HAWAII MEDICAL JOURNAL

September 1997 Volume 56, No. 9 ISSN: 0017-8594

Special Issue on Ophthalmology Part I

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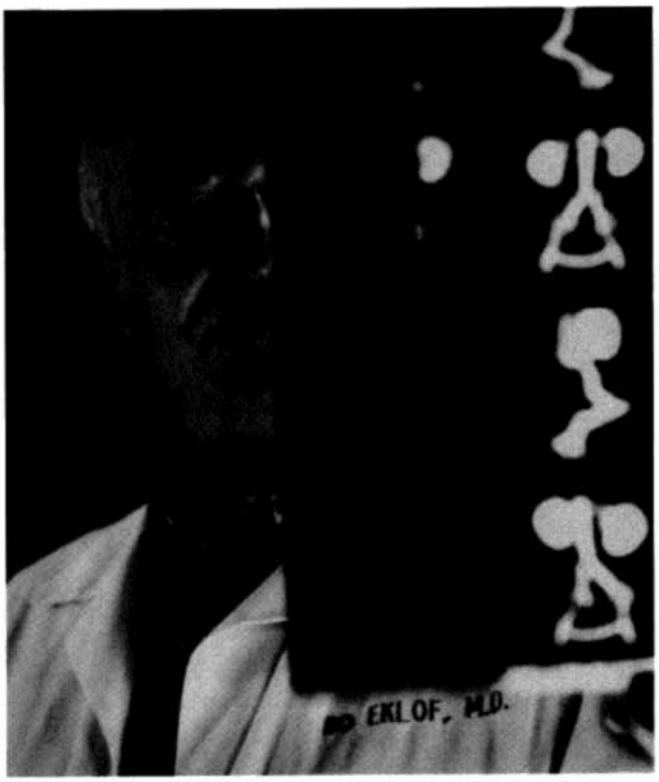

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You are invited to attend...

– Friday Noon Conference –
Environment of Care Trends for the 90's: An Abbreviated Study of Issues Which Impact the Environment of Care for Patients and Employees
Ray Trombly, Rose Arpon, Michelle Fisher and Clayton Takara
September 12, 1997, 12:30 - 1:30 p.m.
Doctors Dining Room

Learning Objectives – At the conclusion, participants will be able to:
- update Straub physicians on specific environment of care issues that may impact their daily practice,
- understand the issues that impact environment awareness (Infection Control, Radiation Safety, Hazard Communications, Fire Safety, Chemical Spills, Body Mechanics and General Safety.

– Ophthalmology Conference –
Diagnostic and Therapeutic Challenges in Ophthalmology
J. Scott Kortvelesy, MD
September 18, 1997, 4:40 - 5:30 p.m.
Doctors Dining Room

Learning Objectives – At the conclusion, participants will be able to:
- recognize cystic tumors of the pancreas,
- differentiate cystic tumors from pancreatic pseudocysts.

– Friday Noon Conference –
Luncheon
Anti-Leukotriene Therapy for Asthma
Ronald A. Simon, MD
September 19, 1997, 12:30 - 1:30 p.m.
Doctors Dining Room

Learning Objectives – At the conclusion, participants will be able to:
- understand the role of leukotrienes in asthma,
- compare and contrast the FDA approval of anti-leukotriene drugs,
- determine where to place anti-leukotrienes in the management of asthmatic patients.

We would like to acknowledge the Educational Grant from Abbott Laboratories.

– Friday Noon Conference –
Ke Ola Ka Hana A Ke Aloha (Health is Aloha in Action) 25 Years of Providing Health Care to the Waianae Community
Richard P. Bettini, MPH, MA; Richard Friedman, MD; Kauila Clark, Merrie Aipoalani
October 10, 1997, 12:30 - 1:30 p.m.
Doctors Dining Room

Learning Objectives – At the conclusion, participants will be able to:
- understand the concept of community health centers,
- describe the financial impact of Quest managed care,
- list the range of services that are available for a community based primary care.

Please call Fran Smith at 522-4471 for more information.

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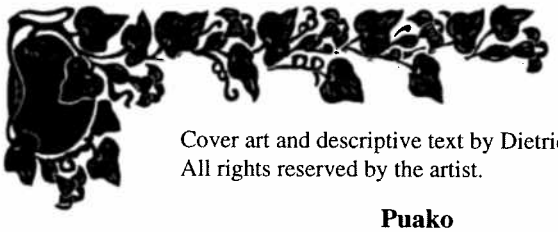

Cover art and descriptive text by Dietrich Varez, Volcano, Hawaii.

Puako

This print depicts a place on the island of Hawaii famous for its many unique rock carvings.

Editorial

Norman Goldstein MD
Editor

Ophthalmology Special Issue

This Ophthalmology Special Issue and the following issue in October are other results of the enthusiasm of one very special Ophthalmologist, Robert Tuck Wong, MD.

Several years ago, Dr Wong suggested to our late editor, J.I. Frederick Reppun that an issue be dedicated to Ophthalmology. Once I gave the "go for it" to Dr Wong, he really did!—As he does with all of his activities. He enlisted the medical, surgical and writing talents of some of the very best Ophthalmologists in Hawaii.

There were so many excellent manuscripts collected by Dr Wong, that we have to publish them in two issues.

As a tribute to this very special man, we are reproducing the editorial, "the catalyst model" written by Fred Reppun in the July 1987 issue of the Journal.*See page 226 on this issue of the Journal.

Bob, Thank you for your efforts to establish our medical school and to keep it afloat via your lectureships and endowments.

Because of the efforts of Bob Wong, the University of Hawaii Foundations Robert T. Wong Lectureship now has a total market value of nearly $400,000.

Many thanks Bob, for serving as Guest Editor for these Special Issues.

*Reppun, J.I. F. editorial: the catalyst model, HMJ Vol. 46, No. 7, 260 & 267 July 1987.

University of Hawaii Foundation
Robert T. Wong, MD Lectureship

Lecturers

- **1985 - Dr Robert C. Gallo**, Laboratory of Tumor Cell Biology, National Cancer Institute; "Basic Aspects of HTLV-1 and HTLV-3 and Their Link to Alterations of T-Cell Growth."
- **1986 - Dr Allan M. Lansing**, Humana Heart Institute International; "The Mechanical Heart: Progress and Problems."
- **1987 - Dr Steven A. Rosenberg**, Chief of Surgery, National Cancer Institute; "Cancer Treatment with Activated Lymphocytes and Interleukin-2"
- **1989 - Dr Samuel Broder**, Director, National Cancer Institute, Bethesda, Maryland; "AIDS: Clinical Perspective."
- **1991 - Dr Hilary Koprowski**, Director, Wistar Institute, Philadelphia, Pennsylvania; "Clone to Clinic: Conceptual Approaches to Immunotherapy."
- **1992 - Dr Robert Peter Gale**, Associate Professor of Medicine, University of California, Los Angeles; "Medical Care in the Soviet Union."
- **1993 - Dr Donald I. Abrams**, Professor of Clinical Medicine, University of California, San Francisco; "AIDS: A View from the Frontline."

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Presidents Message

John S. Spangler MD

Please read your newsletter plus please register early for the annual meeting!

The annual American Medical Association meeting in Chicago was well attended and exciting. The results were well reported in the AMA news. I wish all could attend this meeting.

A major revision of our bylaws is now being discussed and will be finalized at our annual meeting. This is a time for all members to carefully consider the changes which will be outlined for you. Please read carefully all changes before the meeting so rapid resolution of the bylaws will be accomplished.

Remember that all our committee meetings except a few are open to all members. Please feel free to attend the Council meetings.

Medical School Hotline

Student Profile — Class of 2001 at the John A. Burns School of Medicine

Satoru Izutsu PhD
Associate Dean and
Chair, Admissions Committee

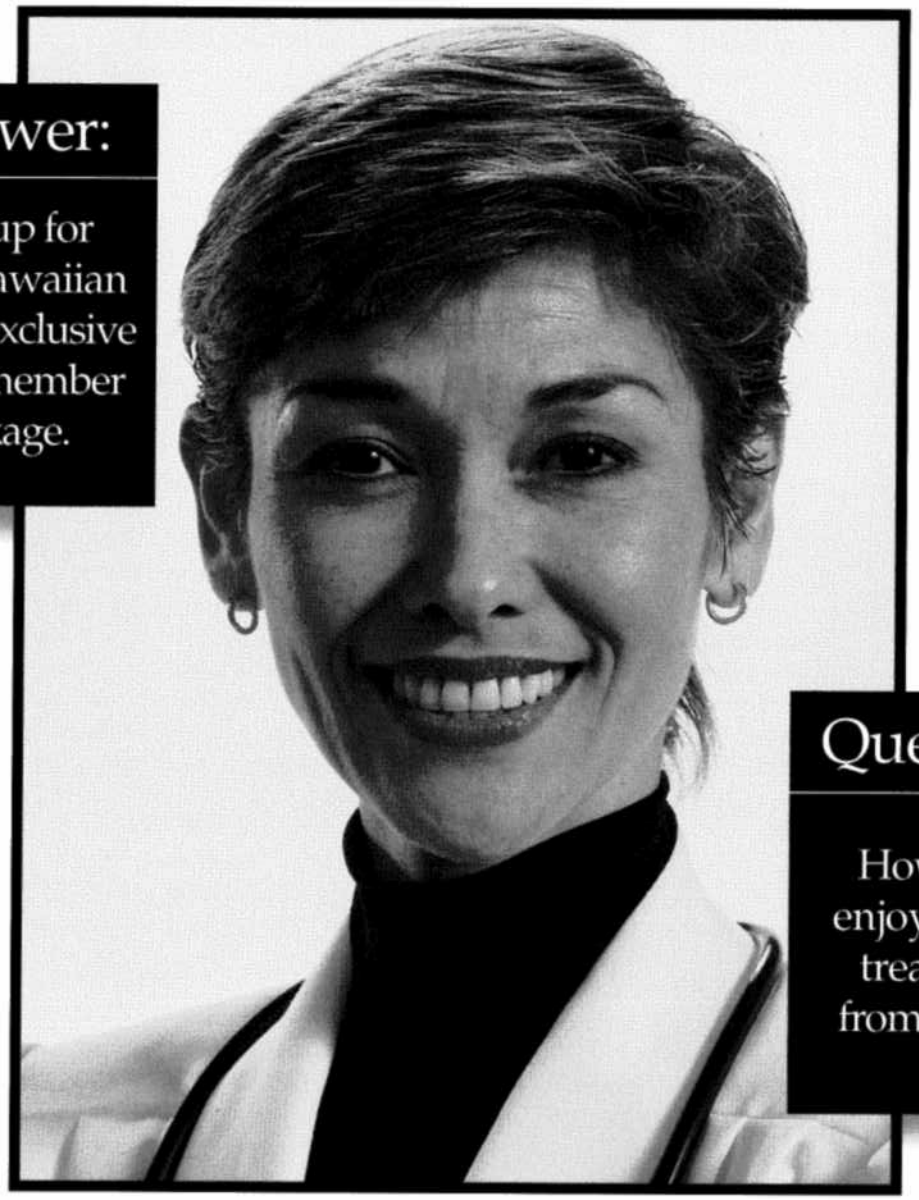
In August 1997, 27 women and 29 men began their four-year journey toward the MD degree. They are members of the 26th class to graduate from the John A. Burn School of Medicine and the 9th class to undertake their medical education in the "Problem Based-Learning (PBL)" format.

