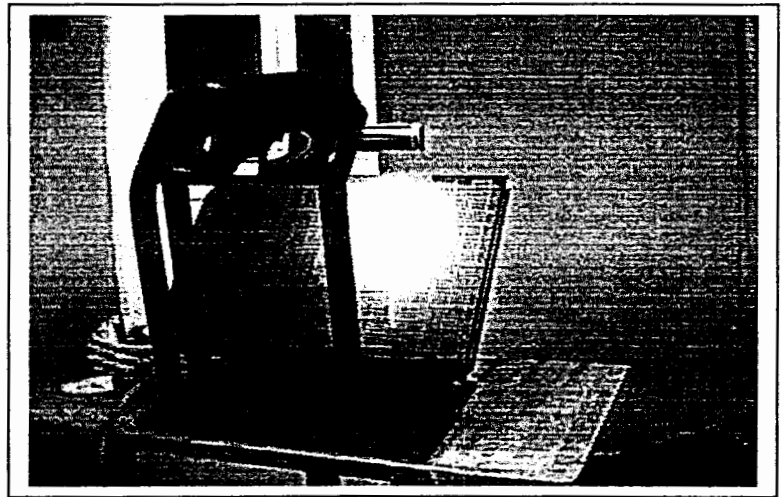
In examining these different functional fields of other patients with glaucoma, retinitis pigmentosa and macular degeneration, we have also indicated that there may, in the right situation, be improvements possible. It should however be pointed out, so as not to upset the medics, that we are not treating the condition of, for example macular degeneration, but the brains ability to process the visual information that is available to it.

### Recommendations

1. All patients whatever their age whose vision appears to be less efficient than would be normally expected should undergo functional visual field testing.
2. When examining our patients, by simply adding the measurements of near and far blur points, whether children or adults, we will be given an indication of whether functional visual field limitations are present. From the investigations undertaken, any patient presenting with an accommodative flexibility range of less than 22 cm should undergo campimetric assessment. This will also indicate if these patients are visually under performing, so that further appropriate questioning of the symptoms with which these individuals may be suffering.
3. If appropriate, a suitable regime of therapy could be considered.



Fields



Campimeter

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# THE PARADOX OF LIGHT

By Peter Russell

With hindsight, my decision to study theoretical physics along with experimental psychology was definitely the right one. They provided two complementary directions to my personal search for truth. Theoretical physics was taking me closer toward the ultimate truths of the physical world, while my pursuit of experimental psychology was a first step toward truth in the inner world of consciousness. Moreover, the deeper I went in these two directions, the closer the truths of the inner and outer worlds became. And the bridge between them was light

Both relativity and quantum physics, the two great paradigm shifts of modern physics, started from anomalies in the behavior of light, and both led to radical new understandings of the nature of light. For example, in relativity theory, at the speed of light time comes to a stop-in effect, that means for light there is no time whatsoever. Furthermore, a photon can traverse the entire universe without using up any energy; in effect, that means for light there is no space.

In quantum theory, we find that light has zero mass and charge, which in effect means that it is immaterial. Light, therefore, seems to occupy a very special place in the cosmic scheme; it is in some ways more fundamental than time, space, or matter. The same, I later discovered, was true of the inner light of consciousness.

Although all we ever see is light, paradoxically, we never know light directly. The light that strikes the eye is known only through the energy it releases. This energy is translated into a visual image in the mind, and that image seems to be composed of light, but that light is a quality of mind. We never know the light itself.

Physics, like Genesis, suggests that in the beginning there was light, or, rather, in the beginning there *is* light, for light underlies every process in the present moment. Any exchange of energy between any two atoms in the universe involves the exchange of photons. Every interaction in the material world is mediated by light. In this way, light penetrates and interconnects the entire cosmos. An oft-quoted phrase comes to mind: God is Light. God is said to be absolute, and in physics, so is light. God lies beyond the manifest world of matter, shape, and form, beyond both space and time. So does light. God cannot be known directly, nor can light.

## The Light of Consciousness

My studies in experimental psychology taught me much about the basic functioning of the human brain. Yet, despite all I was learning about neurophysiology, biochemistry, memory, behavior, and perception, I found myself no closer to understanding the nature of consciousness itself. The East, however, seemed to have a lot to say about consciousness, and so had many mystics from around the world. For thousands of years they had focused on the realm of the mind, exploring its subtleties through direct personal experience. I realized that such approaches might offer insights unavailable to the objective approach of Western science, and began delving into ancient texts such as the Upanishads, The Tibetan Book of the Great Liberation, The Cloud of Unknowing, and works of contemporary writers such as Alan Watts, Aldous Huxley, Carl Jung, and Christopher Isherwood.

I was fascinated to find that here, as in modern physics, light is a recurring theme. Consciousness is often spoken of as the inner light. St. John refers to "the true light, which lighteth every man that cometh into the world." The Tibetan Book of the Great Liberation speaks of "the self-originated Clear Light, eternally unborn . . . shining forth within one's own mind."

Those who have awakened to the truth about reality, whom we often call illumined, or enlightened, frequently describe their experiences in terms of light. The sufi Abu'l-Hosian al-Nuri experienced a light "gleaming in the Unseen. . . . I gazed at it continually, until the time came when I had wholly become that light." The more I read about this inner light, the more I saw close parallels with the light of physics. Physical light has no mass, and is not part of

the material world; the same is true of consciousness. Light seems in some way fundamental to the universe; its values are absolute, universal constants. The light of consciousness is likewise fundamental; without it there would be no experience.

This led me to wonder whether there was some deeper significance to these similarities. Were they pointing to a more fundamental connection between the light of the physical world and the light of consciousness? Do physical reality and the reality of the mind share the same common ground, a ground whose essence is light?

## **Universal Light**

We can now begin to see just how close are the parallels between the light of physics and the light of consciousness. Both are beyond the material world. And both seem to lie beyond space and time. Both seem intrinsically unknowable, at least in the way that everything else is known. And both are absolutes. Every photon of light is an identical quantum of action, and the foundation of every interaction in the universe. The light of consciousness is likewise absolute and invariant. It is the source of every quality that we ever experience. And its essential nature is the same for everyone. Since it is beyond all attributes and identifying characteristics, there is no way to distinguish the light of consciousness in me from the light that shines in you. In other words, how it feels to me to be conscious, that sense of being we label "I," is the same as how it feels to you. In this sense we are one. We all know the same inner self.

I am the light. And so are you. And so is every sentient being in the universe. Mystics have spoken of this inner light as the Divine Light, the Cosmic Light, the Light of Light, the Eternal Light that shines in every heart, the Uncreated Light from which all creation takes form. Once again the phrase "God is Light" comes to mind. But now God begins to take on a much richer and more personal meaning. If God is the name we give to the light of consciousness shining at the core of every sentient being, and if that pure consciousness is the very essence of self, then it is only a short step to the assertion that "I am God."

## **Consciousness and God**

To many, the statement "I am God" sounds ridiculous. God is not a human being, but the Supreme Deity, the Almighty, Eternal Creator. How can any lowly human being claim that he or she is God? To those of a more religious disposition, the statement may sound heretical, if not blasphemous. When the fourteenth-century Christian priest and mystic Meister Eckhart preached that "God and I are One," he was brought before Pope John XXII and forced to "recant everything that he had falsely taught." Not all were so lucky. The tenth-century Islamic mystic al-Hallāj was crucified for using language that claimed an identity with God.

To those who do not believe in God at all, such statements are meaningless, the symptoms of some delusion or pathology. They might have been tolerable a couple of hundred years ago, but not in the modern scientific era, where God seems a totally unnecessary concept. Science has looked out into deep space, across the breadth of creation to the edges of the universe. It has looked back in "deep time" to the beginning of creation. And it has looked down into the "deep structure" of the cosmos, to the fundamental constituents of matter. In each case science finds no evidence for God; nor any need for God-the Universe seems to work perfectly well without any divine assistance. Thus anyone talking of a personal identity with God is clearly talking nonsense.

