

AIOB NEWSLETTER

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"Knowledge which is acquired under compulsion has no hold on the mind."

Plato (c. 427-347 B.C.E.)

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The **66th Annual Meeting of the American Institute of Oral Biology** is scheduled for **October 30–November 2, 2009** at the **Palm Springs Hilton Hotel**.

Our president, **Dr. Shahrokh Shabahang**, has again selectively chosen and assembled a stellar faculty and we will again offer an available 26 continuing education credits to attendees.

Faculty

We are welcoming back **Attorney Arthur C. Curley, President and managing shareholder, Bradley, Curley, Asiano, Barrabee & Crawford, PC, Larkspur, California** as a returning faculty member this year. Attorney Curley, who last addressed us in 2006, brings a wealth of professional expertise and wisdom to us and is a nationally renowned speaker on risk management and professional practice standards. He has devoted over 30 years of professional practice to the defense of dentists and physicians, and is a prolific contributor of articles and textbook chapters. He is an **Assistant Professor, Dental Jurisprudence, Arthur Dugoni School of Dentistry, University of the Pacific**, and is also a **faculty lecturer, University of California, San Francisco**. Attorney Curley is an excellent communicator and past attendees will "testify" to his enthusiasm and passion for the law, which is reflected by the quality of his presentations. Our

digital age brings new innovations on an almost daily basis, and new technologies are being developed or adapted to dentistry. The emergence of telemedicine, including intrastate and intra-country, consultation diagnosis and even robotic telesurgery are issues, which require legal interpretations and opinions. Topics on which Attorney Curley has recently spoken to professional groups include 3-D imaging, Informed Refusal of Treatment and the constantly evolving Standards of Care.

When he last served on our Faculty during the 2001 meeting, **Raymond A. Dionne, DDS, PhD** was **Chief, Pain & Neurosensory Mechanisms Branch, The National Institute of Dental & Craniofacial Research, NIH**. In 2005, he became the **Scientific Director of the National Institute of Nursing Research (NINR), National Institutes of Health**, where he heads their Intramural Program. The primary mission of the NINR according to their website, "is to support clinical and basic research and establish a scientific basis for the care of individuals across the life span. Dr. Dionne's



Dr. Raymond A. Dionne

background is not only in research but he was also engaged in private practice for many years in addition. According to the NINR website, “his research focuses on novel therapeutic agents and neurohumoral responses to acute pain and surgical stress.... Significant contributions of his work include use of pre-emptive analgesia and the pharmacologic basis of pain and anxiety control.” He has over 100 peer-reviewed articles as well as several textbooks to his credit. Be assured that we will be apprised of the very latest in this field, which is pertinent to virtually all our practices on a daily basis.

After his presentations to us at our 2006 meeting, **John Thomas, MS, PhD, HCLD** appears to have hit the ground running and according to the **West Virginia University, Robert C. Byrd Health Sciences Center** website, “since 2007, Professor Thomas has traveled greater than 100,000 miles, covering four continents, 16 countries, and has presented to greater than 15,000 scientists, dentists and public health individuals integrating clinical microbiology, biofilms, antibiotic resistance and links between oral and systemic diseases. He has been a clinical microbiologist for over 41 years, and has established research links with individuals worldwide. Our attendees were intrigued by the story of his initial personal interest in the dental flora association with endotracheal biofilms and their link to ventilator-associated pneumonia, of which he is an acknowledged authority. His zeal and fervor for his wide-ranging interests is obvious to his audience and his presentations are not to be missed.