The Class of 2001 was selected from a total of 1228 applicants. Two hundred thirty-two, 189 in-state and 43 out-of-state, qualified to be interviewed. Forty-nine of the fifty-six medical students (MS1), whose average age is 23, come from Hawaii and 7 are non-residents (2 mainland states, 4 Guam and 1 from the Commonwealth of the Northern Marianas). Eight students are from the Imi Ho'ola Post-Baccalaureate Program which addresses diversity and those who are educationally, socially and economically disadvantaged.

The John A. Burns School of Medicine is the most ethnically diverse school in the nation. In this class, the following ancestries are represented: 15 Japanese, 9 Chinese, 7 Hawaiians, 6 Caucasians, 5 Filipino, 5 Koreans, 2 East Indian/Pakistani, 1 Chamorro, 1 Laotian, 1 other Asian, 1 Other Pacific Islander, 1 SE Asian/Non Vietnamese, 1 Thai and 1 Vietnamese.

Fourteen are graduates of Hawaii colleges (12-University of Hawaii and 1 each from Chaminade University and University of Hawaii, Hilo) and 42 are from mainland colleges which include

Continued on Page 261



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The Catalyst Model

J.I.F. Reppun MD

Reprinted from an Editorial by our Late Editor, Fred Reppun - Hawaii Medical Journal July 1987

Robert T. Wong MD

We have in our medical midst a catalyzer, one who makes things happen.

What has happened is an annual lectureship at our university's School of Medicine that has brought to Hawaii prestigious medical scientists, leaders in the forefront of innovative approaches to the resolving of tough medical problems that affect the health of all people. This very special event bears the name of The Robert T. Wong, MD, Lectureship.

In 1985, it was Gallo, the co-discoverer of the HIV as the cause of AIDS. In 1986, Lansing of Humana described his work with the Jarvik-7 artificial heart, and in April this year it was Steven Rosenberg MD, PhD, from the NCI in Bethesda who described his innovative approach to cancer treatment with his "Adoptive Immunotherapy" using lymphokine-activated killer lymphocytes mixed in with Interleukin-2.

Who has made this happen? Our own senior ophthalmologist Robert T. "Bob" Wong, MD, of course.

Before we delve into how Bob Wong became "the catalyzer" let's examine the man: Where did he come from, who is he and how did he happen to fill this role?

Bob has been practicing medicine for 46 years—he still is—still in the same location in downtown Honolulu where Union Mall now joins Bishop Street. He is 76 years old.

His father, Wong Hing came from China as a young man to work on the sugar plantations of the Big Island, but only for a short while. He became the cook for the Lyman family in Hilo and then went out on his own as the proprietor of Planters Market and of a small leasehold ranch in Olaa. He married a girl from Waianae on Oahu and they raised 15 children, of whom 12 are surviving. Bob was number three and Jimmy Wong, Ob/Gyn in Honolulu was number five, the only two who became doctors, although all were well-educated.

Bob was born in Hilo, went to Hilo High School and then the University of Hawaii from which he graduated in 1932. He went on to Jefferson Medical College in Philadelphia, graduating in 1936 after winning the gold medal in physiology and becoming a reserve officer in the U.S. Army. After 27 months of a rotating internship at Jefferson Medical College Hospital, he put in a year of active duty with the military and then went back to academia, and then to a residency in ophthalmology at Cleveland City Hospital. He was granted a master of medical science degree by the University of Pennsylvania in 1946.

On December 10, 1940 Robert was appointed ophthalmologist to the Western Reserve University 4th General Hospital with the rank of Captain. He was the only non-faculty member and moreover, a mere resident. This was a truly remakable event. He missed going overseas to Brisbane, Australia, with the unit early in 1942, when it was activated, because he came back to Hawaii in July 1941 at the end of his residency training. He was in Mabel Smyth together with others of the HCMS on Sunday morning, December 7, 1941, when the Japanese fleet attacked Pearl Harbor. The doctors were immediately given assignments to duty by the head of the Civil Defense, Bob Faus, MD, who was conducting the meeting at the time, and Wong found himself at Queen's drawing blood for the blood bank for the next several days. Henry Dixon, Faus' deputy, later assigned Bob to a small, makeshift army hospital in a school at the corner of 19th and Waialae in Kaimuki, to prepare for casualties in case of a Japanese invasion that never materialized.

Bob had opened an office for the private practice of ophthalmology on Union Street in September 1941. So, for a year, he divided his time between his own practice and the military. He served as ophthalmologist to both the Alsup and the Fronk Clinics next door. He served as sugical assistant to Dr. F.J. Pinkerton from 1941-1948. In those days, the only other ophthalmologists in Hawaii were F.J. Pinkerton, Cowan, Holmes, Robert Lee Sr., Moffat, Trexler, and Minatoya.

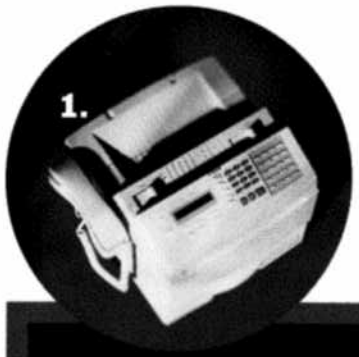
One of Robert's most satisfactory lifetime achievements was serving as ophthalmology consultant to the Hawaii Hansen's Disease program from 1946 to 1992.

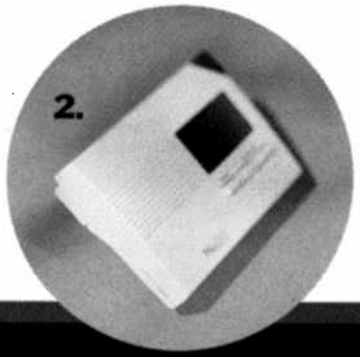
Wong was appointed a consultant to the leprosarium at Kalaupapa, Molokai, in 1946 and he used to fly over frequently until 1950, after which he served the lepers at Hale Mohalu in Honolulu until its demise a few years ago.

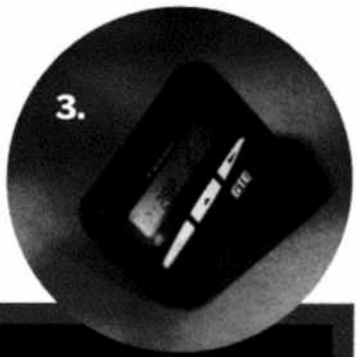
Bob had met Harriet Leong, the sister of his college classmate, and they were married in 1934. Bob's satisfaction in having their two sons follow in their father's footsteps is patently manifest. Stephen, born in 1946, is professor of ophthalmology at Temple; Bradley, born in 1950, is a general surgeon in Honolulu. The father and two sons make an impossible picture in their American College of Surgeons formal trappings, as a threesome.

Robert Wong was president of the Hawaii Chapter of the ACS in 1961 and of the Honolulu County Medical Society in 1965. He became intensely interested in the idea of a medical school at the University of Hawaii, but let us tell the story in his own words:

> "At the height of his regime, Governor Burns decided to expand the University. He was informed that the only recourse lay in the expansion in the field of biological sciences. In 1964, Dr Allen B. Richardson (senior) and I were invited to lunch at Ciro's with the then UH president Hamilton and his legal

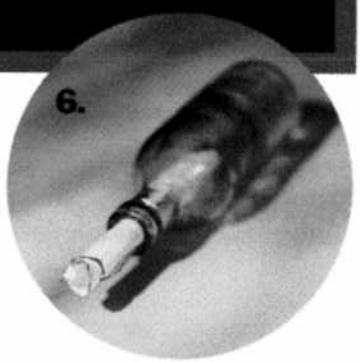






There are all kinds of ways to send a message in Hawaii.

We'll take credit for numbers one through five.



We regret to say we don't offer message in a bottle. But we do offer plenty of other ways to communicate, like faxing, caller I.D., paging, voice messaging, Internet service, the list goes on and on. And they're all from one company. GTE Hawaiian Tel. We've been helping businesses communicate for over a century. To improve your own communication skills, stop by any GTE Phone Mart, visit our web site at www.gte.com, or call 643-4411.

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counsel Kenneth Lau. When we were overcome with too much wine and delicious servings of shrimp scampi and pasta, my longtime friend Kenneth Lau asked what we thought of a 2-year medical school at UH. Without hesitation and with no thought to protocol, Richardson and I gave the two of them our personal approval. At the time, Richardson was president-elect of the HMA and I was president-elect of the county medical society. Within a week, we received letters thanking us for 'pledging the support of the medical community'! A short time later, the remarkable Terence Roger, PhD, chairman of the University's Department of Physiology, was appointed as a task force of one and ordered to proceed with the creation of the school of medicine.

"Dr Windsor Cutting, former Dean of Stanford Medical School, was selected as the Dean of the new school. A feasibility study was processed and within a short two or three months a quonset hut was moved to the northeast corner of the university campus. A professor of anatomy and a professor of pharmacology were appointed; the quonset hut was listed as the Department of Anatomy and Biological Research Building, and the medical school was formally dedicated. The first Professor of Medicine was Richard Blaisdell, MD.

Documentation of Robert Wong's participation in the establishment of the UH School of Medicine contained in a Hawaii Medical Journal report of Dean Terence Rogers' Retirement Dinner Speech. "It was your support which made it all possible. I met with Robert Wong, HMA president, at Leahi. He stood up and said, 'Let's cut out the BS and start the medical school.' Very crude language!!! but very effective!"

"By contrast, the Hershey School of Medicine of the Pennsylvania State University had taken nearly ten years to plan, and had required almost a hundred million dollars to construct. Even so, it nearly failed of fruition, had it not been taken over by the State University.

"Without any funding from the State of Hawaii, Task Force Rogers almost singlehandedly, with a little help from the NIH, brought into being the UHSM. The final miracle performed by Dr Rogers was to obtain the necessary certificate of accreditation, which was granted with almost no reservations.

"The primary reason for the existence of this medical school is to raise and maintain a high standard and quality of medical care in the State of Hawaii."