That is where I stood thirty years ago. Now I recognize that I was rejecting a rather naïve and old-fashioned interpretation of God. When we look to mystical writings, we do not find many claims for God being in the realm of space, time, and matter. When mystics refer to God, they are, more often than not, pointing toward the realm of personal experience, not something in the physical realm. If we want to find God, we have to look within, into the realm of deep mind, a realm that science has yet to explore.

# A TRIBUTE TO J.O. JENKINS

By

Charlie Butts, O.D., Ph.D.

*Dr. J.O. Jenkins, O.D.*

*Born: September 17, 1900*

*Died: Dec 30<sup>th</sup>, 2001*

It is hard for me to explain my feeling for J.O. One reason I suspect is that in the beginning of my life in Syntonics he was always there as a mentor and as a helping hand. I recall that in the first years that I was teaching the basic course, he knew and brought to the convention in Jefferson City, MO., Dr. Skeffington and his wife Mary an M.D. It took a lot of effort and pull on his part to get this kind of power in Optometry at this meeting. At that time, Syntonics was taught as a medical and Optometric course. I recall that when I made several statements that Skeff objected to, Mary (his wife) told him to be quiet. I was correct in my statements and I looked over at J.O. and he was all smiles.

J.O. was then president of the college and CSO administration was out of North Platte, NB. This also was about the time we had a court battle with the F.D.A. The case was in Omaha, NB. at the federal court in that area. This was all on the shoulders of J.O. as we were too small at the time to fight them. We lost the case. We sent from the college (at the time in Pique, OH.) the physical college instruments across the state lines without proper labelling. It is a Federal law that all medical instruments have to be labelled when sent across state lines. Dr. Spitler had passed away and the physical college was sold and the money given to Dr Spitler's widow. All of the books, material, etc. was bundled up and sent by truck to J.O. in North Platte. Can you imagine being watched by the fed's 24 hrs a day. How else did they know we had done that!

Three of us met with the federal director for the Midwest in Kansas City, MO: Dr. Hagena, Dr. Katz and myself (Charlie Butts). He told us we had to change our instrument. We went through several stages of doing this and finally came up with the present design. We took the filters out of the dial fixture and made them individual. The instrument is not an instrument until you put the filters into the unit. The director told us he had no opinion of whether it worked or not and if it did we would survive... and so we did and have continued to do so J.O. out of his pocket bought up all of the old instruments we could find and rebuilt them to the present instrument and when our supply ran out, he started making new ones in the form that they are manufactured today. This was his LOVE. There are not many men or women who would spend their 60's, 70's, 80's, and 90's doing this for the fun of it. He had to love and know the feeling of helping mankind and Optometry to have such an effective therapy as we have today. IT IS THE MIRACLE OF OPTOMETRY.

There is much more that should be said, for he not only was an Optometrist but a leader in his community. He was state president of the Kiwanis Club of Nebraska and active in many other community activities SO..... you see, we owe a great debt to this 101 years young person who donated his life to this wonderful field....It is maybe the reason why I feel as he did. I hope that now you have a brief history of his important involvement in what and why we are so privileged to practice this therapy of light, you all join me in holding J.O.Jenkins in your memories and in your hearts for his dedication to and love of Syntonics. Perhaps without J.O., the practice of Syntonics would not have even survived for so many years as a viable alternative for optometrists to be able to bring light and a renewed perception of life into so many lives and on so many levels today.

# COLOR FIELDS IN SYNTONICS

By Larry Wallace, O.D.

Color fields are of great importance to the syntonetic practitioner. This paper is an introduction to this concept and points in the direction of possible research. New ideas are presented as we contemplate the meaning and the true depth of information that can be obtained from measuring our patients' color sensitivity in the periphery. Taking color fields is an integral part of treatment allowing the doctor to derive more information than is available from using only a white target to measure form and blind spot. The color fields are the most sensitive part of the visual field, being the first to contract and the last to expand. Color fields also provide information for gauging both the physical and the emotional state of the individual. This article will discuss procedures used to measure color fields and analyze results as well as put forth new interpretations of how color fields may be used in the future.

Color fields are measured in the same way we measure the white form field. We bring the one-degree color target from the periphery toward the central spot of fixation and have the patient respond when the color saturation of the moving target equals the color that is placed at the fixation spot. Eight cardinal points are plotted and then connected. It is preferable to attach a target of the same color that you are measuring in the middle of the fixation area for comparison.

Fields are measured in order: green, red, and then finally, blue; green is normally the smallest and blue the largest. Green, the smallest field, is the most sensitive to acute conditions. It is often the first to contract. Constriction of the green field on a physical level often indicates a focal infection either in the choroidal or retinal vasculature. The choroidal vasculature is especially affected when there are infections in the teeth, tonsils and sinuses. Green constrictions also indicate poisoning either through exogenous (outside the individual), or endogenous (within the individual), creating a focus of infection in the retina. Empirical charting of the green field throughout the day will determine whether the toxemia is a result of the exogenous or the endogenous origin. The most accurate way to do this is to follow the charts derived by Dale Fast, O.D., within the Blue Book.<sup>1</sup> This determination process is outside the scope of this article. Reduced sensitivity to green could also indicate tissue edema, especially in the pulmonary or cardiac region. Green field constrictions can also be related to immune dysfunction and therefore involve difficulties with the thymus gland.

I wish to propose that color is a form of energetic information, which is communicated and recorded in our feelings and emotions. The ideation of these emotions can be seen in our psychological states. With green field constrictions a person may have difficulties with relationships, personal or family. A loss of sensitivity to green could also involve emotions such as bitterness, grief, and anger, self-centeredness, loneliness, and lack of forgiveness issues in that person's psychological make-up.<sup>2</sup>

The second color field that we are interested in measuring is red, representing our systemic integrity. Difficulties in the red field usually involve health problems that are more chronic in nature and indicate congestion, especially in the circulatory system. In addition, red field constrictions could indicate intestinal stasis, constipation or a diet high in lipids and fats. Constrictions in the red field also indicate systemic conditions such as high blood pressure, diabetes, and accompanying circulatory compromise. Red field loss may represent a discharge in vital energy associated with chronic fatigue. Emotional issues may be associated with separation from family and/or place and resulting depression or grief.<sup>3</sup>

From a psycho educational standpoint, the red field correlates very closely with the symbolic field. Symbolic field-testing measures a person's recognition of symbols such as circles, squares, triangles, and rectangles as they are brought in from the periphery. Loss of red in this context could indicate a magnocellular pathway defect and a



correlation with reading problems.<sup>4</sup> Reduced sensitivity to red field can also be related to adrenal dysfunction. The endocrine function of the adrenals supplies the energetic basis to such life issues as survival, grounding, and how one fit into the surroundings. Because this relates to security issues, it may also reflect one's relationship to material attachments, to abuse and indulgences of appetites, and excessive behaviors.<sup>2</sup> Often the red field is interlaced with the green fields, indicative of a toxic condition either from the psychological or physiological balance standpoint.

The blue field is the third to be plotted and it is typically the largest of the three fields. Traditionally the blue field is used to represent the energetic integrity of the heart and the adrenal system. Blue constrictions can indicate a build-up of catarrh, thyroid and parathyroid toxemia, migraine headaches and sometimes sinus infections. On an emotional level, blue fields often represent creative expression as well as integrity issues, fears, shyness, and clarity of thought. The blue field can also represent love-hate relationships, resentments, grief and anger issues, self-centering, and self-knowledge. Blue is often associated with one's strength of decision-making and strength of words. This can include the ability to express oneself and to exercise judgment and critical thought.

Blue fields have also been associated with the pineal gland and therefore can relate to higher expressions of spiritual matters and conscience and self-knowledge. Issues in this area may involve an inability to learn, vague or unclear thinking, narrow-mindedness, high level of rationalization or having no conscience. This individual may be illogical, unreasonable, or just lack self-awareness. Loss of the blue field represents psychological stress probably more accurately than the other two fields. It is often associated with internalization of tension and therefore often associated with headache problems, especially migraines. On a physical level, blue constrictions involve the energy in the individual as a whole and therefore may indicate heart problems and adrenal exhaustion.