We are, indeed privileged, to welcome **Sharon Gordon, DDS, MPH, PhD, Associate Professor, Biomedical Sciences, University of Maryland, Baltimore College of Dental Surgery, Baltimore, Maryland** to our Faculty for her initial appearance this year. Dr. Gordon is also engaged in research



Dr. Sharon Gordon

with the **University of Maryland, Greenbaum Cancer Center, Experimental Therapeutics Research Program**. Dr. Gordon, who earned her MPH and PhD, at **Johns Hopkins University**, previously served as the **Director of the Office of Education, NIDCR, NIH**. According to her UM webpage, her, “cancer research interest focuses on pain related to cancer treatment, such as mucositis-related oropharyngeal pain, bony pain, and neuropathic pain. Studying the contributions of inflammation and cytokine dysregulation that underlie the tissue injury and repair mechanisms associated with cancer treatment-induced pain may lead to better understanding of these mechanisms in disease conditions to improve therapeutic modalities for cancer pain.” Among the research projects she pursued while at NIH was a novel treatment of recurrent aphthae in patients with HIV/AIDS. Her broad research aims include “behavioral and molecular-genetic contributions to human pain experience.” She is also engaged in collaborative research “to determine whether there is an association between pulpal inflammation, a decrease in local anesthetic sensitivity and changes in the relative density of voltage-gated sodium channel subunits along the axis of pulpal afferents. Since securing local anesthesia in the presence of irreversible pulpitis is a clinical problem most of us have faced many times during our professional lives, we are all certain to profit by any translational outcome of this particular project.

The **Philip J. Boyne Memorial Lecture** serves to honor our past long-term president with a scientific presentation, which offers a broad perspective on a particular field of interest. This year's lecture will be presented by **Dr. Eugene Keller, DDS, MSD, Professor of Surgery, the Mayo Clinic, Rochester, Minnesota**, an oral and maxillofacial surgeon of international repute, who was a Faculty Member at our 2002 meeting, Dr. Keller's presentation this year is a tribute to Dr. Boyne, who was his long term friend and professional research colleague.

Dr. Keller is an alumnus of the **Mayo Graduate School of Medicine** and is a **Diplomate of the American Board of Oral and Maxillofacial Surgeons**. He has gained a reputation in many fields of interest within his specialty and is considered an authority of treatment of maxillofacial deformities, orthognathic jaw surgery, reconstruction of the temporomandibular joint, and management of infectious and oncologic head and neck pathologies. Dr. Keller has written numerous peer-reviewed articles and has made many scientific presentations throughout the world. This lecture has always a highlight of our meetings and spouses and accompanying persons are invited to attend.

The Institute, in fact, has a policy of allowing all accompanying persons to attend any of our sessions in which they have an interest –without granting of CE credits—at no charge, on a space available basis.

For those contemplating first time attendance, our tuition fee includes all meals during the Conference commencing with Lunch on Friday and ending with Breakfast on Monday, November 2. For individuals who are attending within the first three years post graduation from school, we have a reduced tuition fee. Additionally, for those accompanying persons staying in the Hilton Hotel, an all-inclusive American plan meeting food charge must be paid, and there is a greatly reduced charge for children ages 6–12.



This year's Philip J. Boyne Memorial Lecture speaker, Dr. Eugene Keller.

It is not too early to make your room reservation by calling the **Palm Springs Hilton Hotel** directly at **(760) 320-6868**. Do not call the Hilton chain's national reservation number as they do not list our conference and do not offer our special conference room rate.

Our new **Hotel/ Meeting Arrangements Chairperson Courtney Fitzpatrick** is busy with planning for the meeting, which falls on the Halloween weekend this year.

Again, those with special dietary requirements can call **Catherine Bacher** directly at the Hotel **(760) 320-6868** once you have a room reservation and a confirmation number. Also included is a **Welcome Reception** on Friday evening, provided by the Hilton Hotel and the **President's Reception** traditionally held in the President's Suite immediately preceding Dinner on Saturday evening? The former is a wonderful opportunity to renew friendships and for our freshman attendees to experience the welcoming camaraderie of the AIOB. A unique aspect of our meetings are our communal meals with breakfast and lunch and learn opportunities to interact with our faculty members on a one-on-one basis. No one should leave the meeting with unanswered questions as we have formal Seminar Question and Answer periods as well.

We also offer a **Spouses and Accompanying Persons Program**, which is offered at no charge to attendees, as the Institute underwrites it. **Chairperson Jo Fitzpatrick** will announce the nature of the activity as the meeting draws near.