From a deep sense of obligation to his parents and to his brothers and sisters who had made sacrifices on his behalf, and to his own good fortune in having become a physician at the feet of Aesculapius in Philadelphia, Bob Wong had devoted himself to supporting the John A. Burns School of Medicine these past 20 years. However, he has jumped ahead and he is now quite enthused over the success of the current annual lectureship program which has furthered the original purpose of the establishment of the medical school, i.e. to elevate the standard of medical care in the community. We quote from Bob once more:

"I have supported the medical school since its inception. My lectureship, however, was established as a result of an unusual chain of circumstances. Several years ago I helped a young man gain admission to Jefferson Medical College. Subsequently, his grateful mother Jean Wong, a dedicated academician, died and in her legacy left $15,000 at the UH School of Medicine in my name. In 1984 I matched that initial contribution in order to start the Fund. Since then, it has grown to over $300,000, thanks to gifts from other friends and colleagues, and in particular a major contribution from the estate of Beatrice Watson Parrent. The lectureship has created an important annual scientific contribution to medicine in Hawaii."

Robert Wong, the catalyzer, is particularly pleased that as a result of Dr Gallo's visit to Hawaii in 1985, the Blood Bank of Hawaii began to test every donor for HIV, thus assuring its non-transmissibility via blood transfusions (which very likely may have happened before then). He is pleased that Dr Lansing's visit may have helped inspire Livingston Wong and Ricardo Moreno to proceed with the first heart transplant in Hawaii recently, and Bob is hoping that Rosenberg's lecture may stimulate cancer research in Hawaii to greater heights.

With Bob as a model, perhaps others in the profession will become similarly imbued with an urge to establish forever living memorials.

Editor's Note:

Bob Wong is a true catalyst, as the you will see in this issue and part II of the Special Issues on Ophthalmology.

Beginning with Bob's History of Ophthalmology in Hawaii, we have excellent manuscripts by, Doctors Sugiki, Drouilhet, Kokame, Camara, Yamamoto and our contributing editor Russell Stodd. Russ has excellent vision—he sees "Ophthalmology in Hawaii in 1997 and Beyond." Look for part II next month.

History of Ophthalmology in Hawaii

Robert T. Wong MD, MMS, FACS*

After Captain James Cook's discovery of the Sandwich Islands in 1778 and Captain George Vancouver's visit in 1793, the Hawaiian nation was devastated by foreign diseases to which it had no immunity. During the time of the Discovery Era of the 1770's, scholars estimated the Hawaiian population to have been between 250,000 and 300,000. That number fell to 108,579 according to an 1835-1836 American missionary census. The population dropped even further to 84,165 in a 1850 government census. In 1887 King Kalakaua reported that the Hawaiian population of 400,000 had been reduced to one-tenth its size.[1] Gonorrhea and syphilis in their most virulent forms were first introduced, resulting in severe disabilities, infant deaths, infertility, and *ocular complications*. Then measles, whooping cough, influenza, smallpox, cholera and tuberculosis took their toll.

The earliest report of ophthalmological problems in Hawaii was by a missionary physician Alonzo Chapin. He wrote in the 1830s, "Ophthalmia of the purulent form, abounds in every portion of the group [i.e., population], and opaque corneas and thickened coats of the eyes, are very numerous."[2] Missionary Mercy Whitney filled her journal with references to "the ophthalmia." On February 7, 1830, she wrote "I have an attack of it almost every year of our residence here."[3]

In his 1954 work, *Nine Doctors and God*, Francis John Halford describes how even physicians were not immune to ophthalmological problems. "In 1844 missionary physician James Smith of Koloa, Kauai, complained of sore eyes, probably conjunctivitis, which so many of the missionaries seemed to pick up within a short period of time after landing, obviously a contagion from the Orient, where ophthalmia is common and chronic.[4] This affliction is usually accompanied by a catarrhal condition of the nasal and bronchial passages. It has been suggested that these symptoms are allergic responses to the molds and pollens prevalent in the moist and humid tropical atmosphere of the islands. Another possibility is trachoma, a disease endemic in the Orient."

Robert C. Schmitt's thesis entitled "Two Centuries of Eye Care in Hawaii," was written with the collaboration of Ogden D. Pinkerton MD, and published in the *Hawaiian Journal of History* in 1985. Schmitt and Halford left the only substantial references to the history of ophthalmology. Schmitt notes that the first person to sell eyeglasses was E. H. Boardman, a maker of watches and chronometers. On September 9, 1846, Boardman advertised "gold, silver and steel-framed spectacles and other goods for sale." Optometry emerged as a separate discipline when "An Act to Regulate the Practice of Optometry" was passed by the 1917 Territorial Legislature. The law required all optometrists to have at least two years of high school and either three years of experience in a registered office or a degree from a reputable school of optometry. The most famous eyeglass seller was William "Doc" Hill, who was as an optician and optometrist. He was the first licensee under the newly passed Optometric Act. He became involved with high-level financial circles and the Hawaiian Legislature.

According to Schmitt, who depended on commercial journals for reference, one of the earliest physicians specializing in eye disorders was Joseph Bechtinger, MD; a multilingual Austrian who moved from Washington, DC to Honolulu in 1866. For six months, beginning March 24, Bechtinger advertised his services, with "particular attention paid to the Diseases of the eyes." He sailed for Hong King on March 2, 1867 and eight years later he advertised his Eye, Ear, Nose and Throat Institute in San Francisco.

In 1872 a Hugo Stangenwald, MD offered to treat "patients suffering from Chronic Diseases including the diseases of the Eye and Ear, Throat and Lungs." In 1880 Charles Neilson, MD advertised "Eye and Ear Cases successfully treated." E. Pontoppidian, MD, a 38-year-old German arrived in Honolulu on October 2, 1881 and described himself as an "Oculist, Physician, and Surgeon, Eye Diseases a Specialty." Three months later he discontinued his newspaper notices and left the islands. In 1896 Dr H.C. Sloggett was listed in the directory as a Honolulu "Eye and ear specialist," and Dr William L. Moore of Hilo as, "Makes a Specialty of Eye and Ear." From 1899 to 1905, the Honolulu Eye and Ear Infirmary was operated first by Dr Sloggett and later by Dr Moore.

Dr William Gibson Rogers was the first Hawaii ophthalmologist with authenticated credentials. He was born in Greenfield, Ohio, on February 14, 1864, and received his medical degree from Pulte Medical College in Cincinnati, Ohio, in 1891. From 1899 to 1900, Dr Rogers took a special course at the Royal Ophthalmic and Central London. He came to Honolulu in November, 1900 and opened an office specializing in diseases of the eye, ear, nose and throat. In 1904, Dr Rogers took a postgraduate course at the Manhattan Eye, Ear, Nose and Throat Hospital in New York, followed by additional specialty training at the Postgraduate Hospital, New York, in Vienna in 1909 to 1910, and the Chicago Polyclinic Hospital in 1916. From 1917 to 1918, Dr Rogers served as eye, ear, nose and throat consultant for the Selective Service medical advisory board. He retired in 1920 and died in Honolulu on

*Clinical Professor of Surgery
Division of Ophthalmology
Department of Surgery
University of Hawaii
John A. Burns School of Medicine

September 29, 1936.[5]

About the time that Dr Rogers retired, Dr. James A Morgan arrived in Honolulu and opened his office at the Young Hotel Building to practice eye, ear, nose and throat medicine (EENT). He had trained at the renowned Philadelphia General Hospital.

Leprosy

Any history of ophthalmology in Hawaii must mention a disease endemic in Hawaii—leprosy or Hansen's disease. Leprosy, with its inevitable ocular involvement before sulfone drugs, became a major public health problem in the mid-nineteenth century. The Hawaii Board of Health, established in 1850, founded a leper settlement at Kalawao, Molokai in 1865 and moved it to Kalaupapa a few years later. King Kamehameha V by direction of the Board of Health mandated that all lepers be isolated from the general population. The "Act to Prevent the Spread of Leprosy" authorized police officers, and Board of Health agents to arrest and deliver alleged lepers for medical inspection and for removal to a place of treatment or isolation.[6] Poor nursing and medical care, lack of food, clothing, and shelter, and absence of law and order for several decades turned this banishment into the most inhumane edict in Hawaiian government history.

Before the advent of sulfone drugs, in 1946 nothing could arrest the disease. From 1920 to 1946, chaulmogra oil was injected intramuscularly frequently causing renal damage. Presently, the principal drugs for treatment of leprosy are dapsone (sulfone), rifampin, clofazimine, ethionamides, corticosteroids, and atropine for iridocyclitis. The *Mycobacterium leprate* can now be cultured in the live nine-banded armadillo, a *Dasypodidae*.

Leprosy affects the eyes in several ways;: it damages the zygomatic branch of the facial nerve, causing paralysis of the orbicularis muscle, it damages the trigeminal and nasociliary nerves causing loss of corneal sensitivity, conjunctivitis, keratitis, corneal ulceration, iridocyclitis, and secondary glaucoma; it damages the sensory nerve fibers of the cornea causing early photophobia and eventual anesthesia. Iridocyclitis and uveitis are very common complications.

From 1922 to 1948, Dr F.J. Pinkerton regularly visited Kalaupapa and provided surgical care for the ophthalmological problems.

Dr Robert T. Wong was the ophthalmological consultant from 1948 to 1992. He made monthly visits to Kalaupapa on a single-engine plane, which made many hazardous landings. One of his last patients before he retired in 1992 was from the Hansen's Disease Program.

Dr Donald Sort became the principal consultant to the program in 1972 and he served in the program until his death in 1996.

Advances in Ophthalmology

In 1941 Hawaii was just emerging from a decade of severe economic depression. The population statistics were:

	1940[7]	1990[8]
All Islands	422,770	1,108,229
Oahu	257,696	836,231
Honolulu	179,358	377,059

The gross state product was $309 million in 1940 compared to $26,945 million in 1990.[9] Medical care, particularly ophthalmology, was of comparatively high quality, considering that Hawaii was an agricultural community isolated from medical academic centers. Kuakini Hospital was a small institution; St. Francis had been founded just a decade earlier; Queen's Hospital was our only major hospital with a national reputation. There were no peer review committees, but our notable Drs Nils P. Larson, Joseph Strode, Harry Arnold, Sr, Rogers Hill, and F.J. Pinkerton were our leaders who elevated the quality of medical care.

Since 1941, ophthalmology has seen more research and instrument development than in any other era. Electron microscopy has unraveled histochemical secrets of the eye previously never imagined. Newer diagnostic tools include fluorescein angiography, ultrasonography, electroretinography, computerized axial tomography, and radioactive phosphorous (P_{32}). Therapy has been revolutionized by new antibiotics, corticosteroids, diuretics, antimetabolites, antifungal and antiviral agents, and antihypertension ocular agents.

Innovations during the past 50 years include the use of alpha-chymotrypsin in cataract extraction, cryosurgery, phacoemulsification and phacofragmentation of cataracts, implantation of intraocular lenses, refinement of suture materials and needles, refractive surgery, retinal surgery and keratoplasty, laser photocoagulation, and new techniques in tumor and vitreous surgery. In recent years, the operating microscope has enabled the ophthalmic surgeon to perform operations with incredible accuracy and precision.