The basic prescription for red or green field constrictions is mu delta or yellow-green. This acts to facilitate a detoxification process. If the green field alone is constricted, it is typically not a detoxification issue, but a focal type infection and mu epsilon or blue-green is the starting filter combination. Then  $\mu\epsilon$  is often the first filter thought of because it is usually associated with a focal type infection. However, if it is deemed that the infection is exogenous, then the source of the toxemia must be removed and again mu delta would be the filter of choice for detoxification.

Constrictions of the blue field usually indicate the need for emotional support and often indicate use of alpha omega or alpha epsilon. These filters for physiological balancing are often combined with  $\mu\delta$  as well. Blue field losses also can be indicative of severe stress or headaches. If so, begin with epsilon omega or indigo to palliate the pain. mu epsilon may be added after several treatments when the pain diminishes.

The time of day the field is taken should always be noted. This is very important in toxic conditions and helps to determine whether the source of the toxic condition is internal or self-intoxicating.

Since the use of three colors to chart the field gives us information that we don't get from white form fields, it seems sensible that we might plot all the colors and not just red, green and blue. By using the seven basic colors, we might gauge with more specificity which color the individual is lacking the ability to assimilate from the visual field. We might also plot symbols and see which symbols may be representative of certain types of psycho educational or psychophysical problems. It opens up a whole new arena of field-testing.

Color field-testing in general gives us information we really cannot obtain any other way. That is why it is so essential to the practice of syntonics. Testing the color fields is valuable for diagnosis and monitoring our treatment as well as offering insight into the possible psychophysical and psycho emotional balance of the individual. The opening of the color field might be synonymous with the expansion of the psychophysical being of our patients and we know that our therapy is not complete until the color fields are brought up to normal.

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# **Selected Lecture Summaries of the 2001 Syntonic Conference**

**By Frank Forgnoni, O.D.;FSCO**

## **Autonomic Balance and the Physiology of Personal Effectiveness-**

Presented by Robert E. Massy, Ph.D.

Dr. Massy presented research from the Institute of HeartMath. When our heart "comes alive" we feel productive, focused, healthy, and connected to others. Positive emotions and appreciation create increased harmony and coherence in heart rhythms and improve balance in the nervous system. In contrast, negative emotions and frustration lead to increased disorder and incoherence in heart rhythms and in the autonomic nervous system, thereby adversely affecting the rest of the body. Harmonious rhythms are more efficient and less stressful to the body's systems, while disharmony in the nervous system leads to inefficiency and increased stress on the heart and other organs. The heart is, in fact a highly complex, self-organized information-processing center with its own functioning "brain" that communicates with and influences the cranial brain via the nervous system, hormonal system and other pathways. These influences profoundly affect brain function and most of the body's major organs, and ultimately determine the quality of life. Dr. Massy encouraged us to "Be a walking, talking, coherent unit," with optimal clarity of thought and emotional balance. He demonstrated modern technology using computerized biofeedback to optimize autonomic nervous function through balancing heartbeat function.

## **Using Light and Sound for Brainwave Entrainment**

Presented by Dave Siever,

CET (Certified Engineering Technologist)

Driving brainwave activity by pulsing sound in each ear and flashing light in each eye or visual field independently alters cerebral blood flow, neurotransmitters and brainwave activity and improves relaxation, anesthesia, Attention Deficit (ADD), Premenstrual Stress (PMS), Seasonal Affective Disorder (SAD), migraine headache, chronic pain, stress reduction, and cognition. Physiological and psychological responses can be altered with brainwave entrainment. Beta waves are primarily active when we are alert and attentive; alpha waves predominate during relaxation and meditation; delta waves are primary during deep sleep, and theta waves are most active during an "in and out" state during dreams and creative work. Brainwave entrainment can be used to specifically accentuate the brainwave activity which is needed, for example one can use beta waves for increased performance during the day "to clear the fog," and use delta for better sleep. "Our arousal has to apply to the situation we are in, and our brain has to flux." He described a "bell curve of attentional stability" in which individuals can have under arousal, peak arousal or "the zone," and over arousal. The "alpha experience" is a time of relaxation and a peaceful sense of well-being.

Dissociation is a time of clearing mental "chatter." He said: "A change is as good as a rest." To help you disconnect; the brain needs a variety of experiences and activities "to keep the dendrites rolling." State-of-the-art brainwave entrainment devices were also demonstrated.

## **Iridology and Light Therapy**

Presented by Peter Guhl, OD, FAAO, FACOP

The study of iris landmarks provide insight into a person, including constitutional typing, genetic predisposition, personality, and time risk. Chromatic iridology uses the iris as an extero-receptor that both detects and affects bodily conditions through the application of colored lights onto specific iris points. "The iris is the genome of the eye. The eye is the window to the soul." A Russian, hospital-based study of over 1,800 people looked at iris markings and systemic disease. For example, 87% of patients with angina had a specific iris sign, whereas only 2% of the healthy population without angina showed the same iris sign, providing outstanding specificity and sensitivity in statistical quantification. The iris is unique, in that it has the only muscles in the body derived from neuroectoderm. The dilator muscles are unusual with dense innervation at a ratio of 1 nerve fiber for 5 muscle fibers compared to normal muscle tissue at a ratio of 1 nerve for 300 muscle fibers. In addition to epithelial muscle tissue the dilator muscles also have motility capabilities and light receptivity capabilities. A theoretical afferent pathway enables the iris to receive information from the environment to create a topographical change and to increase its pigment production. Therefore the iris can act as a sensor to help clinicians understand what is happening throughout the body. Light energy can be a catalyst or an irritant to the organ system. An organ system that is diseased wants to rest, and it can send signals up to the iris causing biochemical tissue changes resulting in increased pigmentation markers, blocking light in the area of the iris from activating the nerve pathways of the diseased organ, allowing the organ to rest. Seven types of iridology were discussed, including: constitutional, scleral, American, psychological, time-risk, inner-pupillary border, and chromo-therapy. Non-physical iridology deals more with the spiritual, mind-body connection.

## **Theoretical Foundations of Esoteric Medicine**

Presented by Manohar Croke, BA

Named and developed by Peter Mandel, Esoterics is derived by combining the names esoteric and energetic. It uses sound and colored light focused on acupuncture points to facilitate information flow between the material and energetic bodies. This removes existing blockages and disorders felt as pain and illness. Esoterics utilizes subtle energetic therapies to be used for self-healing and personal transformation to "travel one's path freely and light-heartedly." Special photos, first developed in the early 1900's, are used for evaluation and treatment to look at energy emitted from fingers and toes to analyze the relationship to organs and other body parts. All of the meridians in the body begin and end in the fingers and toes. The whole energetic story of a person is best analyzed by looking at all 10 fingers and 10 toes on one page. With color puncture, "The light seems to talk to the places that need balancing." "The human body and all living things are constantly emitting a certain low level energetic or light radiation." "Human cells emit light, and they talk to each other

through light." Low level frequencies of light used in cellular communication are called biophotons. There is constant communication of the cells using light. "Metabolism and cellular communication is unthinkable without light." Giving light into the body gives information to the cells therapeutically to help the cells restore auto-regulation and balance. "Light on (acupuncture) points is more effective than needles or electro-stimulation." "The skin is an area and transformer for light." Esotericism is used to address physical body systems and brain regulation, meridians, and psycho-spiritual underlying the health issue. "Induction therapy" uses electrodes to influence brain wave sequencing to alter and restore proper movement through the brainwaves to help with healing. In-office and supportive home therapies were discussed: including light and sound therapy.