Attendees who wish to view spectacular sunrises will enjoy our traditional **Sunrise Walk**, which leaves the Hilton lobby at 6:15 AM promptly, Saturday through Monday, and returns in time for Breakfast at 7AM. Consider joining us for a leisurely stroll through the surrounding neighborhoods. Naturally no special equipment is required except for comfortable clothing and sneakers or shoes. This offers a wonderful opportunity to renew or make new friendships.

The **Coachella Valley** abounds in both natural and manmade features, which appeal to those with varying interests.

In the last Newsletter, issued after the 65th meeting, a list of attendees who have been to 5 meetings, halfway to Fellowship was published and apologies are due to **Dr. Bruce Davey, Sausalito, CA** whose name was inadvertently omitted from the list.

The Institute has been, and continues, to be fortunate to attract an invited faculty second to none, as you can see from the speakers listed herein. "This is not your father's or mother's typical dental conference," to coin a phrase. There is a reason why we have attendees who have returned for 20, 30, and 40 and yes, even, 50 meetings! Our coterie of retired dentists serves as a tribute, not only to the Institute, but our profession as well. Those in clinical practice agree that we are all better dentists as a result of our sitting at the feet, so to speak, of our faculties that have included some of the greatest

names in contemporary science. We thank you all for your past support and encourage you to inform and bring a colleague, if at all possible to our upcoming meeting in October.

Hope to see you all in October.

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*"What does education often do?
It makes a straight-out ditch of
a free meandering brook."*

Henry David Thoreau
(1817-1862)

Science Notes

FREE EXCHANGE OF IDEAS:

The Internet has been a new presence in our lives for a number of years and continues to evolve as a powerful means of communication, study and research. There are several ongoing ambitious projects to digitize and make available to all viewers the contents of printed collections and libraries worldwide. Rare texts and obscure resources are being scanned and are certain to find an appreciative audience which previously might never even have been aware of their existence or could never have traveled to their physical location for study. We are, indeed, light years away from the Guild-mentality of the Middle Ages, when the specialized knowledge of a craft or profession, such as medicine, was closely guarded and sequestered from the average person.

On February 11, 2008 **Boston University's University Council** voted to make the scholarly work of faculty and staff, available online for free to anyone who wished to view and utilize it. The stipulation was that the work's authorship must be credited and no profit be derived by its use. One of the avowed purposes was that the BU faculty could share their research in this manner with fellow faculty and students. In the spring issue of **BOSTINIA**, alumni magazine, **Dr. Barbara Millen**, a co chair of the Council committee, which presented the proposal, stated that BU researchers would have both ownership and control of their material, which would be archived by the university.

The article also mentions two new online models, which have evolved, namely the online journals, and open-access journals. Most of us are aware of and reference online versions of journals, such as **JADA**, from which we already receive a printed copy. There are usually provisions for the non-subscriber to purchase access to articles of interest. In many instances, the availability of back issues is limited to a short number of years, however, some journals

are working to or have placed their entire past production online.

Dental Cosmos, a Monthly Record of Dental Science (published 1859–1936) is a treasure trove of dental history, which is available in its entirety online through a grant from the **Colgate–Palmolive Company**. The site is maintained by the **University of Michigan Digital Library**. (<http://quod.lib.umich.edu/d/dencos/>). According to the website, Dental Cosmos, “was the first enduring national journal for the American dental profession, and one of the most significant in the early history of American dentistry.” In 1936, it merged with the ADA, “serving as a cornerstone for **JADA**.” There are “Search”, “Advanced Search” and “Browse” functions available and one can find mention of, or the publications of, virtually every important individual in the evolution of our profession, during the covered period. The reader should be warned, however, that visiting this site is possibly addictive, and kudos are extended to both the commercial sponsor and the host university site. Online Open-access journals generally charge their contributing authors a onetime publishing fee to cover cost of maintaining the site and its archival functions. An example is **PLOS** (www.plos.org), which consists of a number of peer-reviewed journals published by the **Public Library of Science**, a non-profit organization of scientists and physicians. Initially publishing one journal, the PLOS family now includes seven journals: **PLOS ONE, PLOS BIOLOGY, PLOS MEDICINE, PLOS COMPUTATIONAL BIOLOGY, PLOS GENETICS, PLOS PATHOGENS AND PLOS NEGLECTED TROPICAL DISEASES.**