Neuro-ophthalmology and neurosurgery were advanced by Ralph Cloward. The influx of specialists began to restrict the surgical privileges of general practitioners. The leaders in ophthalmology were F.J. Pinkerton, Harold Moffat, Thomas Cowan, Robert H. Lee, Sr., Wilfred Minatoya, and Robert T. Wong.

Cataract Surgery

In 1941, cataract surgery was done as follows: first a 170-degree corneoscleral incision with the von Graefe knife; then a complete or peripheral iridectomy; followed by pre-placement of corneoscleral sutures; finally removal of the lens with the Kalt or Arruga lens forceps Complications included injury to the iris with the cataract knife, rupture of the lens capsule with the forceps, vitreous loss, and wound separation. The Kalt needle with its fine point, round edge, and insufficient rigidity made closure of the corneoscleral wound difficult. Sharp, beveled, cutting-edge needles with adequate rigidity became available in 1942. Barraquer's erisophake became available in 1950, and the keratome replaced the von Graefe knife. Shigemi Sugiki procured the first electrically powered cryoprobe for lens delivery in 1965, and phacoemulsification became available in 1971. *Intraocular lens implantation, (without doubt the most significant development in ocular surgery) began in 1972.* The pioneers of this procedure in Hawaii were Drs Percival Chee, Wayne Wong, and Gerald Faulkner.

Intraocular Lens Implantation

In 1949 Ridley of London introduced a lens implant which was unsuccessful because of the weight, inadequate fixation, and endothelial and intraocular complications. In the 1950s an anterior chamber lens was devised. Even with internationally known surgeons such as Strompoli, Danneheim, Choyce, Worst, and Barraquer involved, the high incidence of post-operative complications nearly

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doomed intraocular lens implantation.

Enthusiasm for lens implantation was revived briefly when lenses that depended on iris fixation were designed. But this proved physiologically unsound and was abandoned. In December 1963 Binkhorst did an extracapsular extraction and inserted an iris-clip lens without the anterior loops. In 1968 Binkhorst and Choyce of London devised an improved lens implant of polymethylmethacrylate. Binkhorst pioneered and demonstrated the advantages of extracapsular surgery with a posterior chamber implant fixed with loops . The incidence of corneal edema, endothelial damage, and intraocular complications were reduced dramatically.

In Hawaii Gerald Faulkner MD introduced the Kelman phacoemulsification machine in 1971. Next year Drs Percival Chee and Wayne Wong successfully introduced the pupillary or iris-clip lens in a series of patients. In 1973, Faulkner combined his extracapsular extraction by phacoemulsification with the Binkhorst posterior chamber implant. The popularity and success of the posterior chamber lens has been dramatic in the last two decades. The anterior chamber lens is still used in special situations. The latest exciting development is the foldable silicone implant and sutureless cataract extraction.

Glaucoma Surgery

In 1941 considerable attention was given to acute glaucoma and the pupillary block mechanism influenced by the techniques of Otto and Hans Barkan of San Francisco. Nearly every ophthalmologist in Hawaii possessed a Koeppe or Barkan lens gonioscope and a portable Barkan binocular microscope. Curran, as early as 1920, and Otto Barkan in 1938, began to differentiate between open and closed angle glaucoma. In 1941, acute angle closure glaucoma was called acute congestive glaucoma, and the classical Graefe iridectomy was generally acknowledged as the only effective operation.

Limited access to proper medical care resulted in a high incidence of acute angle closure glaucomas progressing to chronic angle closure glaucomas or chronic congestive glaucomas. A limited number of basal iridectomies were performed for this latter condition with mostly unsatisfactory results. Iridosclerectomy of LaGrange, or an iris inclusion operation, was the best procedure.

Corneoscleral trephine was the operation of choice for medically refractory open angle glaucomas. A few preferred cyclodialysis. About 1950 Scheie's thermosclerec-tomy became the operation of choice for both refractory open angle and chronic angle closure glaucoma.

In 1968 John Cairns of England reported his results with trabe-culectomy, the first effective and safe surgical procedure for open angle glaucoma.[10] The procedure creates an opening into the anterior chamber under a scleral flap. The opening is extended from the limbus

to, the scleral spur and parts of the cornea, trabeculae, and sclera are removed. It is now the most popular surgery worldwide for glaucoma. Trabeculectomy is also the preferred procedure for uncontrolled chronic primary angle closure glaucoma and for acute angle closure glaucoma when iridectomy is considered inadequate. The procedure was established in Hawaii in 1971 by Drs Herbert Pang, Chee, Thomas Frissell, and Sugiki.

Trabeculectomy is the prime surgical procedure for medically refractory open angle glaucoma. Laser trabeculoplasty on occasion will circumvent trabeculectomy while Neo-YAG cyclophotoablation is considered a last resort.

Retinal Surgery

In 1941, retinal separation, retinal holes and tears, and retinal disinsertion were treated with the Walker diathermy and micro-pins. Lack of proficiency and inability to localize peripheral tears limited the success of this procedure before development of the indirect ophthalmoscope and the Goldmann contact lens in 1950. The scleral buckle was first used in Hawaii by Herbert Pang in 1962. Scleral buckling for repair of retinal detachment (particularly when there is subretinal fluid) and for retinal tears (when there is persistent vitreous traction), involves the creation of an indentation of the sclera toward the vitreous. This provides apposition of the sclera and the detached retinal parts allowing healing of the retinal tear without surgical entry into the globe. Absorbable materials such as facia lata, human donor sclera, and gelatin were used formerly, but now, nonabsorbable materials such as silicone rubber and silicone sponge are used more often. Cryotherapy or laser surgery is used in the treatment of retinal tears when there is no fluid accumulation. New techniques in vitreous and macular surgery offer new hope. The arrival of retinal fellowship-trained Drs Donald Sroat, Worldster Lee, John Drouilhet, Gregg Kokame, Pierre Pang, Byron Wong and Vernon Wong has elevated the status of retinal surgery in Hawaii to the level of academic centers.

Corneal and Refractive Surgery

Dr Thomas Frissell performed the first successful corneal transplant in 1956. The first-fellowship-trained cornea specialist, Dr Gilbert Yamamoto, arrived in 1979. With the help of the late Dr Kent Bennett at Straub, Yamamoto transformed the Makana Foundation tissue procurement system into today's Hawaii Lions Eyebank (which is sponsored and funded by the District 50 Hawaii Lions Club). The Eyebank can now network with mainland tissue banks and process local tissue for distribution. Approximately 120 to 140 keratoplasties are performed each year. As of 1995, 1,300 corneal transplants have been performed since the inception of the Eyebank in 1980. Now there are several more fellowship-trained cornea specialists in Hawaii, viz Lloyd Minaai, Rhodes Stevens, Steven Gee, and John Olkowsky. With the advent of high technology refractive centers, patients can seek PRK (photorefractive keratectomy), ALK (automated lamellar keratoplasty), PTK (phototherapeutic keratotomy), and soon, LASIK (laser-assisted in-situ keratomileusis) for correction of nearsightedness, astigmatism, and corneal scarring.

Oculoplastic and Reconstructive Surgery

Vernon Jim, who retired in 1992 was board-certified in both plastic surgery and ophthalmology, pioneered this field. Jorge Camara arrived in Hawaii in 1982 after a fellowship at Baylor College of Medicine in oculoplastic and reconstructive surgery.

Scott Kortvelesy trained in neuroophthalmology has made contributions in orbital surgery. Carl Minatoya and Steven Sameshima have distinguished themselves in ophthalmic plastic surgery.

Retinopathy of Prematurity

One of the first cases of retrolental fibroplasia was documented in Hawaii in late 1941. In 1942, T.L. Terry of Boston[11] reported cases of premature infants with gray-white opacities behind their lenses. The incidence of retrolental membranes increased alarmingly. In 1950, Gordon of Colorado suggested the high concentration of oxygen given the infants as the cause. In 1977, retinopathy of prematurity was reported in 50 percent of infants weighing less than 1500 grams. This incidence has been reduced dramatically by careful monitoring of oxygen concentration in infant incubators.

Xenon Arc Photo Coagulator, Cryosurgical, and Lasers

Diathermy was formerly used to produce chorioretinal adhesions around retinal breaks. In 1946 Meyer-Schwickerath began experimenting with sunlight as the energy source to produce chorioretinal burns. A commercial photocoagulator was subsequently developed which produced light radiation by passing electrical current through gas. This instrument, the Xenon Arc Photocoagulator, was the highlight of the International Congress of Ophthalmology exhibit in Brussels in 1958. In 1965 Harry Cooke donated this equipment to St. Francis Hospital where it was used extensively by Drs Herbert Pang and Frissell for retinal detachments and at least on one case of bilateral retinoblastoma with excellent results.

Cryosurgical units operate on the Joule-Thompson principle that temperature drops when pressurized gas is forced through a narrow aperture. Cryosurgery was first used for cataract extraction in 1965 by Sugiki. It is the preferred instrumentation for retinal breaks and intraocular tumors.

Light amplification by simulated emission of radiation (laser) was first described in 1960. Investigations into laser light iridectomies were begun immediately. The first laser available, the pulsed ruby, failed in iridectomies. Improvements in performance started an investigative furor in the mid-1970s. The success of these investigations has made the argon laser iridectomy the procedure of choice.

Argon laser first became available in 1980. Argon laser photocoagulation has a high degree of effectiveness and applicability. It is the current treatment for certain stages of diabetic retinopathy. It is used for laser trabeculoplasty. It is the preferred method of prophylaxis for lattice degeneration, cystic retinal tufts, degenerative retinoschisis, and retinal breaks. In many cases, of retinal breaks transconjunctival cryotherapy for retinal breaks is preferred, especially for eyes with cloudy media.

Use of the Neodymium YAG laser (neodymium yttrrium-aluminum-garnet) is classified as photodisruptive surgery. It was developed in 1984 and became available in Hawaii the same year. The most widespread application of this laser technology is in sectioning the posterior capsule of the aphakic eye.

Conclusion

Ophthalmology has been transformed into a specialty of supreme sophistication. The metamorphosis from the ancient surgical art of cataract couching to a precise and skilled discipline has been driven by the revolution in instrumentation and technology. Hawaii is fortunate to have benefited from a constant and unrelenting flow of ophthalmologists who have been trained in the most current techniques and their contributions to health care in Hawaii is simply outstanding.

Acknowledgements

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Editorial

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- **1994 - Dr Robert Michael Blaese**, Deputy Chief, Metabolism
- **1995 - Flossie Wong-Staal, PhD**, Florence Riford Chair in AIDS Research, Professor of Medicine & Biology, University of California, San Diego.