#### **Advanced Syntonic Cases and Filter Applications**

Presented by Larry Wallace, OD; FCSO and

Ray Gottlieb, OD; PhD; FCSO

**Dr. Wallace** spoke about the following topics:

Tiny LED's (Light Emitting Diodes) are used by NASA for healing wounds of astronauts in outer space. The LED's are needed due to the lack of healing caused by zero gravity. "The forefront of their medicine is Light." Electromagnetic energy pours through our bodies through movement to drive so much of our physiology. LED's are used to penetrate the skin in the wavelengths of 688nm, 730nm and infrared at 880nm. The theory is that the light at those wavelengths affects the mitochondria, the powerhouses of every cell. Cytochromes, light sensitive components of the cell, absorb light to increase electron transfer. This converts energy from sugar used to provide ATP for the mitochondria. Huge LED blankets can act as preventative medicine when they are used on a daily basis for the astronauts to prevent health problems. Interestingly they wrap the astronauts in the blanket for 20 minutes, similar to most treatments in syntonics.

A book called "Homeopathic Color Remedies" speaks of colors used to make "potentized" remedies. They are used to balance and treat the mental, physical, and emotional energy centers of our bodies that may have blockages. "Each imbalance reflects some kind of desire or avoidance of a particular color." One prescribes the homeopathic color remedy based on the energetic need of the patient. The way that we react to things and our attitudes dramatically affect our energy centers. Allowing the patient to understand this helps them to take responsibility for themselves. "We shine light on their problems using color, and, we can energetically shift them away from suffering towards health." These homeopathic color remedies can be used in conjunction with syntonics, especially for individuals with deep injuries, including head trauma. The same color used syntonically can be used homeopathically.

**Dr. Wallace** also spoke of using micro-stimulation currents into the eye to increase the output of all the nerves, to conduct more electricity to the cells while reducing oxidation damage and increasing enzymes used to make ATP. Micro currents into the eye, including light, help to re-polarize and promote recovery of the optic nerve by maximizing circulation, which in turn can improve macular degeneration.

Another topic on the physics of light involved the four basic forces of nature: electro-magnet, nuclear, weak, and gravitational forces. The basic unit of the electro-magnet force

is the photon. Quantum Electro-Dynamic Theory uses "virtual photons" to keep all atoms together. Electro-magnetism is the overlying, dominate force in the universe, and supports all other forces. Electro-magnetism is a sign of God's eminence in the world, which drives our existence. "Consciousness is light."

**Dr. Gottlieb** spoke about the following topics:

"Life and light evolved together." "Light is the primordial essence of the universe and it is the dynamic force of nature." Pancoast wrote a book published in 1877, called "Red and Blue Light." **Dr. Gottlieb** shared his discoveries from reading it at the University of Rochester. Red light is the polarizer or assimilator to strengthen the cells and blue light is the de-polarizing or disintegrator. The loss of equilibrium may be due to acceleration of one force, for example, the parasympathetic system may be the over-charged system, and therefore, the sympathetic system needs to be attacked. In the "Anti-Pathic Plan," the out of balance charge is added until it exhausts itself. The other side is called the "Sympathic Plan," in which charge is taken out. Normal on one side, and too strong on the other or normal on one side and too weak on the other is disequilibrium. "The activity of the attack must depend on the activity of the disorder." The blue end of light, the ultra-violet end is the electrical end because it de-ionizes the atoms, to prepare old forms for re-constitution, like waves reformatting our cellular life. "Life is a continual recycling." The red end of light is the creator of new forms using materials prepared for it. "Death of a living matter is when the charge is gone." "Physical life is perpetual polarizing and depolarizing. Disease is the loss of this regularity." "To accelerate the nervous system the red ray is used, and to relax the nervous system the blue ray must be issued." Pancoast used "Solarizing rooms" with red and blue panels, starting in small doses then increasing. Individuality of treatment is important, since "A proper dose for one, often proves insufficient for a second or an overdose for a third patient where the symptoms are identical."

Babbitt wrote in 1878 *The Principles of Light and Color: The Healing Power of Color*. Various colors were used to treat different areas of the body. Babbitt also emphasized lots of outdoor sunlight, pure air, nourishing but simple foods and proper sleep. Solarized and potentiated water was also used to treat patients. The use of light and color is gentle, but often more direct, and longer lasting than ordinary medicine as it works with fine nervous forces.

Spitler used many of the concepts of Pancoast and Babbitt in his book *The Syntonic Principle*. Recently, a clinic in England treated acne with red and blue light. The red light stimulates the healing, and the blue light diminishes the bacteria.

A 2001 article in the *Southern Medical Journal*, "Vitamin D, Balancing Cutaneous and Systemic Considerations," shows vitamin D deficiency is a leading cause of osteoporosis and the RDA ratings are often too little. In milk the vitamin D is in the fat component, and breast-feeding mothers need to get lots of Vitamin D for their infant. Ultra-violet light is needed for vitamin D production. Vitamin D may be protective against tuberculosis, breast cancer, and skin melanoma. The body needs to be ready for the sun on a regular basis. **Dr. Gottlieb** joked that the healthiest people in the future will be the smokers because they are the only ones who go outside.

# Dr. Carl Loeb on Emotional Healing

By Sarah Cobb

*Nature practices spectroband therapy on all life -- Dr. Carl Loeb*

Disease is healed, in one way or another, every day. What happens to the mental thought form that accompanies the disease in the first place? Can we assume that as the physical body heals, so does the mental blueprint of the disease? Or does it happen the other way around. And which is the precipitating factor, the mental or the physical?

The electromagnetic field around the physical body is an invisible energy force that receives and distributes vital energy and is therefore a key player in health and well being. Composed of electromagnetic energy emanating from atoms and cells, this light body is magnetized, emits color, and is influenced by emotion. Resonance between the electromagnetic body and the physical body allows states of harmony or discord in either body to affect the other.<sup>1</sup>

Within the last seven decades, doctors have treated emotional and mental bodies with colored light.<sup>2,3,4,5,6,7,8,9,10,11</sup> The work put forth by Carl Loeb, M.D., is significant because he refined a method for treating both mental and physical conditions, practicing *spectroband therapy* on thousands of patients over a twenty-year period.

Loeb was the inventor of the *Mountain Sun*, a device that flooded the nude body with colored light for physical complaints and the head for mental ones. In the 1939 edition of *A Course in Specific Light Therapy*,<sup>12</sup> Loeb said that deployment of spectrobands, light frequencies of given wavelengths, were for the purpose of controlling and altering *psycho-physiological* responses.

## THE FREQUENCY OF EMOTION

The mental, emotional and spiritual bodies comprise a large portion of the human aura.<sup>1</sup> Collectively, this nerve energy from our thoughts and emotions forms a unique and ever changing electromagnetic field that envelopes the body like a cocoon. A review of the work of modern day researchers and practitioners, verifies Loeb's early premise that treatment with colored light alters *psycho-physiological* responses.<sup>4,5,6</sup>

For the past twenty-five years Hunt has researched the human aura, writing about it in her book, *Infinite Mind, Science of the Human Vibrations of Consciousness*.<sup>1</sup> Hunt carried out sophisticated electronic field research and extensive clinical studies on the electromagnetic radiation field as it changes during human interaction. In her book, she describes the electromagnetic field as being smaller in amplitude and higher in frequency than the electrical frequencies of muscle, brain, and heart. It responds before the cells in the brain and it can change color or frequency in an instant. After years of measuring the chakra emissions with an oscilloscope under varied conditions, she has concluded that "emotions connected with the self are the synthesizing mechanism of the body and the emotions connected with the soul are the organizing medium for the mind... Every emotion temporarily restructures the field"<sup>1</sup>

Dr. Peter Mandel,<sup>6</sup> the German Naturopath who developed colorpuncture, has spent the last several decades treating emotional conditions that lead to disease. He talks about disease as the final link in a very long chain that begins with unresolved conflict. Illness is the consequence of not dealing with the emotional and or psychological stresses that are currently occurring or that may have taken place in childhood or even the womb. Says Mandel, "Disease is losing life's meaning. Disease always is only the upside-down unreality of life's manifest."