“GRAY’S ANATOMY”– A Tale of Two “Henry’s”

As first year predoctoral or graduate dental students most of us spent many hours in the anatomic dissection laboratory. In addition to a formal dissection manual many of us also relied upon, and studied “Gray’s Anatomy” as the definitive reference textbook. Indeed, this medical text, which enjoys a worldwide reputation and usage even

among laypersons, is readily available for purchase in commercial bookstores and illustrations from the 1918 classic twentieth edition, revised and edited by Warren H. Lewis, are freely available for reference on the Internet. It is likely, however, that virtually none of us know the history of the eponymous **Mr. Henry Gray** (1827–1861) and his collaborator and illustrator, **Mr. Henry Vandyke Carter** (1831–1897).

The year 2008 marked the publication of the 40th United Kingdom edition of *Gray's Anatomy*. The year 2008 also marked the publication of **Ruth Richardson's** book, "**The Making of Mr. Gray's Anatomy**", *Oxford University Press*, 288 pages, \$29.95 which was reviewed in *The Wall Street Journal*, March 27, 2009 by **Mark F. Teaford**, professor of functional anatomy and evolution at the Johns Hopkins School of Medicine. Professor Teaford's Book Review was entitled, "Dissecting an Unheralded Alliance: A classic medical text bears one man's name, but it was the product of a true collaboration."

Ms. Richardson's book recounts the rather remarkable story of two physicians, Gray, a surgeon and Carter, an apothecary–surgeon, or general practitioner, who trained at the medical school attached to St. George's Hospital in London. As it was possible at that time to undertake medical studies without first attaining an undergraduate education, both Henrys chose that route. Henry Gray, the son of the Deputy Treasurer to William IV, initiated his studies at St. George's at age 15, where he distinguished himself in anatomical studies. Henry Carter, initiated his studies at St. George's in the late 1840's, and ultimately became a Demonstrator in Anatomy. His father was a landscape artist, and Henry apparently inherited his artistic talent and supported himself, while studying medicine, by selling illustrations.

Ms. Richardson determined from reading Carter's diary that Gray, a Lecturer in Anatomy, initiated the idea of publishing, an anatomical, "manual for students," and asked Gray to join him in the endeavor as an additional dissector and the illustrator. Both men had taught anatomy at St. George's for years, and Gray, obviously more financially secure, offered to pay Carter, "10 pounds sterling a month for a period of 15 months."

Teaford notes that human cadavers were readily available at that time as the British Anatomy Act provided that bodies unclaimed for 48 hours after death, in a workhouse or hospital, could be made available for dissection and study. Measured by today's standards, their working conditions would be termed primitive and difficult, at best, as refrigeration and means of preservation of bodies were not what we enjoy today. Their collaborative "dissecting season" was noted by the author to be the winter months from January to March, and their workday began at dawn to take full advantage of natural sunlight.

The project was to take not 15 but 20 months to complete, according to Ms. Richardson and the two produced a volume of 750 pages containing 363 figures. All the while the two continued to teach and attended to hospital duties. It is noted that Carter also obtained a medical degree from London University during this time. Their efforts resulted in publication of "**Gray's Anatomy: Discipline and Surgical Theory**," in 1858, in the United Kingdom, followed by its release in the USA the following year.

Professional jealousy was apparently at work in their relationship, and Ms. Richardson documents that Gray, already named a Fellow of the Royal Society in 1852, reduced the type size of Carter's name on the title page and edited out a reference to, "...Carter's recent appointment to a prestigious professorship."

The reception from the *Medical Times and Gazette* to the initial edition, “was scathing...(however) copies of the book virtually flew off the shelves, leading to the second of many editions of what quickly became known by the shorthand, “Gray’s Anatomy.” What was revolutionary about their textbook, according to Ms. Richardson, was its presentation and, most importantly, “anatomy had never been so *legible*.”