The Blue Ribbon Panel on Living and Dying with Dignity

The Governor's Blue Ribbon Panel on Living and Dying with Dignity has been meeting since January, and plans to hold public hearings around the State in October to hear from Hawaii residents. The 18-member panel has been studying more than just physician-assisted death, and has looked at issues of pain management and palliative care, financial costs of dying, hospice, legal concerns including whether advance directives are being followed, spiritual and religious aspects, cultural differences and perspectives from various special interest groups. After the public hearings, the panel will develop policy and program recommendations. Prior to presenting these recommendations to the Governor, the panel will hold additional public hearings.

The panel has just published its first newsletter, and persons wanting to be included on the mailing list for that newsletter should contact the Executive Office on Aging at 586-0100. The specific dates and times for the public hearings will be soon available.

Glaucoma

Shigemi Sugiki MD

Glaucoma is the second leading cause of blindness in the United States and the leading cause of blindness in African Americans. Early detection and treatment can prevent blindness.

Glaucoma as we understand it today represents a group of disease entities which have as a final common pathway damage to the optic nerve and as a consequence, visual field loss. These changes can result in blindness. Traditionally, the glaucomas were classified simply as primary, secondary, combined or congenital. However, it is now clear that glaucoma is a much more complicated disease.

In recent years, the study of molecular genetics have opened new areas of understanding glaucoma. Juvenile open angle glaucoma, primary infantile glaucoma and other developmental glaucomas have been determined to have a molecular basis. With increasing knowledge in these areas, the classification of the glaucomas will be partially based on the findings of the defective gene or gene products. Primary open angle glaucoma, the most common form of glaucoma, may eventually be subdivided genotypically into many different diseases.[1] In these cases, gene therapy may offer a new treatment modality.

Glaucoma is the second leading cause of blindness in the United States and the leading cause of blindness in African Americans. The most common form of glaucoma, primary open angle glaucoma, is a major health problem with 2 million Americans having this disease. Half of these Americans may not be aware that they have this disease.[2] More than 7 million office visits occur per year with the primary diagnosis to monitor patients with glaucoma and patients at risk for developing glaucoma.[3] About 80,000 Americans are legally blind from glaucoma and many more have severe visual impairment.

Primary open angle glaucoma accounts for 70% of the glaucoma cases in the United States.[4] Important risk factors include the level of intraocular pressure, race and age. The prevalence of primary open angle glaucoma increases with increasing intraocular pressure. Primate studies and observations in angle closure and secondary glaucomas provide good evidence that elevated intraocular pressure can lead to optic nerve damage. However, significant individual variation exists in correlating the optic neuropathy and intraocular pressure. Studies show only one-tenth or less of those with elevated intraocular pressure have glaucomatous field loss.[5] About one-sixth of patients with glaucomatous optic nerve damage with field loss have less than 21 mmHg intraocular pressure even after repeated measurements.

Several factors may cause the progressive optic neuropathy of primary open angle glaucoma besides the intraocular pressure but the intraocular pressure is treatable and therefore treatments have included medications, laser surgery or other surgical treatments. This is a reasonable approach to therapy for this condition because progressive field defects occur in patients with higher intraocular pressures.[6]

African Americans have a prevalence of 4 to 5 times greater than other races, making race an important risk factor in primary open angle glaucoma. Compared to Caucasian Americans, blindness due to glaucoma is 4 to 8 times greater in African Americans.[2] Japanese appear to have a higher prevalence of low tension glaucoma.

Age is another important risk factor for primary open angle glaucoma. The Baltimore Eye Survey demonstrated this. African Americans 80 years or older have a prevalence exceeding 11%.

Family history of glaucoma is a risk factor. The risk of developing glaucoma is at least 3 times greater in patients who have a sibling with primary open angle glaucoma.

Other risk factors which have not shown consistency include cardiovascular disease, hypertension, diabetes and myopia.[7]

Besides measuring intraocular pressures, screening of patients for primary open angle glaucoma must include an assessment of the optic nerve status. This can be done by direct observation of the optic nerve or nerve fiber layer or by an analysis of the visual fields. Visual field defects may not be noted until one-third or more of the optic nerve fibers have been destroyed. Glaucoma can be suspected if the intraocular pressure exceeds 21 mmHg or the vertical cup/disc ratio of the optic nerve head is greater than 0.5. Intraocular pressure measurement alone cannot be relied on to make the diagnosis of primary open angle glaucoma. Therefore, probably the more efficient way to detect and diagnose primary open angle glaucoma is a routine periodic comprehensive eye examination.[3]

The examination for glaucoma must include the family history, ocular history and systemic disease history. A history of prior eye injury or diseases may give clues to the etiology of the glaucoma. A strong family history might suggest a genetic link while the presence of some systemic diseases like pseudoexfoliation syndrome might correlate with the presence of glaucoma.

The ocular examination must include the recording of visual acuity. The pupillary responses must be checked for any afferent pupillary defect. A Goldmann type applanation tonometer is preferable to measure the intraocular pressure. The time of the pressure measurement should be recorded as diurnal variations may influence the pressure measurements. Sometimes diurnal measurements may be necessary in those cases where the severity of the optic nerve damage does not correlate with the normal or less than normal intraocular pressure.

The slit lamp examination of the anterior ocular segments, gonioscopy to determine open or narrow angle, optic disc and nerve fiber layer evaluation and fundus examination are part of the glaucoma evaluation. (Fig. 1) The optic nerve appearance can be described but photographs of the optic nerve head and if available, stereophotography, are preferred methods of documenting the optic nerve head.

Fig 1.—Aqueous Flow

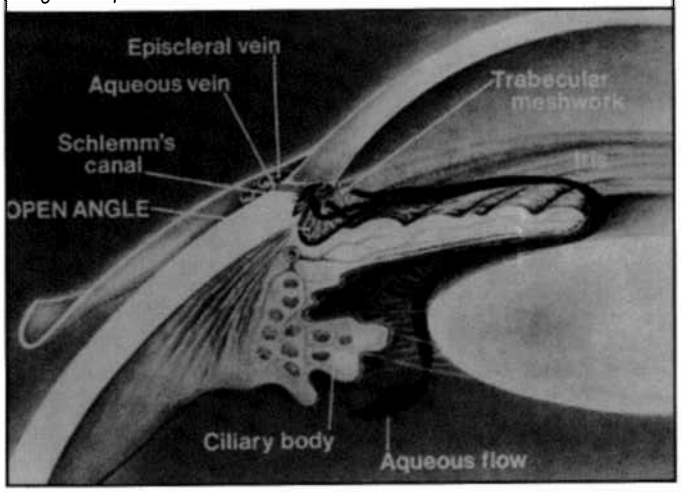


Fig. 2—Cupping of the Optic Nerve

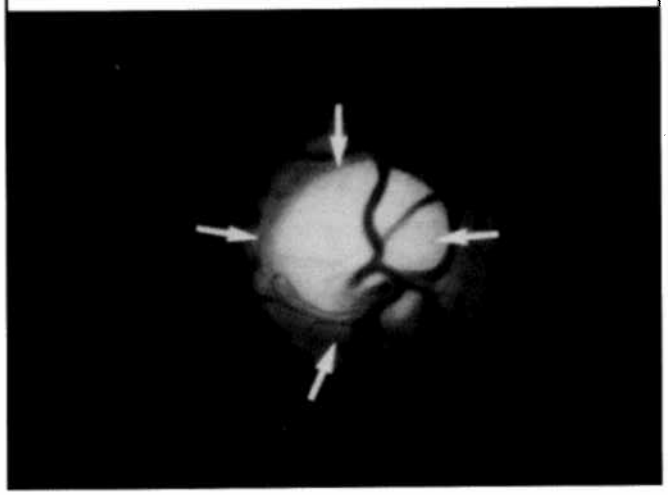
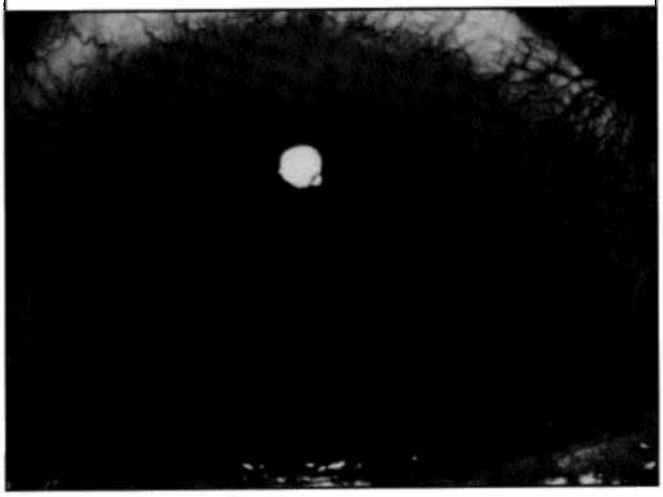


Fig. 3—Acute Glaucoma



(Fig. 2) When photography is unavailable, a careful drawing of the optic nerve head is appropriate.[8]

The examination of the fundus may reveal information that could explain certain visual field defects. Automatic static threshold techniques are useful methods to record reproducible defects in the fields of vision.

Arcuate scotoma typically is formed in advanced glaucoma. Since primary open angle glaucoma is a chronic and often, asymptomatic disease, noncompliance in the use of medications may have a significant impact on the glaucoma control.[9] Medications are expensive and often produce significant side effects and even can cause death. Medications include epinephrine, miotics, beta blockers, alpha agonists, carbonic anhydrase inhibitors, and prostaglandins. Marijuana may reduce intraocular pressure but it is not more effective than the available medications. It may also have significant side effects.

Other treatment modalities include laser therapy and glaucoma surgery. The most commonly used filtering operation is trabeculectomy which creates a fistula to allow the aqueous to leave the eye. In complicated cases, posterior tube shunts are inserted into the eye to drain the aqueous. Antifibrosis agents like 5-fluorouracil or Mitomycin-C can often improve the success rates in glaucoma filtering operations. When treatment modalities have failed, cyclodestructive procedures that destroy the ciliary body and its processes may be utilized. Laser or cryosurgery is available for cyclodestruction.

The life-styles of glaucoma patients can be seriously affected. Peer support can be helpful and constant encouragement is necessary for patients taking medications for a generally asymptomatic disease. Because of possible systemic side effects, other health care providers must have knowledge of the glaucoma medications being used. Life-style areas which can be affected may include loss of independence, hobbies, sports, financial, sexuality, reading, driving and job loss.