Although Dr. Mandel, has located treatment meridians all over the body for specific emotional issues, the head is used for what he calls *conflict solving therapy*. Based on the theory that different types of conflicts are lodged in different parts of the brain, Mandel said:<sup>13</sup>

*I already knew that the brain works on a holographic basis, and that the pattern that vibrates in the brain is divided, physiologically, into three parts. We have a stem brain, a midbrain or limbic system, and the cortex, and each has a different task. The midbrain is the mammal brain, the brain of emotion....In a normal happy life, these three parts are attuned, vibrating together in harmony. If this synchronization is present, the individual does not have a great potential for repressing conflict.*

To bring these three parts of the brain into accord, Mandel located lines on the forehead relating to the three layers of the brain. He also incorporated two triangles – the Triangle of the Subconscious on the left ear, for touching buried issues, and the Triangle of Intellect on the right ear, to stimulate understanding. Whereas Dr. Mandel treats acupuncture points with a penlight and a colored quartz tip, Dr. Loeb relied on the power of ultra violet.

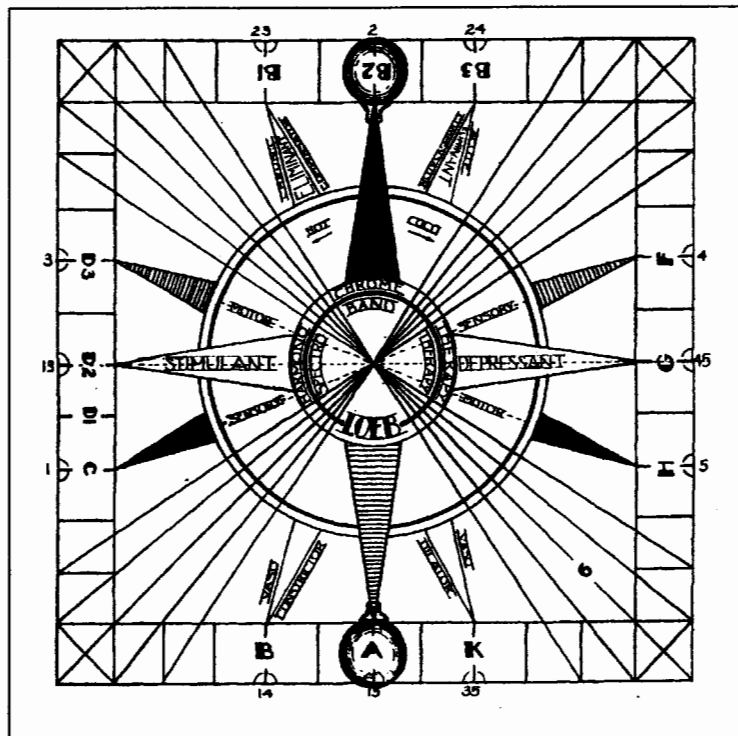
## SPECTROCROME

Throughout Dr. Loeb's work, spectrochrome bands are referred to as numbers that correspond to prismatic instrumentation. Dr. Harry Riley Spittler, the founder of syntonix optometry, studied under Loeb and adopted many of his ideas. Therefore, light

frequencies used in modern syntonics optometry should be most accurate. The Color Velocity Diagram gives us a better understanding of how Dr. Loeb conceived of spectroband therapy.

A thorough study of the diagram goes a long way in understanding not only the characteristics of a particular frequency but also the opposite action of the opposing (complementary) frequency. *In reasoning it is well always to consider the properties or the frequency in use together with the opposing properties, and generally, some of the opposing properties should be present in the patient's symptoms in order to verify the proper selection for a particular condition* <sup>4,5</sup>

The diagram (see cover for colorized version) is composed of a square within which there is a multipoint star. The various star points contain the functional effect produced by a given frequency or frequency combination. The center of the diagram indicates the light source dissipating into all directions. The solid black points signify a single action, #1 red (heat or life), #2 green (growth or stabilization), and #5 blue-violet (sleep or recuperation). The semi solid points signify secondary frequencies and contain two actions namely, #3 oak brown (motion and activity), #4 etheric blue (coldness and relaxation), and #15 blue violet flame (rhythmic expansion and contraction).



The six open star points relate to triple activity. They are #13 tangerine (heat, motion, and activity), #23 lime green (growth, motion and activity), #24 etheric blue green (growth, coldness and dryness), #45 etheric blue violet (dryness, contraction and depression), #35 amethyst (moisture, relaxation, and expansion), and #14 crimson (heat, congestion and irritation). The two largest points in the diagram are stabilizers: #2 spinach-green representing the physiological and #5 blue-violet flame representing the emotional.

The letter *A* used in conjunction stands for anabolic and is employed when *anabolic* or thick, calm types are treated, while letter *C* connotes *catabolic* for thin, nervous individuals (read Spitler's *Syntonics Principle* for more about these types).

Note the small, heredity circle. Between #14 crimson and #2 spinach-green clockwise represents physical life and between #23 lime-green and #2 spinach-green counter-clockwise, is spiritual life or physical death. The outer, environment circle signifies day alternating with night, conscious alternating with sub-conscious. The upper half of the chart governs the physiological while the lower half governs the emotional and sub-conscious activities. In a state of health, the

expressions of life spring from the inner and outer circles of the diagram, oscillating rhythmically through the entire circle of action and reaction.

Notice the number six, resting in the lower half or emotional / subconscious part of the diagram. According to Loeb, number six, which is a blend of blue violet and amethyst, had been put to great success in the treatment of eye conditions. Relaxation of the eye muscles was much greater with blue violet because it did not produce fatigue and sense of depression. It also eliminated headaches and was successful in the treatment of myopia.

Keeping the diagram in mind, now consider the characteristics of the various frequencies:

Flame-red .....	Hot
Cobalt -blue .....	Cold
Lime-green .....	Alkaline
Etheric-blue-green .....	Acid
Spinach-green .....	Food for the body
Oak brown (dark) .....	Food for the mind, intelligence, bone, nerve
Flame-red .....	Infancy, blood, fat and heat
Spinach-green .....	Youth, muscle, resistance and defense
Etheric blue .....	Electrical Energy
Blue-violet .....	Spirit, physical death, introspection, magnetic
Tangerine .....	Hot and wet



Etheric-blue-violet .....	Cold and dry
Crimson .....	Hot and flaming
Amethyst .....	Moist and depressing
Blue-violet flame .....	Food for emotions.

Significant\* is the use of the color **dark oak brown** described as a motor stimulant and food for the mind. The use of brown light is rarely used in modern color therapies. Loeb believed it to be a worthy frequency. Oak brown was applied to treat problems relating to mental focus and memory. Dark oak brown, called a secondary frequency was composed of flame red and spinach green. Known as a motor stimulant, it directly stimulated conscious and sub conscious motor activity and increased sensory response. According to Loeb, exposure of light to the head resulted in better coordination of thought. A quick review of the mental/emotional aspects of the remaining frequencies is of special interest because they may provide inspiration for new forms of treatment.

Although **flame red** stands for blood, heat, and expansion, it can induce a form of pent up pressure that accumulates and may be set off explosively in the form of a violent tantrum. Dr. Loeb did suggest its use for the first few treatments of amblyopia.

**Spinach green** has a slightly sedative effect on the mentality and produces a feeling of well-being. It is in no sense a depressant and is self limiting in dosage. It is known as the governor or control frequency, and whenever it is found in a combination, it causes a stabilizing effect.

**Blue violet** was the highest frequency that when combined with red sun electrodes; it achieved the greatest amount of relaxation without depression. In the treatment of mental conditions, it was used for nervous, erratic mental activity, mental hyperactivity, talkativeness and hysteria.

For cases of insomnia due to overwork, nervous strain or worry, **etheric blue** for anabolic (thick, calm) types or **cobalt blue** for catabolic (thin, nervous) types was applied to the face and then to the back of the head. In anabolics, **etheric blue violet**, like some opiates, first excites the imagination and can actually produce hallucinations.

Patients who are being psychoanalyzed and become restless are quickly quieted with **amethyst** (catabolic) and **pansy** (anabolic) without impairing their flow of thought or their response to questions.

