

# **BEHAVIORAL OPTOMETRY SCIENCE: TRANSACTIONAL & FUNCTIONAL EFFECTS ON STRUCTURE, OPTOMETRIC MEASUREMENTS & PRESCRIBING 1954-2025**

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## **RVH: RetinoVascular Homeostatology**

- 1954—Lane 's Princeton thesis : *On the Logic of Measurement*.
- **1965 – Lane at Kraskin Invitational Skeffington Symposium**
- **Skeffington urged every OD to read this important paper.**
- **Lane developed nomenclature for measuring effect on retina of:**
  - **A. Embeddedness vs Nonembeddedness**
  - **B. Embedded Esophoria vs Embedded Exophoria**

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### ***Elevation of Intraocular Pressure with Sustained Reading and Close work Stimulus to Accommodation***

- 1980 – Dr. Lane published his SUNY, State College of Optometry thesis, Prof Paul Harris OD endorsed for OEP distribution.
- Dr. Lane introduced the nomenclature:
  - HRA = Habitual Relative Add in diopters
  - AAHRA = Age-Associated HRA
  - Diopter Hours
  - Log Diopter Hours – most significant in myopia epidemiology studies. This study showed with high significance *that total hours of reading detailed print per day* is not nearly the predict of myopiagenesis afforded by analyzing HRA or AAHRA multi[lied by logarithm of hours reading, so a college student age 20 reading 24 hours per

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### **Elevation of IOP with Sustained Reading & Closework Stimulus to Accommodation--2**

- While the immediate effect of short-term accommodation in normal subjects is acknowledged to be lowering of intraocular pressure (IOP), no carefully controlled experiments have been reported studying the long -term effect of sustained close work accommodation. The long-term effect, as found in this study, is opposite to the short-term effect. In the absence of adequate near-vision dioptric adds, the long-term effect of sustained close work is elevation of IOP

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## **Elevation of IOP with Sustained Reading & Closework Stimulus to Accommodation--3**

- The influence of Age-Adjusted Habitual Relative Add and specific interaction (AAHRA) and specific interactions with the visual environment were assessed for 200 Ss, age equal to or greater than 40, free of recognized eye pathology or pharmacological treatment, and with standard correctible acuities.

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## **Elevation of IOP with Sustained Reading & Close work Stimulus to Accommodation--4**

- Correlations significant at better than 1% level of confidence were found for IOP with (1-AAHRA) LOG Detailed Close work Hours, and with other parameters. Significant differences were identified for Ss (a) pursuing nutritional or aerobic conditioning regiments, and (b) deficient nutritionally or restricted in ambulation.

**IOP elevation as an adaptation to sustained closework is suggested as a mechanism for axial elongation**

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## VALUE of “FAIL-SAFE” MECHANISMS for REVERSIBLE Phenomena and Human EYES

- **A. VALUE of a “Fail-Safe” car bumper which can be repaired or replaced while saving the car, unless it is inadequate to prevent failure from too great a force, like a military tank rolling over the car.**
- **B.. Fail-Safe Mechanisms for REVERSIBLE Optic-Disc cupping. Our data in behavioral-nutritional optometry has been confirming this effect using optical coherent tomography (OCT) for many years.**
- **C. Fail-Safe Mechanisms for REVERSIBLE Preretinal (Epiretinal) Membranes. Our data has likewise been confirming this effect for many years using OCT multispectral wavelength filtering to document the increases and the reversals as affected by behavior, nutrition, lenses and therapy.**

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## Surgery for Severe Epiretinal Membranes can be temporarily successful – BUT read on --!

- The membrane is likely to recur unless the patient learns how to reconstruct his light-exposure habits.
- 1. The work and play environments may need to be redesigned to reduce the likelihood of intense light coming directly into the eyes. The bright white light of the sun strikes the eyes with intense potentially damaging ultraviolet light depending on cloudiness and angle of the sunlight beam. Also, a problem is that the blue-violet part of the light beam generates free-radical ions that are able to damage the clarity of the eye tissues and the retina.
- 2. The membranes are “fail-safe” mechanisms that help protect the retina . But when bright intense light is shined directly into the eye, we see the membrane lit up, but not what we are trying to see beyond the membrane.

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**Good Rx sunglasses can be helpful, but baseball caps, visors, and brimmed hats can be better at protracting from direct sun membrane-causing damage.**

- **Recommendation to improve night driving safety on winding, narrow country roads: Keep a baseball cap or a visor or a brimmed hat available in the car for safer night driving on a narrow, winding country road.**

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## **BCL on Cataract 1982—APHA Meeting in Montreal**

- The APHA highlighted Dr. Lane's study on Fish Methylmercury as a Major new risk factor for cataract. *Medical World News* featured the study as a cover page highlight.
  - This showed that the major new risk factor for this condition is excessive ingestion of very large fish that have been collecting fish methylmercury dining on older lifetime than younger, smaller fish, whereas shark and swordfish and albacore tuna have been eating lots of fish. The human large fish overeaters find they are getting rather less hyperopic or more myopic and have a reduced need for reading glasses until the nuclear cataract gets more severe by acquiring lots of mercury over the years.
  - The intake of mercury poisons within the eye may first present vacuoles in the anterior of the crystalline lens. A more visible sign of the mercury-induced cataract is poisoning of the Posterior Subcapsular layer, which itself induces nuclear cataract and becomes characteristic evidence of a fish methylmercury cataract.