Angle closure glaucoma accounts for 10% of glaucoma cases in the United States. Predisposing factors include persons with anatomically narrow angles as determined by gonioscopy. Hyperopia, Asians and Eskimos, the elderly, women and a family history of this condition are other predisposing factors.[4] The patient may present with a painful red eye, nausea, vomiting, blurred vision and seeing halos around lights. The cornea is hazy due to edema and the pupil is semidilated. Gonioscopy will reveal the closed angle and the intraocular pressure will be greatly elevated. (Fig. 3)

Angle closure glaucoma requires emergency treatment which may include topical, oral and intravenous medications. After the pressure is stabilized, a peripheral iridotomy with laser is done. Because there may be a 78% chance of the unaffected eye developing acute glaucoma, a prophylactic laser iridotomy is done on the unaffected eye.[10]

Glaucomas with related ocular conditions are termed secondary glaucomas. These include trauma, uveitis, diabetic retinopathy, vein occlusions and long term use of steroids.[11] Retinal ischemia as a result of diabetic retinopathy or occlusive disease may result in new blood vessels growing into and obstructing the trabecular meshwork. This can result in neovascular glaucoma, a difficult glaucoma to treat. Ocular developmental abnormalities can lead to congenital and infantile glaucoma. In this group, symptoms can

include corneal enlargement, epiphora, photophobia, blepharospasm, and corneal edema. The preferred treatment in congenital and infantile glaucoma is surgery. Medical management usually has a limited long-term value.

In summary, glaucoma is a unique ophthalmic disease. Before treatment, the patient may have been totally asymptomatic. Major effects on the quality of life can occur once therapy is initiated. Medical therapy may be life long but untreated, the disease in its natural course may result in blindness. Surgery can be offered to patients if the disease progresses and the patient becomes intolerant to medications. An ongoing assessment of the quality of life is an essential portion of the management of the glaucoma patient.

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Flashes, Floaters Retinal Tears and Retinal Detachment

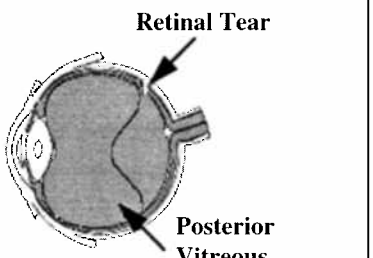
John H. Drouilhet MD

With age the vitreous gel in the vitreous cavity degenerates. The gel is a combination of viscous hyaluronic acid and collagen fibrils. The collagen fibrils are in greatest number adjacent to the retina. The fibrils are more firmly attached to the retina over the optic nerve, macula, retinal vessels, and at he anterior insertion of the retina. As the gel degenerates and liquefies, the collagen fibrils pull away from the retina. This separation of the gel from the retina is known as Posterior Vitreous Detachment (PVD).

The mechanical pulling away of the gel from the retina stimulates the retina and produces light flashes (photopsias). As the collagen fibrils separate from the retina they become visible to the patient and are seen as floaters. Floaters have a variety of appearances to include cobwebs, strings, rings, "bugs", and dots. Usually seeing hundreds of black dots represents bleeding in the eye from either a tom retina or blood vessel.

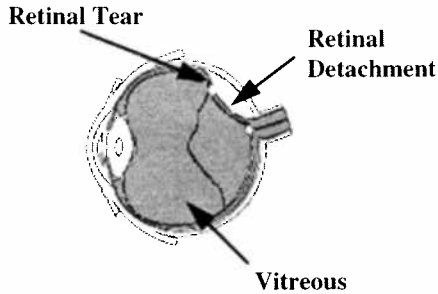
Although flashes and floaters are usually of no long-term visual consequence, they can be the first sign of retinal tears or retinal detachment. The retina is a delicate structure. Because the vitreous is attached to the retina, it is possible for the vitreous gel to tear the retina (Fig. 1) when it physically pulls away from it during Posterior Vitreous Detachment or PVD.

Fig. 1



Retinal holes or tears can lead to separation of the retina from the inside wall of the eye producing a retinal detachment (Fig. 2). When the retina detaches, it separates from part of its nutritional supply coming from the choroidal layer of blood vessels in the wall of the eye. The patient usually first notices loss of peripheral vision. If the retina detaches to include the macula, the patient loses reading (central) vision.

Fig. 2



Everyone will develop a Posterior Vitreous Detachment if they live long enough - usually by 60 to 70 years of age. The prevalence of retinal breaks in U.S. adults is 4-8% based on clinical and autopsy reviews. Not all retinal tears lead to retinal detachments. The incidence of retinal detachments in the general population is 1:10,000. This risk increases to 1:100 to 3:100 after cataract surgery and after YAG laser capsulotomy for secondary cataracts. Near sighted patients are more prone to retinal tears and detachment.[1]

New symptomatic retinal tears with minimal surrounding retinal detachment are usually operated with cryo or laser surgery.[2] This produces an adhesion between the retina and the wall of the eye. This acts like a spot weld to prevent retinal detachment.

However, if a retinal detachment occurs, laser and/or cryo surgery will not be work effectively to restore peripheral vision. Other surgical modalities include pneumatic retinopexy, scleral buckle, and vitrectomy surgery.

Pneumatic Retinopexy was first popularized in 1986.[3] The retinal tears have to be located above the 8:00 to 4:00 meridians of the eye (think of a clock face). A gas bubble is injected into the vitreous cavity. The patient's head is positioned so that the bubble rises in the liquid vitreous to tamponade the retinal tear. Then either cryosurgery or laser surgery is used to surround the tear or tears. The patient maintains the specified head position with the gas bubble against the tear for several days until the adhesion biologically glues the retina to the wall of the eye. The eye has a pump mechanism that removes fluid from between the retina and wall of the eye as long as the gas bubble plugs the tear from inside the eye. The long-term success rate of only this operation (73%) is not quite as good as performing a scleral buckle as the initial procedure (82%). However, the combined success rate of Pneumatic Retinopexy and Seleral Buckle is equal to doing an initial Scleral Buckle. The Pneumatic Retinopexy operation offers the advantages of it being an office procedure and having less morbidity with a slightly better visual acuity result as compared to a Scleral Buckle operation.[4]

A Scleral Buckle operation is used for more severe retinal detachments and inferiorly located retinal tears. This is an Outpatient Operating Room procedure. The eyeball is exposed. All retinal tears are localized and receive cryosurgery. A silicone band is placed over the tears such as to indent the wall of the eye to approximate it to seal the retinal tears.[5] This succeeds in 85-95% of uncomplicated primary retinal detachments.

Vitrectomy surgery is reserved for detachments accompanied by vitreous hemorrhage that prevents seeing into the eye appropriately, detachments from tears in the far back portion of the eye, and for detachments associated with significant scar tissue growth on the

retina known as Proliferative Vitreoretinopathy (PVR). The vitreous is removed and scar tissue is excised from the retinal surface. The fluid in the vitreous cavity is replaced with a gas bubble that pushes the detached retina against the wall of the eye. Laser surgery surrounds the retinal tears. A scleral buckle helps to seal the tears also. The patient is then placed in a face down position for two to five weeks until aqueous humor gradually the gas bubble. A few patients require silicone oil as a long acting vitreous substitute.[6] Intraoperative perfluorocarbon liquids are also now used as a mechanical liquid tool in selected PVR cases and giant retinal tears.[7] This has dramatically improved surgical ability in these more difficult detachments. With these modalities ophthalmologists in Hawaii can care for all patients with even the most difficult retinal detachments.

Overall, retinal detachment surgery has a 90-95% successful reattachment rate with one or more operations. Unfortunately, final visual acuity cannot be predicted. If the macula is detached, reading vision may never return to normal. New flashes and floater symptoms demand proper examination. It is much better to operate a retinal tear before it has progressed to a detachment with loss of vision.

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Retinopathy of Prematurity

John H. Drouilhet MD

Retinopathy of Prematurity (ROP) is a disorder of altered retinal vasculature occurring in low birthweight infants (1250 grams or less). These vascular abnormalities evolve over time and may progress through stages. ROP may result in permanent visual disability or blindness.[1]

The Committee for the Classification of ROP identified the five basic stages of vascular and retinal abnormalities.[2] Embryologically the retinal vasculature begins at the optic nerve and grows anteriorly in the retina toward the ora serrata, the anterior insertion of the retina. The geographic growth of the retinal vasculature is divided into Zones. Zone 1 is twice the distance of the radius beginning from the optic nerve extending to the macula. Zone 2 is the radius from the optic nerve extending to the nasal ora serrata. Zone 3 extends from the anterior border temporally of Zone 2 to the temporal ora serrata. The vascular abnormalities are classified by Stages. Stage 1 ROP shows terminal vascular arborization with a terminal line (whitish-gray thread-like line) separating vascularized from avascular retina. In Stage 2 ROP the line becomes a ridge with definite thickness and broadness. In Stage 3 there is fibrovascular proliferation along the surface of the retina and into the vitreous. If the vessels exiting the optic nerve are tortuous and dilated this is known as "Plus" Disease. Stage 4a is partial retinal detachment not involving the macula whereas Stage 4b involves the macula. Stage 5 is total retinal detachment of the vascularized retina. This results in a funnel-shaped detachment.[3] Of premature infants weighing less than 1250 gm at birth 25.2% develop Stage 1, 21.7% develop Stage 2, and 18.3% develop Stage 3.[4] "Plus" disease can progress through Stage 1 and 2 quickly thus necessitating frequent ocular exams in the neonatal ICU. Although most ROP regresses, it can exacerbate thus requiring continued monitoring until full vascularization of the retina.

The Japanese report on regression of ROP following ablation of the peripheral avascular retina prompted a prospective randomized clinical trial comparing observation alone to cryoablation.[5,6] The eyes reaching Threshold for surgery had "Plus" disease with five continuous hours or eight total clock hours with Stage 3 in Zone 1 or 2. The operated eyes had a 31.1% unfavorable result compared to 51.4% in the control group.

With the advent of better laser surgery delivery systems, it became possible to ablate the peripheral avascular retina with laser surgery. A prospective randomized study was not feasible. The Laser-ROP Study Group combined three large laser studies and determined equal efficacy to cryosurgery.[7] There is indication that laser surgery for Threshold Disease in Zone 1 may have better result than cryosurgery. Laser surgery carries significantly less morbidity than cryosurgery. Hawaii has had laser capability for ROP disease for some time. This significantly reduces the risk of Threshold ROP progressing to retinal detachment.

Those eyes progressing to retinal detachment can be operated with scleral buckle operation. Scleral buckle reduces progression from Stage 4 to Stage 5 ROP.[8] Vitrectomy surgery can help in severe Stage 5 ROP although the visual result has not been very gratifying. Much work needs to be done to obtain better vision results in these advanced cases and to prevent progression to this level..

With new technical and pharmacological advances the low birthweight infant is increasingly surviving and we need to be watchful for the incidence of ROP is increasing.[9] Newer research initiatives continue to look for ways to prevent or resolve ROP to reduce vision loss. Animal studies show that too much oxygen given shortly after birth causes ROP.[10] However, animal studies also demonstrate that too little oxygen later can make ROP worse if it already exists.[11] The STOP-ROP Study (Supplemental Therapeutic Oxygen for Prethreshold), funded by the NIH, is registering infants with marginal arterial oxygenation and "Prethreshold" ROP disease. Kapiolani Medical Center for Women and Children is one of the clinical trial centers. This study will determine if supplemental oxygen will reduce the number of infant eyes progressing to Threshold ROP. STOP-ROP is also examining the effects of supplemental oxygen on infant growth rate, pulmonary disease, and length of stay. Hopefully, this study will definitively answer the question as to the role of Oxygen administration in the development of ROP.