**Blue violet flame** was composed of flame red and blue violet and is indicated in practically all chronic disturbances of an emotional nature. Producing a psycho-physiological action, blue violet flame is primarily indicated in compensating for extreme emotional states. Loeb explains,

*Every mental and emotional state is combined with analogous physiological functional activity and if either one is changed it will invariably effect the other...The heart functions like a barometer; it responds both physiologically and emotionally and by studying and carefully observing cardiac response, one learns a great deal about the patient and his condition...Blue violet flame directly affects the physiological processes and as irregular, fast heart activity becomes stabilized, respiration improves. Thus we have changed an emotional state of fear and excitement, and we have created psycho-physiological function associated with a mental state of calmness and well-being. Fear cannot operate without its physiological components of increased respiration and heart activity.*

## TREATMENT

Giving credit to the sun because it contained every form of chemistry we find on the earth, Loeb believed that increased efficiency came from a variable ultra violet light source. By dispersing high intensity light through a prism in a calibrated spectroscop (see figure 1), Loeb felt that the chemical integrity of the ultra violet was maintained in the colored bands of light.

Various coated arching electrodes produced a very intense light source. Depending on what the electrodes were coated with, they boosted a selected part of the spectrum and created what he called, the *Spectrum Sun, Yellow Detoxicant Sun, Blue Sun, Yellow Sun, and Red Sun.*

The Spectrum Sun contained an electrode, like sunlight, that emitted energy below 2900 A.U. It gave off a large amount of ultra violet in a balanced spectrum similar to natural sunlight. Dr. Loeb warned against overdose. For over-sensitive individuals, *Spectrum Sun* could be used in place of either Blue Sun or Yellow Detoxicant Sun. It was used to treat pain because it excluded all reds and infrareds from the spectrum increasing sedative effects. This treatment was said to relieve severe pain from inflammation in minutes.

The spectrum of the electrode powering the Blue Sun was deficient in the visible red portion. Although Blue Sun was employed to intensify the action of the sedative frequencies, it was used much less after the advent of the *Tungsten Sun.*

The electrodes contained in the Tungsten Sun was a combination of tungsten, molybdenum, wolfram with uranium oxide, producing an unusually rich ultra violet spectrum extending below 1980 A.U. made of tungstate of iron and magnesium. It was used for unobstructed irradiation and where large quantities of short ultra violet emission, over the shortest period, were desired. "Unobstructed" light, as Loeb called it, was offered after the colored light was dispensed.

Yellow Detoxicant Sun was deficient in the middle register of the ultra-violet radiations, with an absence of short ultra violet radiations; however, the long penetrating and stimulating bands were abundant. This energy was used as a powerful mental stimulator.

The Red Sun burned on the borderline at the hot end or red portion of the spectrum, just where the eye is unable to perceive color. It relieved hypo-activity of the endocrine glands by enhancing the tonicity and the secretory powers of the hypo-producing glands.

The specific light sources were then combined with prisms and glass filters in order to boost the effect. For example, flame red, blue-violet, crimson, and crimson/cobalt blue were used with the Red Sun as a light source. Yellow Detoxicant electrode was applied to the browns, yellows, lime green, blue green, and some blues. Spectrum Sun boosted spinach green. Tungsten or Blue Sun was indicated for amethyst, pansy, etheric blue and cobalt blue.

For treatments to the mind, light was applied to the head or face *and eyes* through the energy field surrounding the head. *The effect of spectrobands and light is augmented when received through the eye.*<sup>14</sup> However, when using unobstructed ultra violet light, he suggested protecting the eyes with an opaque cover.

Before treatment, Dr. Loeb grounded the patient first. Although he conceded that it is nonessential with modern equipment, it was definitely helpful because *it facilitated the action of the light.*<sup>14</sup> To ground a patient he connected one end of a wire to a gas or water pipe and the opposite end to the patient's arm or leg.

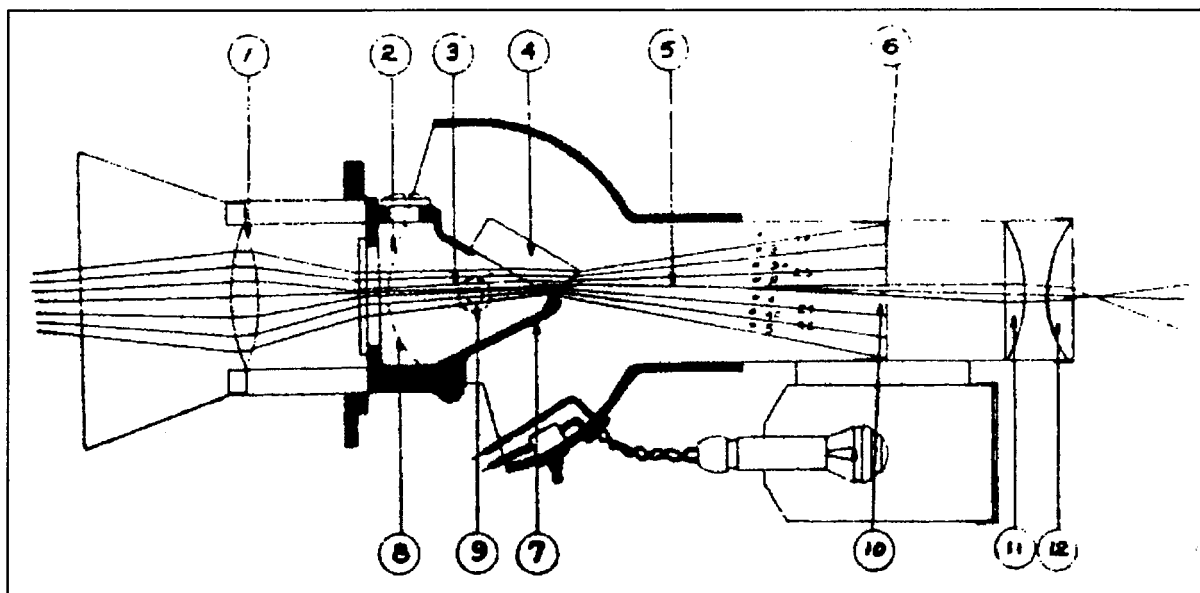


Figure 1. White light comparable with that of the sun, produced by the electric arc of the Mountain Sun emitter enters the funnel-like opening of the collimation chamber where they are made parallel by collimating lens (1). Passing onward as a parallel beam the rays pass through an absolutely colorless liquid contained in the fluid prism (2) where dispersion begins. Having traversed the fluid components of the original beam light encounters a refracting prism (4), resulting in complete separation into wavelength bands, the series beginning with red and ending with violet. Another function of the second prism is that it lends aid to spread the dispersed light into a broad, vertical, fan-like formation.

Thick, calm patients (anabolic) were treated at a distance of four feet and thin, nervous types (catabolic) were treated at six feet. Sometimes frequencies were altered to accommodate the frequency variations that accompanied each type. Treatment time with the powerful Prismatic Mountain Sun required ten minutes or less divided between anterior and posterior.

The suggestions put forth should be regarded as an outline, as treatment could not be standardized and executed automatically. In light therapy, the practitioner should consider a vast array of symptoms when deciding on a treatment plan. *Short, specific intense treatments are always preferable to long, weak, non-specific radiations.*<sup>12</sup>

Dr. Loeb's book contains specific frequencies for treating over 400 symptoms. See appendix for an edited list of the most common mental conditions.

## CONCLUSION

As humans, we are influenced by light vibrating at various frequencies. The electromagnetic output generated by our thoughts, emotions and feelings set up a resonance between the electromagnetic body and the physical one. Greg Braden, in his book *Walking Between Worlds*, discusses the process of resonance. Resonance, he says, is an exchange of energy between two or more

systems of energy. During this process there is a tendency for the element of slower vibration to synchronize and match the element of the faster vibration. In changing our attitude, we change our resonance, which changes our vibration.

It was this writer's intention to recognize one of the true pioneers in energy medicine, Dr. Carl Loeb. If we can glean anything from his work it should be that healing requires a shift of consciousness, which can be enhanced by treating the mental body along with the physical one. Ultimately, the individual must be willing to accept the light being offered and the changes that accompany it if true healing is to occur. For healing to last it must take place multi dimensionally, encompassing the body, mind and spirit.