Effusive in his praise for Ms. Richardson’s book, Professor Teaford explains that she did not have a copious amount of historical reference material available regarding their 20-month collaborative odyssey and relied more on inference than evidence.

Teaford states, that, “For my money though the author brings just enough fact to bear on her subject to make the book one of those rarities–history that reads like a novel.”

What of the subsequent life of the two Henrys? Sadly, **Henry Gray** did not live long enough to savor his success, as he died from smallpox contracted from a cousin he was treating, at age 34, in 1860, the year of publication of their book’s second edition.

Henry Vandyke Carter left England in 1857, prior to the initial release of their textbook, to join the Indian Medical Service in Bombay, India– a distance of over 4400 miles from London– beginning as Professor of Anatomy and Physiology at Grant Medical School. He spent almost all his professional life there, with the exception of a short interregnum to study leprosy in Norway and another to seek personal medical care for pulmonary tuberculosis in England. He achieved the Army Rank of Brigade Surgeon in 1872 and became a recognized authority on infectious diseases and tropical medicine. The British Medical Association conferred the Stewart Prize on him for his research and prevention of epidemic diseases. In spite of his illness, Carter

remained in service in India until 1888, when he retired to England. In 1890, his career and many accomplishments were again recognized as he was named Deputy Surgeon General and Honorary Physician to Queen Victoria. He succumbed to his tuberculosis in 1897 at age 66.

A SEVENTEEN-YEAR ANATOMIC ODYSSEY:

Slightly more than 100 years after the first publication of *Gray’s Anatomy* in the United States, another *tour de force* of anatomic studies, **Dr. David Bassett’s**, 24 volume, “**Stereoscopic Atlas of Human Anatomy**,” was completed and published, in 1962. Production involved 17 dedicated years of cadaver dissections by the author, the making of 1547 photographic images and accompanying detailed explanatory, black and white line drawings.

This effort was again a collaborative effort by **Dr. Bassett, Professor of Anatomy at Stanford, Harvard and University of Washington** and **Mr. William B. Gruber, inventor of the View-Master system** of stereoscopic imagery, and the three artists – **Ruth Ogren, Harriet O’Neill and Lorene Segal**, who produced the line drawings.

Dr. Bassett, a Stanford Medical Alumnus, undertook, a documented systematic dissection of the entire human body, and according to his family and colleagues, returned to his lab virtually every evening after dinner, for years in order to produce his opus magnum. Dr. Bassett apparently developed a proprietary embalming fluid to enhance the life-like appearance of his cadaver specimens, while veins were injected with blue latex and arteries with red latex, to appear blood-filled.

Both Dr. Bassett and Mr. Gruber were apparently perfectionists and spent many hours at the creation of this work. Dr. Bassett dissected while Mr. Gruber, returned at intervals to photograph the specimens with special dual cameras for production of images for use in the Stereo Master system.

Of interest to us as dentists, is the fact that Dr. Bassett, commenced his work, with the Head and Neck region, and the 463 dissections and illustrations of this complex area, far outnumber those of other body areas or sites.

Dr. Bassett, like Henry Gray, did not live enough to garner the full accolades of his accomplishment, as he died of amyloid disease, in 1966, at age 54.

Max Gruber also died apparently before all of the objectives of their project were met. The printed volumes and accompanying View-Master slides were very well received, however, the sheer volume of the material and its viewing technology may have limited its usefulness for its intended audience, as time went by.

Upon the death of her husband, **Mrs. Lucile Bassett** donated the original Slides and slide sets to the **Lane Medical Library and Knowledge Management Center of Stanford University School of Medicine**. The collection then came under the curatorship of **Dr. Robert A. Chase MD, Emile Holman Professor of Surgery and Anatomy, Emeritus, at Stanford** who reproduced portions of the work in a shortened text accompanied by a smaller number of View-Master slides and also permitted production of Videodisks containing the bulk of the collection.