Retinopathy of Prematurity requires ongoing research to determine its multifactorial causes and the best ways to prevent and halt its potentially devastating end result of blindness.

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Diabetic Retinopathy

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Diabetic Retinopathy is the leading cause of new blindness in the 25 to 74 year age group in the United States. The diabetic patient has a twenty-five times greater risk of developing blindness than the non-diabetic patient. Only 50 % of all patients with diabetes mellitus have actually been diagnosed.[1] The Community Epidemiologic Work Group for Diabetes Mellitus in Hawaii showed a prevalence of 25.2 per 1000 to 63 per 1000 persons based on self-reported data. The State Blind Registry for 1992-1993 showed diabetic retinopathy as the second leading cause of all new blind cases (20.9%).[2] Diabetic retinopathy is a significant cause for concern in Hawaii in regard to patient quality of life and socioeconomic concerns.

Various factors have been studied in the pathophysiology of Diabetic Retinopathy to include aldose reductase, growth hormone, blood rheology abnormalities, blood viscosity,[1] vascular endothelial growth factor,[3] etc. It is as yet not fully understood how much each of these (or other unknown factors) contributes to the retinal vascular disease process.

Duration of diabetes mellitus is critical relative to the onset of retinopathy. Type I diabetics usually have no retinopathy until five years after diagnosis. By 15 years into the disease 90% will have retinopathy. Type II diabetics can present with retinopathy on initial diagnosis. The recommendation for dilated eye examination in the Type I diabetic is yearly once the patient has had diabetes for five years. Type II diabetics should be examined yearly from time of diagnosis.[1]

Definite risk factors for diabetic retinopathy include duration of disease, poor glucose control, hypertension, and renal disease.[4] As 87% of patients with advanced retinopathy have nephropathy and/or neuropathy, patients with nephropathy and /or neuropathy definitely need an ophthalmologic exam.[5]

Diabetic Retinopathy has two major classifications—Non-Proliferative Diabetic Retinopathy (NPDR) and Proliferative Diabetic Retinopathy (PDR).[1] In NPDR one sees retinal microaneurysms, blot hemorrhages, cotton wool spots, intraretinal microvascular abnormalities, and retinal edema (Fig 1). Edema affecting the macula causes loss of central (reading) vision. PDR is the more advanced stage occurring when the retina starts to lose its blood supply. The eye responds by growing new blood vessels on the optic nerve or retina (Fig 2). These fragile new vessels bleed, filling the vitreous cavity. Scar tissue accompanies the neovascularization and can cause retinal detachment (Fig 3).

To combat Diabetic Retinopathy, surgical strategies were developed in which Laser surgery treats macular edema and causes atrophy of the neovascularization. Vitrectomy surgery removes

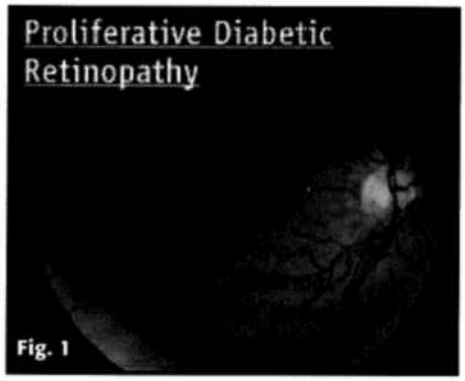
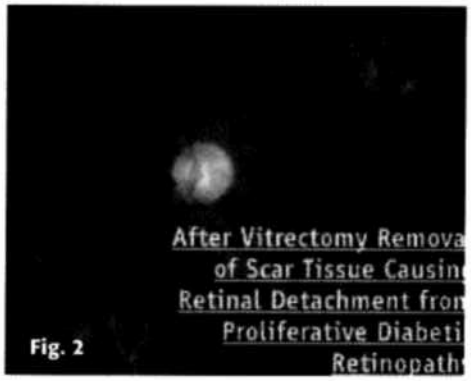


Fig. 1



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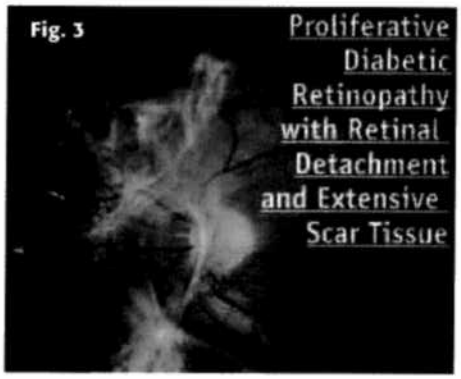

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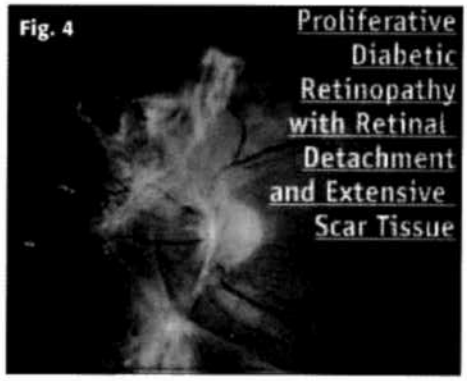
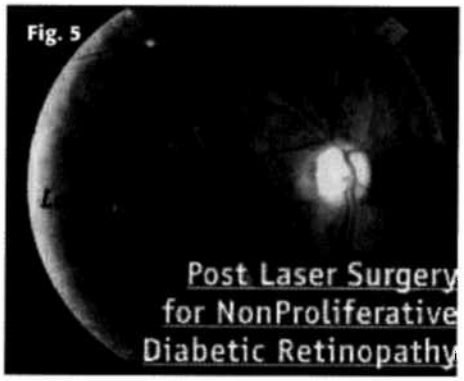


Fig. 4



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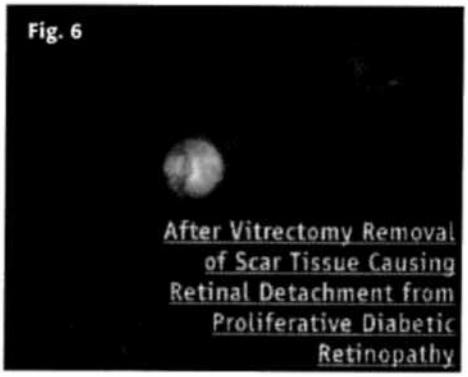

Fig. 6

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dense vitreous hemorrhage and relieves traction retinal detachment from scarring.

The Early Treatment Diabetic Retinopathy Study (ETDRS)[6] demonstrated a 50% reduction in loss of vision with appropriate laser surgery for clinically significant macular edema (Fig 4). This study also showed that aspirin did not reduce progression of diabetic retinopathy nor increase the risk of vision loss from vitreous hemorrhage.[7] The Diabetic Retinopathy Study showed a 50-60% reduction in vision loss for timely laser surgery in patients with Proliferative Diabetic Retinopathy (Fig 5).[8] The Diabetic Retinopathy Vitrectomy Study showed better visual result with early vitrectomy surgery in Type I Diabetics with nonclearing vitreous hemorrhage (Fig 6).[9]

The Diabetes Control and Complications Trial (DCCT) showed delay in onset and slower progression of Diabetic Retinopathy, nephropathy, and neuropathy. There was a 50% reduction in amount of laser surgery for Diabetic Retinopathy in tightly controlled diabetics.[10]

Diabetic Retinopathy is the major cause of new blindness in working Americans. The longer the duration of diabetes, the greater the risk of retinopathy. Excellent serum glucose, blood pressure, and cholesterol control11 delay and decrease the severity of retinopathy. Timely laser surgery reduces vision loss by 50%. It is the responsibility of all physicians in partnership to diagnose and properly manage the diabetic patient.

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Loss of Reading and Central Vision Due to Macular Diseases - Therapeutic Management, Advances and Limitations

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Remarkable advances have recently developed in the management of macular diseases. There are now treatment options for diseases previously felt to be incurable, and for recovery of central vision for some of these patients. The macula is the central part of the retina (the nerve tissue lining the back of the eye). The macula provides for the fine and discriminating vision, needed for driving, reading and facial recognition. Thus, macular diseases result in loss of some of the most important visual tasks, ie. - the ability to read, the ability to drive, and the ability to recognize others. Vitreoretinal surgery is a rapidly changing subspecialty of ophthalmology, which has recently developed new approaches to macular diseases, such as macular holes, macular degeneration, and subretinal neovascularization. Research in Hawaii has contributed to these advances.

Macular Holes

Age-related macular holes are holes in the central part of the retina, resulting in a missing spot in the center of vision and in distortion of vision (metamorphopsia) (Fig. 1). Macular holes are more common in females and increase in frequency with age, especially after age 55. Prevalence has been estimated to be 3.3 per 1000 in people over 55. This disease was previously felt to be untreatable until 1991, when the first pilot series of vitreous surgery showed closure of the macular hole, sealing of the retinal separation and improvement of central vision (Fig. 2).[1] Marked improvements in surgical techniques have resulted in a significant increase in success rate from 58% in the initial reported series to over 90% in recent series, including series reported from the Retina Center at Pali Momi. To take a disease previously untreatable six years ago to a point of highly successful surgical management is truly a remarkable story in the field of vitreoretinal surgery.

The Retina Center at Pali Momi, (a division of Kapiolani Medical Center at Pali Momi), is one of 15 study centers around the nation participating in the randomized national multi-centered trials on macular hole surgery (The Vitrectomy for Prevention of Macular Hole Study[2,3] and The Vitrectomy for Macular Hole Study).[4-6] These studies have resulted in significant contributions to the literature and represent the only well-controlled randomized studies on macular hole surgery. The Retina Center at Pali Momi is studying the use of serum growth factors to stimulate higher macular hole closure rate and vitrectomy with an intraocular gas bubble to prevent macular hole development in early stages of this disease.[3] In previously published studies ultrasonographic techniques were utilized to demonstrate tangential traction within the vitreous gel causing macular holes[7], and macular hole surgery was shown to allow patients even with chronic macular holes of many years in duration to recover useful central vision following surgery.[8]

Age-Related Macular Degeneration

Age-related macular degeneration (AMD) is a degenerative disease of the central retina, which results in a gradual scarring of support tissues. AMD is the most common causes of reportable blindness in the United States, as well as here in Hawaii. It is most common in Caucasians, especially fair and blue-eyed individuals, and less common, although not infrequently seen in Asians. Presently, preventative treatment is not proven, but studies on mineral, antioxidant, and vitamins supplements are ongoing. Laser treatment in the early stages of the disease is being studied in randomized trials.