## APPENDIX

Absent minded .....	oak-brown (dark)
Absorbed (buried in thought) .....	tangerine
Abusive (with anger) .....	blue/violet flame
Agitated .....	etheric blue
Angry .....	blue/violet
Anger (violent) .....	etheric blue/violet
Anguish .....	blue/violet flame
Antagonistic .....	blue/violet flame
Anxiety .....	etheric blue/green
Apathy .....	cardinal red
Arrogant .....	amethyst
Bashful .....	flame-red
Bewildered .....	spinach green
Brooding .....	crimson
Complaining .....	blue/violet flame
Critical .....	blue/violet flame
Death (desires) .....	crimson/cobalt blue
Despair .....	crimson/cobalt blue
Despondent .....	crimson
Discouraged .....	spinach green
Emotional (too) .....	cobalt blue
Emotional (lack) .....	oak yellow (light)
Excitable .....	blue/violet
Fear .....	cobalt blue/green
Forgetful .....	oak brown (dark)
Frantic .....	cobalt blue/violet
Impatience .....	cobalt blue
Irritability .....	blue/violet
Lustful .....	cobalt blue/green
Love (ailments from disappointment) .....	blue/violet flame
Mania .....	cobalt blue/violet
Memory (weak) .....	lime green
Morose .....	tangerine
Oversensitive .....	etheric blue/green
Reserved (too) .....	flame red
Restless .....	cobalt blue
Sadness .....	crimson
Suicidal .....	crimson/cobalt blue
Thinking (aversion to) .....	oak yellow (light)
Thoughts (wondering) .....	lime green
Timid .....	tangerine
Unsympathetic .....	blue/violet flame

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# NIELS RYBERG FINSEN -- 1903 NOBEL LAUREATE IN MEDICINE

*Nobel Prize in Physiology or Medicine 1903 in recognition of his contribution to the treatment of diseases, especially lupus vulgaris, with concentrated light radiation, whereby he has opened a new avenue for medical science.*

## PRESENTATION SPEECH

by Professor the Count K. A. H. Mörner, Rector of the Royal Caroline Institute

Your Majesty, Your Royal Highnesses, Ladies and Gentlemen.

This year's Nobel Prize for Physiology or Medicine has been awarded by the Council of Professors of the Caroline Institute to Professor Niels Finsen of Copenhagen in recognition of his work on the treatment of diseases, and in particular the treatment of lupus vulgaris by means of concentrated light rays.

Finsen's studies in connection with this disease constitute the most well known and the most fruitful part of his work and are responsible for the important role played by phototherapy in medical art today. His first steps in the field of phototherapy, however, were directed towards general biological problems related to the effects of light on the organism. This led him to consider a number of specific problems concerning the effects of light on the skin in certain diseases. At first his research was not concerned with lupus but with another disease, smallpox. This first project in the field of therapeutics was certainly far removed from the principles that Finsen followed later in the treatment of lupus and other diseases, but it prepared the way nonetheless for his major research in this latter field.

In 1893 Finsen recommended the use of red light in the treatment of smallpox; this treatment, by protecting the skin against harmful light rays, was believed to facilitate the healing of the skin lesions and prevent the appearance of scars, which are often the sequel to this disease. An analogous form of treatment for smallpox had in fact been in use many years before and had even been current during a part of the nineteenth century. A firm basis for this practice was lacking however. The situation was far more favorable when Finsen began his research on the subject. In 1889 Tidemark's important work had demonstrated that the most refractable rays of the spectrum, in particular the ultraviolet rays, had a strong and specific effect on those parts of the body surface which were exposed to them. This effect is quite different from the irritations or burns produced by heat rays. At first no effect, or at the most a slight one, is apparent, but a few hours after exposure to the rays a certain degree of irritation is felt which progressively increases in intensity for about twenty-four hours and then gradually subsides. Finsen's proposed treatment of smallpox made use of Widmark's findings in this field. His method consisted in filtering off the ultraviolet rays by means of red glass and red curtains, etc., thus preventing their irritative effect on the skin, without having to keep the patient in total darkness.

Although this work brought recognition for Finsen, it is nevertheless of secondary importance when compared with the results of his further research. Finsen's stroke of genius in his later work was to attempt to make therapeutic use of the powerful biological effects of highly refractable rays. In this way he blazed the trail for scientific phototherapy and for the curative use also of other rays than those contained in ordinary light.

Finsen's decision to follow this line of research was influenced by the phenomenon that light has the property of preventing the development of bacteria and even of killing micro-organisms. This phenomenon had already been observed in 1877 by Downes and Blunt and had been confirmed and studied by a number of scientists such as Duclaux, Roux, Buchner and others, on bacterial cultures, before Finsen undertook to apply it to living tissue-containing bacteria. In this case also the active rays are the high-refraction rays of the spectrum. In considering the effects of light on living organisms containing bacteria, an explanation of the results obtained must take into account an essential factor other than the effect of light on pathogenic microorganisms, namely, the already mentioned effects of light on the tissue itself. The question as to which of these two factors is most important in the therapeutic use of light will no doubt be the subject of further research. Whatever the answer may be to this question, the effective rays are the ones strongly refracted. The lower refraction rays, on the other hand, are of little use and, since they have the great disadvantage of producing combustion, must, as far as possible, be eliminated. Finsen's method is therefore in no way comparable to certain previous attempts to treat lupus by burning the affected tissue with a burning-glass.

The treatment of lupus by Finsen's method is carried out in the following way. Sunlight, or more frequently the light from a powerful electric-arc lamp (both forms containing a high proportion of active rays) is concentrated by means of lenses of appropriate composition into a beam from which the heat rays have been as far as possible eliminated; this beam is projected on a small area of affected skin, which has been drained of blood by pressure. The beam of light is applied continuously for one hour. Immediately afterwards the treated area becomes red and a little inflamed. During the next few days, this irritation of the skin increases, and then soon after begins to decrease and it is at this point that healing commences and scar tissue begins to form, which eventually produces a surface almost exactly like normal skin. Every part of the diseased area is treated consecutively, repeating the process twice on the same area if this proves necessary. This treatment has no unpleasant effects but it is expensive, requires constant supervision and considerable time. The results obtained, however, greatly outweigh these disadvantages. This method has proved of use in the treatment of a number of other skin diseases, but it has been particularly successful in the treatment of lupus vulgaris. None of the methods previously used for the treatment of this disease has produced results which can in any way be compared to those obtained with phototherapy.



Lupus vulgaris is, as we know, a form of tuberculosis, with localized lesions on the skin, especially that of the face, such as the nose, eyelids, lips and cheeks. The skin is gradually eroded, the face sometimes becomes dreadfully disfigured, and finally transforms patients into objects of repulsion. The chronic and progressive nature of this disease is particularly marked: it may remain active for ten years, twenty years, or even longer and, until now, it has proved resistant to all treatment. Even when patients had sufficient courage to persevere with these forms of treatment their hopes were dashed more often than not; rarely was a permanent improvement possible in this dreadful disease.

Finsen began to treat his first case of lupus in November 1895. Although the method had not yet been developed far, and although the case itself was of considerable severity, having proved resistant to all the current forms of treatment most energetically applied, the results were most satisfactory. News of this success soon spread: patients suffering from lupus left their hiding places and hurried from far and near to seek a cure or some relief from their suffering. They were rarely disappointed.

The new method soon obtained recognition from the medical world and became current practice. It also gained considerable support from philanthropists outside medical circles. The very next year, in 1896, the Finsen Institute of Phototherapy was founded in Copenhagen with funds obtained largely from generous private donations; the State and the City authorities also contributed. This Institute, devoted to research on the biological effects of light and the practical medical application of the results obtained, has since gradually been greatly developed and improved. It is now housed in its own recently equipped building, which includes a clinical section for the treatment of patients and an experimental research laboratory. It has a large staff including 8 doctors, 53 nurses, 3 assistants, other employees and numerous domestics.