The story does not end there, however, as **Dr. Paul Brown, a California endodontist, and consulting associate professor at Stanford University School of Medicine** discovered the Bassett Collection and desired to make it available to a wider audience using the latest interactive technologies. Accordingly, he and his partner, **Dr. Eric Herbranson** (a 2003 AIOB Faculty member), co-founders of an imaging software company, applied for an NIH grant and in 2000 initiated a seven year effort utilizing, five technicians, to digitize the images, adding labeling and voiceover capabilities. These images are available at e-human, for a monthly or yearly

subscription rate, and there are apparently plans to incorporate them into Body Explorer, for a comprehensive interactive study reference. Additionally, the entire original collection is available online without charge, from the Lane library.

Relevant Websites:

Gray's Anatomy (1918 edition):

<http://bartleby.com/107/>

Gray's Anatomy (1918 edition– Larger illustrations):

<http://www.theodora.com/anatomy>

Bassett Collection of Stereoscopic Images of Human Anatomy:

<http://lane.stanford.edu/bassett/index.html/>

Dr. David Bassett–A Slide Show–The New York Times [See, especially, images # 4, #5 of the 17 provided.]:

http://www.nytimes.com/slideshow/2008/04/21/science/Bassett_index.html?scp=6&s+RSS

Anatomy Atlases (Cross-sectional anatomy of the head):

<http://www.anatomyatlases.org/HumanAnatomy/CrossSectionAtlas.shtml>

The Visible Human Project:

http://www.nlm.nih.gov/research/visible/visible_human.html

"It's elementary, my dear Watson." A Tale of Two Trace Metals

The History and Physical Evaluation are key to arriving at a diagnosis of a patient's illness. Selective imaging studies and laboratory investigations are often critical contributors to this process of discovery.

A most fascinating bit of medical detective work was reported by **Sharon P. Nations, MD, Department of Neurology, University of Texas Southwestern Medical Center, Dallas, Texas** and eight other

collaborators in *Neurology* 2008; 71; 639–643; originally published online June 4, 2008, entitled, **“Denture cream: An unusual source of excess zinc, leading to hypocupremia and neurologic disease.”**

Dr. Nations' co-authors are affiliated with the **Departments of Neurology and Clinical Sciences at her institution, the Department of Pathology, University of Colorado Health Sciences Center and Department of Laboratory Medicine and Pathology, the Mayo Clinic, Minnesota.**

The levels of both copper and zinc, both essential trace metals in the body, are regulated in such a manner that ingestion of excess zinc, results in a net reduction of copper uptake and increased fecal loss, according to the authors. Other common reasons for copper deficiency are noted to be malabsorption-associated diseases, gastrointestinal surgery, dietary deficiencies and use of copper chelating agents. Documented causes of excess zinc ingestion are listed by the authors as zinc supplements, denture cream, and coins, which have all been responsible for documented copper deficiency. They further note that deficiency of copper is noted to be etiologic of both Neurologic and Hematologic disease. Myelopathy, with or without peripheral neuropathy are noted to be the most common neurologic effects of hypocupremia. To quote the authors, “Less frequently reported, and less clearly causally related with hypocupremia, are motor neuron disease, ⁴ peripheral neuropathy in the absence of myelopathy ^{5,6} and optic neuritis.⁵

How common a problem is neurologic disease associated with hypocupremia? It is worth quoting the investigators at length. “The literature currently documents at least 43 patients with Myelopathy, peripheral neuropathy, or myeloneuropathy in whom laboratory evaluation identified hypocupremia. The exact number of cases is difficult to determine, as some patients have been included in two or more reports. Of the 32 patients for whom serum or zinc

levels were reported, 25 patients (78%) had elevated levels. ^{1,2,3,7,11,12,24,31} Notable with respect to accurate laboratory screening for excess zinc intake and excretion, four patients with normal serum levels had elevated 24-hour urine levels.² However, the source of the hyperzincemia was identified in only 4 patients, with a presumed denture cream source noted in one patient (our patient 4)⁷ and zinc supplement source noted in three others ^{2,4,6,11} “

Four patients are reported on in this paper– one having been the subject of a previously published paper, as stated, on, “Hematologic disease in zinc-induced copper deficiency.”⁷ All four had varying Neurologic symptoms, however, laboratory investigation revealed that their commonality was, “hypocupremia, hypoceruloplasminemia, and hyperzincemia.” All four patients were noted to be edentulous and the working hypothesis was that their denture cream, which all used to excess, was the source of their hyperzincemia.