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## 1984-85 Yearbook of Nutritional Medicine--1

- Dr Lane submitted his 43-page chapter on “Nutrition and vision” at request of Jeff Bland, PhD, Editor.
- In this yearbook, Dr Lane reported the results of meticulous epidemiological studies conducted through his New Jersey offices on hundreds of Age-Related Macular Degeneration (AMD) patients and controls, benefitting from his graduate education at Columbia University in Human Nutrition.
- Two formulas addressed the prevention and treatment approach for the AMDs. The first formula was for the so-called “Dry” or “Atrophic” form of AMD.—and this became *PRESERVISION*

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## 1984-85 Yearbook of Nutritional Medicine--3

- The first of three formulas became “**Preservision AREDS 2**” of the National Eye Institute (NEI), probably the most popular over-the-counter mac degen formula in the world. **Before the clinical trials, Dr. Lane was the last physician to correct omissions in the formula.**
- **When Dr. Lane published these formulas in 1984, he had already presented two papers to ISER (International Society for Eye Research) and in 1984 was invited to present 4 one-hour lectures in Moscow to the Moscow International Society on Metabolic Eye Disease Symposium.**
- **Before accepting, Dr Lane called the State Department in Washington to benefit from their advice. Their best advice was, “Don’t go! But if you decide to go despite our advice, we recommend that as soon as you arrive go to the US Embassy to inform them of your arrival for your protection.”**

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## 1984-85 Yearbook of Nutritional Medicine-4

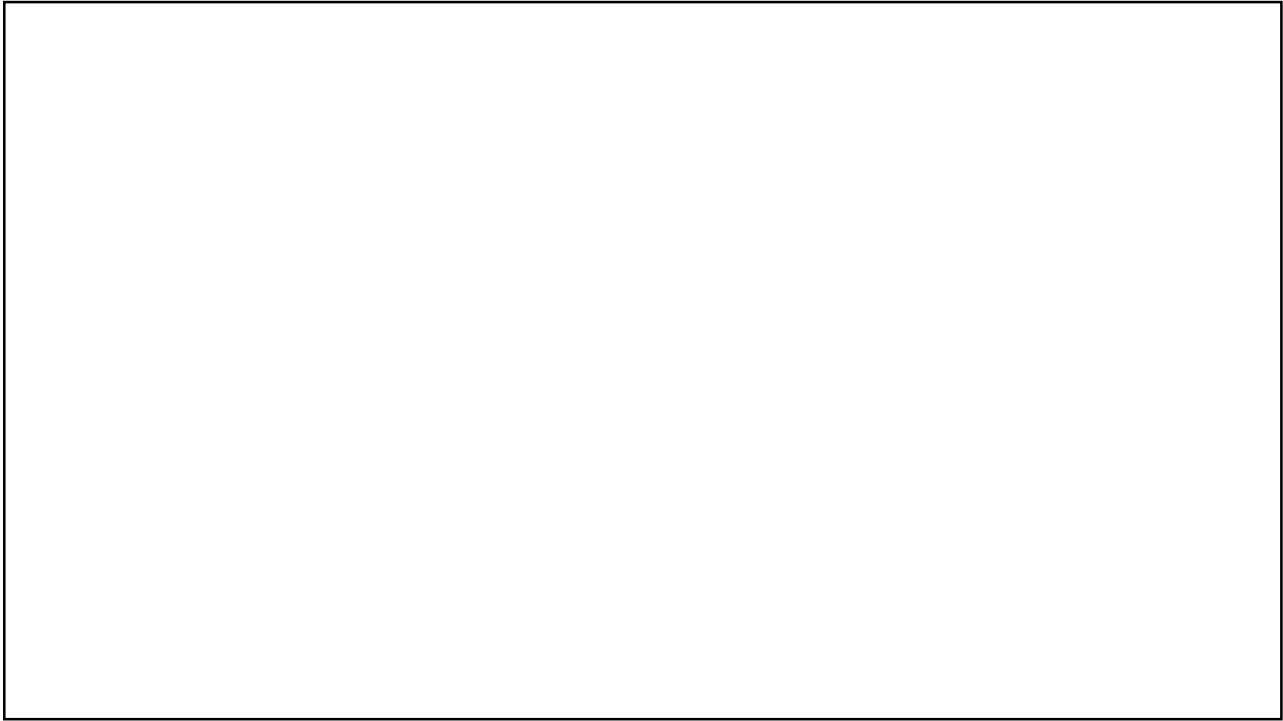
- **In 1988, 4 years after publication of the 1984 Yearbook of Nutritional Medicine, David Newsome** published a fine clinical trial including zinc as he had been involved in zinc research.
- *Dr. Lane met with Dr Newsome at ARVO meetings over the next couple of years to share with him Dr. Lane's findings --which included AN IMPORTANT ROLE FOR A SMALL AMOUNT OF COPPER IN THE FORMULA AND AN IMPORTANT ROLE FOR PYRIDOXINE (Vitamin B6) to potentiate the transaminase enzymes in the upper small intestine to enable adequate utilization of the precise amino acid to remodel Bruch's membrane to prevent the wet form of AMD.*

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## 1982 -- NERVO AT ARVO Nutritional Epidemiology Research in Vision & Ophthalmology

- In 1995, Dr. Lane organized a new Special Interest Group (SIG) at ARVO (Assn for Research in Vision and Ophthalmology.—the world's largest eye research meeting, at Fort Lauderdale, Florida.
- Dr Lane invited Professor Walter Willett, DrPH, Director of the Harvard University School of Public Health, to give the keynote lecture.
- After Willett's profound lecture, he suggested to me, "Let's sit down together to discuss our mutual interests." His first comment was, "You can quote me. All of your research studies that we were able to review with our Harvard research teams were found to be "RIGHT ON" with all your conclusions

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