Finsen's method for treating lupus is still used in the Institute. This year a report was published containing the cases of lupus treated during the first six years, up to and including November, 1901, in which 800 cases are described. The results are particularly satisfactory and are far superior to those obtained previously in the battle against this disease.

In 50 % of these cases the skin disease was cured, although in many of them the lesions were extensive and of long standing. In a great number of cases, so much time has elapsed since the recovery that one considers this as permanent.

In the other 50 % of these cases, in which a complete cure was not achieved, a partial cure or a considerable improvement was obtained in most cases. In only a very small number of cases, approximately 5 % of all cases, treatment was unsuccessful or produced only temporary results. From the beginning of December 1901 until the end of October of this year, 300 further cases of lupus were treated. It has been noted that in recent years the proportion of cases of early lupus is much higher than before. As Finsen has said, it seems that in Denmark the time will soon come when the last chronic cases of lupus will have disappeared. Since cases of early lupus respond more easily to treatment, the future is most encouraging.

This method represents an immense step forward and the work of Professor Finsen has led to developments in a field of medicine, which can never be forgotten in the history of medicine. For this he deserves the eternal gratitude of humanity.

An illness, from which he has long suffered, unfortunately prevents Professor Finsen from being here today.

I therefore ask you, Count Sponneck, as representing Denmark, to accept on behalf of Professor Finsen the tribute which the Council of Professors of the Caroline Institute pays to your eminent fellow countryman in awarding him this year's Nobel Prize, and I am particularly happy to do so in the knowledge that this tribute has been won by a brother from over the Sund.

## **NIELS RYBERG FINSEN – BIOGRAPHY**

Niels Ryberg Finsen was born on December 15, 1860, at Thorshavn in the Faroe Islands. His father, Hannes Steingrim Finsen, belonged to an Icelandic family with traditions reaching back to the 10th century, and occupied prominent (from 1871 the highest) positions in the administration of the Faroe Islands. The mother, Johanne Fröman, was also born on Iceland. The boy received his early education in schools at Thorshavn and then at Herlufsholm in Denmark. Here the Rector declared that "Niels was a very nice boy, but his gifts were small and he was quite devoid of energy". This may have been due to fagging for older pupils, for when the boy was moved to a school at Reykjavik, Iceland, in 1876, he succeeded much better in spite of the fact that he did not initially know the language.

In 1882 Finsen went to Copenhagen to study medicine, taking his final examination in 1890. The same year he also became professor of anatomy at the University of Copenhagen, a post he left in 1893 in order to be able to devote more time to his scientific work. He still went on with private tutoring of medical students, thus gaining a very moderate income for his living.

Already from 1883 and probably several years earlier he suffered from an illness which turned out to be Pick's disease and is characterized by progressive thickening of the connective tissue of certain membranes in the liver, the heart and the spleen. This results in impairment of the functions of these organs. As time went on, symptoms of heart trouble developed in addition to the general weakness and ascites, so that Finsen became more and more of an invalid. His last years had to be spent in a wheel chair and his ascites had to be tapped no less than 18 times - often as much as 6 litres of fluid were withdrawn. That he in spite of this was able to make his remarkable contributions to medicine tells of a strong will and great energy.

He has himself given the following short description of his work. "My disease has played a very great role for my whole development... The disease was responsible for my starting investigations on light: I suffered from anemia and tiredness, and since I lived in a house facing the north, I began to believe that I might be helped if I received more sun. I therefore spent as much time as possible in its rays. As an enthusiastic medical man I was of course interested to know what benefit the sun really gave. I considered it from the physiological point of view but got no answer. I drew the conclusion that I was right and the physiology

wrong. From this time (about 1888) I collected all possible observations about animals seeking the sun, and my conviction that the sun had a useful and important effect on the organism (especially the blood?) became stronger and stronger. What this useful effect really was, I could not find; I have been working for this goal ever since but have not been able to find exactly what I have been seeking, though we have gone somewhat forward.

My intention was even then (about 15 years ago) to use the beneficial effects of the sun in the form of sun bathing or artificial light baths; but I understood that it would be inappropriate to bring it into practical use if the theory was not built upon scientific investigation and definite facts.

During my work towards this goal I encountered several effects of light. I then devised the treatment of smallpox in red light (1893) and further the treatment of lupus (1895). Both these things are therefore in sense side issues, but they completely occupied my time for several years and have partly drawn me away from my main goal.

During the last few years, I have, however, become convinced that it does not help to wait until I find the answer I am looking for in the laboratory, but that it is justified to work also with clinical experiments. Thus both approaches can be carried out simultaneously in the effort to reach the final goal.

In beautiful but simple experiments Finsen demonstrated that the most refractive rays from the sun («the chemical rays») or from an electric arc may have a stimulating effect on the tissues. If the irradiation is too strong, however, it may give rise to tissue damage, but this may to some extent be prevented by pigmentation of the skin as in the Negro or in those much exposed to the sun. In smallpox Finsen thought that the multiple scars might be avoided if the patient was protected from the chemical rays. The experiments with such patients were successful. On the other hand chemical rays free from heat rays might be used to obtain a useful effect either by concentration on particular area - and this led to the treatment of lupus vulgaris or other skin diseases - or employed as general sun-baths, which on Finsen's suggestion was tried in cases of tuberculosis. The results were promising but as a rule the northern climate was not well suited for such therapy. As is well known, this kind of treatment has been found to be excellent in places where the sun is rich in chemical rays, e.g. in the Alps where the absorption of these rays by the atmosphere is rather small. The treatment of surgical tuberculosis in this way by O. Bernhard and A. Rollier at high elevations in Switzerland has been especially successful.

Finsen himself proved very convincingly that the concentrated chemical rays may exercise very beneficial effects in the disfiguring disease lupus vulgaris. This is due to a bactericidal as well as a general stimulating effect on the tissues. He has developed the technique by numerous practical methods, and the Finsen Institute was erected in Copenhagen as early as 1896, being enlarged some years later due to the generosity of two Danish donors, Mr. Hageman and Mr. Jørgensen, and the Danish Government. It has served as the model for numerous similar institutes in different parts of the world, and together they have greatly reduced the number of cases of lupus.

Finsen's work contained a definite and important recent discovery and was therefore well qualified for a Nobel Prize. Moreover he was still a young man. Of course it was known that his health was not good, but it was obviously thought that the Prize might be of considerable importance. This was soon found to be the case. When Finsen, on October 17, 1903, received the letter with the announcement of the decision, his first words were: "Well, thus it has now been established that the thing is Danish". When the usual Nobel festivities took place at Stockholm on December 10, 1903, he himself was sitting at his home in his wheelchair receiving congratulations from his personnel and from numerous friends. He then made it known that he would donate 50,000 crowns of the Prize to the Institute and another 60,000 crowns to a sanatorium for heart and liver diseases, which had also been founded by him. One immediate consequence was that each of his two main donors gave 50,000 crowns to the Finsen Institute. Thus in spite of Finsen's failing health his ideas were spread still further and his creation - the Institute - was helped.

Among the many publications by Finsen *Om Lysets Indvirkninger paa Huden* (On the effects of light on the skin) appeared in 1893 and the classical treatise *Om Anvendelse I Medicinen af koncentrerede kemiske Lysstraaler* (The use of concentrated chemical light rays in medicine) in 1896. This and other papers were published in German in 1899, and *La Photothérapie* appeared in French the same year. The results of many of his researches are contained in the communications published by his Institute. Finsen tried to counteract the symptoms of his illness in various ways, and during his last years he kept to a diet poor in salt. This led to his last publication, a thorough study of *En Ophobning af Salt i Organismen* (An accumulation of salt in the organism) in 1904.

Finsen received the title of Professor in 1898, and in 1899 he became Knight of the Order of Dannebrog, to which a few years later the Silver Cross was added. He was member or honorary member of numerous societies in Scandinavia, in Iceland, Russia, Germany etc. He received a Danish gold medal for merit, and in 1904 the Cameron Prize was given him from the University of Edinburgh. Dr. Finsen died on September 24, 1904.

From Nobel Lectures, Physiology or Medicine 1901-1921.

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