A very careful and exacting analysis of multiple tubes of three formulations of denture cream, from different manufacturing lots, and purchased in different cities, including those used by the patients in this report was done utilizing, “... dynamic reaction cell-inductively coupled plasma mass spectrometry.” The denture creams examined were Fixodent, Original, Poli-Grip, Original and Poli-Grip, Polyseal. Consistently, each tube of the denture creams studied did contain at least 17 mg of zinc per gram of cream. The authors calculated that, “Application of two standard 68 g tubes or more per week would lead to exposure of at least 330 mg of zinc per day. It is reasonable to assume that the patients' ingestion of zinc exceeded the NIH's recommended daily allowance for adult women (8 mg) and men (11 mg) and may also have exceeded the daily tolerable upper level intake of 40 mg established in 2001 by the National Academy of Sciences.²⁷ “

varying time periods. There were two patients of each sex, and three of the four were in their forties, –age 41, 42 and 44– while the oldest person in this cohort was 61 years of age. Neurologic symptoms developed two years after the initiation of denture use and utilization of 2 tubes of denture cream/week in Case 1. It is reported that Case 2, had, “a 7 month history of hand weakness, most prominent in finger extensors. She also had hand numbness and poor balance. ...(and) had worn dentures for many years and used about three tubes of denture cream per week.” Cases 3 and 4 were reported to have Neurologic symptoms, “in the setting of denture cream use,” which was reported to be at least 2 or more tubes per week for years.

In terms of treatment, Case 1 was given both IV and subsequent oral copper supplementation and discontinued her use of denture cream, with reported improvement in, “sensation, strength sphincter control and cognition.”

Case 2 was administered a similar copper regimen and also ceased use of denture cream, with reported improvement in distal hand strength and normalized sensation at six months.

Case 3, the oldest subject in this series, a 61–year–old male, refused to cease use of denture cream. He had a one–year history of ascending paresthesia, ataxia and vibratory and proprioceptive loss and subsequently had no change in his neurologic condition following a therapeutic copper regimen. The authors report that his zinc level remained elevated, however, his copper level did return to average value on copper supplementation.

After treatment, Case 4, had improved Hematologic parameters, however, there was no improvement neurologically.

In support of the primacy of the denture cream as the exogenous source of these patients’ initial

elevated zinc levels, their zinc levels decrease with discontinuation of the denture cream, with the exception of Case 3, who continued its use. The therapeutic copper regimen succeeded in normalizing the copper levels of all four patients.

In their DISCUSSION, the authors state that they believe that the patients ingested indeterminate quantities of denture cream, which they all used to excess, far exceeding package usage directions, while Case 4 admitted to ingesting “pellets” of the substance. Furthermore, they write, “We speculate that the copper deficiency in these four patients was secondary to ingestion of denture cream.” Interestingly, they further state that, “While the Neurologic disease in our patients is most likely the result of acquired copper deficiency, a direct neurotoxic effect of elevated zinc cannot be ruled out.” (Emphasis, my own, T.E.S.)

The authors conclude their article by stating that although their findings do not prove a causal relationship between, “excessive denture cream usage and hyperzincemia, secondary hypocupremia and subsequent Neurologic symptoms” they believe they have proven the case for inquiring about its use, along with zinc supplementation, “during the clinical evaluation of patients with myeloneuropathy and hematologic dysfunction.”

The reader is referred to the publication in its entirety in order to appreciate the depth and breadth of the authors’ clinical investigations, as they attempted to rule out other possible sources of excess zinc and etiologies for copper loss.

“Not to engage in the pursuit of ideas is to live like ants instead of like men.”

Mortimer Adler
Saturday Review, 22 Nov 1958