AMD has two categories - the dry form and the wet form. The mainstay of treatment is laser surgery for the wet form which is the most common cause of severe vision loss. In the dry form there is gradual scarring with slow and gradual vision loss. In the wet form, choroidal neovascular membranes (CNVM) rapidly proliferate causing bleeding, scarring and leaking and rapid vision loss (Fig. 3). Laser treatment to obliterate the CNVM has been shown in large national multi-centered trials to decrease the risk of further vision loss.[10-11] A fluorescein angiogram (office procedure) is used to visualize the extent of CNVM (Fig. 3). Fluorescein dye is injected into an arm vein and an ophthalmic fundus camera with specific filters for the fluorescent light visualizes the dye in the retinal vessels.

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Fig 1.—Photograph of macular hole in left eye. Note visible hole approximately 800 um in size in center of macula. Visual acuity is 20/200.

Fig. 2.—Postoperative photograph following macular hole surgery. Note that macular hole has sealed. Visual acuity is 20/40.

Fig. 3.—Fluorescein angiogram of retinal pigment epithelial detachment (RPED) or blister-like formation in pigment epithelium due to subretinal neovascularization and AMD. Note bright spot at superonasal edge of blister consistent with SRNVM, but partially obscured by fluorescence within the RPED.

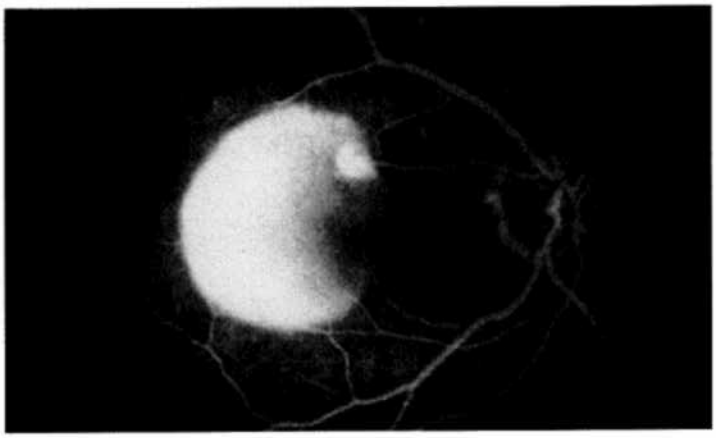


Fig. 4.—ICG angiogram demonstrating bright, focal area of hyperfluorescence consistent with SRNVM in same eye as in Figure 3. Note absence of fluorescence obscuring SRNVM within the RPED.

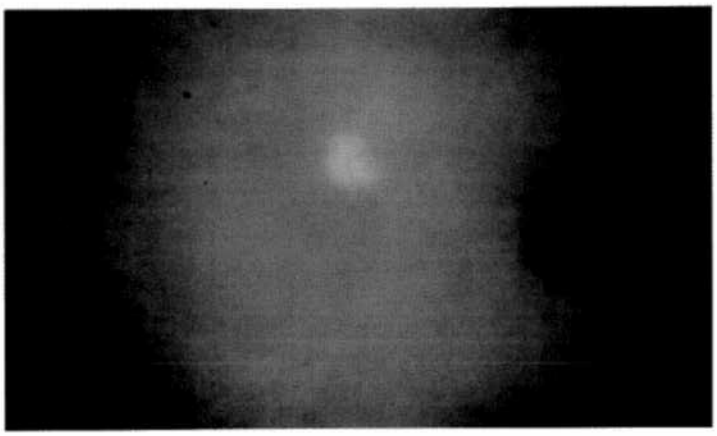


Fig. 5.—Photograph of SRNVM in patient with idiopathic inflammatory disease of retina, called punctate inner choroidopathy. Note the grey subretinal lesion extending into central fovea, as well as serous retinal detachment. Visual acuity is 20/200.

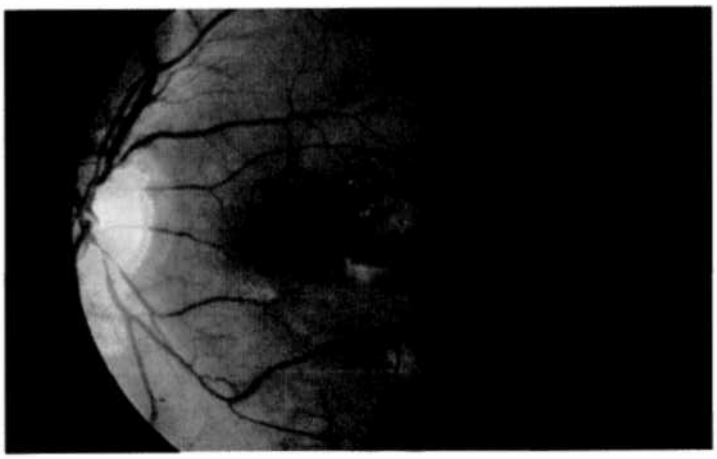
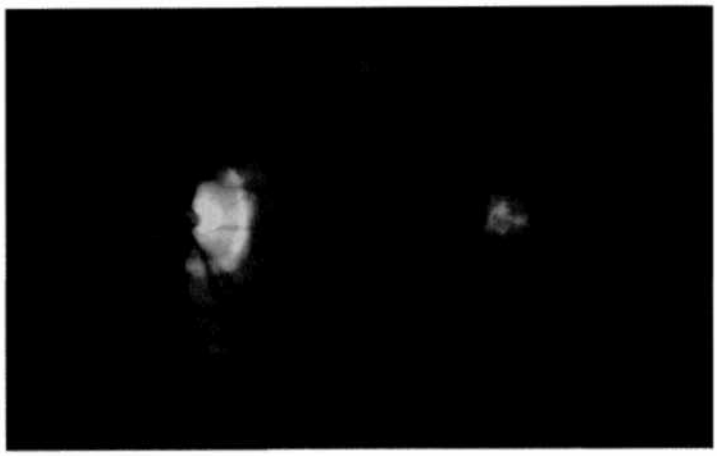


Fig. 6.—Postoperative photograph following subretinal surgery to remove SRNVM showing focal hypopigmented scar in temporal macula. Note absence of grey membrane and serous retinal detachment. Visual acuity has improved to 20/30.



The images are captured on film or on digital camera with computer interface, and laser treatment can be guided to the area of CNVM. Unfortunately, the percentage of patients with the wet form treatable with fluorescein angiographic criteria is less than 15%. A new imaging technology utilizing indocyanine green (ICG) may allow more precise localization of CNVM in select cases (Fig. 4). This imaging technology uses digital imaging, because of the higher sensitivity of digital cameras or video cameras to the fluorescence of the ICG dye in the infrared range. This imaging technique has become available in Hawaii for just over a year. With further experience and research with this modality, more patients may become eligible for laser surgery, although we have often found the two imaging modalities are complimentary. For patients not treatable with laser surgery, the prognosis for central vision is poor, although the majority of patients will have normal peripheral vision. Ongoing studies are evaluating medical treatments of CNVM by anti-angiogenic modalities, such as oral thalidomide, vascular endothelial growth factor antibodies, and radiation therapy.

Choroidal neovascular membrances (CNVM) are abnormal blood vessels growing into the subretinal space through retinal pigment epithelium. The most common disease is AMD, but there are other entities, which cause retinal scars and CNVM ingrowth. These include ocular histoplasmosis syndrome (a scarring disease associated with the fungus, Histoplasma capsulatum, common in the midwest), high myopia, angioid streaks (associated most commonly with pseudoxanthoma elasticum), trauma with choroidal ruptures, and multiple viral or idiopathic inflammatory diseases of the retina. Because CNVM is subretinal under the nerve tissue thus limiting surgical access, surgical removal was not considered until the first successful surgical series of CNVM removal through a small retinotomy in 1991.[12] Subretinal surgery has since develeped remarkably with improved techniques and instrumentation. Most promising visual results have been in patients with ocular histoplasmosis or idiopathic causes (Figs 5-6).[13] The initial results of surgical removal of CNVM in AMD were dissappointing, but research is ongoing, including exciting possible new treatment avenues of neuroretinal and retinal pigment epithelial cell transplantation. Subretinal surgery to remove hemorrhage using tissue plasminogen activator has successfully restored vision in subretinal hemorrhage due to retinal macroaneurysms and AMD.

Macular diseases cause loss of some of the most important visual abilities. Recent diagnostic, therapeutic and surgical advances have resulted in recovery of central vision for many patients with these diseases. Ongoing research has led to advances in this rapidly changing field, much occurring within this decade.

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Advances in Ophthalmic Plastic, Reconstructive and Orbital Surgery in Hawaii

Jorge G. Camara MD*

Advances in ophthalmic plastic and reconstructive surgery continue to be made in the state of Hawaii. A new technique of dacryocystorhinostomy using the endoscope and the pulsed Holmium: YAG laser as well as a subconjunctival endoscopic assisted approach to orbital surgery for orbital decompression is described. The integrated hydroxyapatite implant replacing the enucleated eye gives excellent postoperative extraocular motility.

History of Ophthalmic Plastic and Reconstructive Surgery

Ophthalmic plastic surgery is any surgery that changes the form of the adnexal tissues of the eye (from the Greek *ophthalmos*, meaning eye, and *plastos*, meaning formed). Thus, ophthalmic plastic surgery includes repair of eyelid malpositions), eyelid and orbital reconstruction, conjunctivoplasty, cosmetic blepharoplasty, lacrimal surgery, orbitotomy procedures, and the treatment of orbital socket deformities.[1]

Examples of ocular diseases treated by ophthalmic plastic and reconstructive surgeons are ptosis, eyelid malpositions such as entropion and ectropion, cancers of the eyelids and ocular surface, malignant exophthalmos, orbital tumors and blocked tear ducts.

Deformities of the orbital region from congenital defects, trauma, neoplasms, and/or infectious diseases have afflicted men throughout the ages. Prehistoric skeletal remains reveal deformities that did not cause death, but ocular disability. The oldest surviving reference to oculoplastic surgery is a passage from the Code of Hammurabi (2250 BC) that refers to treatment of an infected lacrimal sac:

> "If a physician performs on a patient a deep cut with the operating knife or if he opens with a knife an (abscess of cavity) and the eye is lost, the physician's hands shall be cut off."

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References to the surgical repair of entropion go as far back as Hippocrates (460-380 BC); the first century Roman philosopher Celsus (25 BC to 50 BC) believed that reconstruction of mutilated eyelids was hopeless.[2]

The development of modern day ophthalmic plastic and reconstructive surgery was started by Byron Smith, an ophthalmologist, and John Converse, a plastic surgeon, who met during World War II. They collaborated in the repair of ocular and adnexal injuries sustained by American soldiers, and described the diagnosis and treatment of complex naso-orbital fractures.[3] Subsequent work by Fox, Callahan, Hughes, and Beard contributed greatly to the development of this subspecialty.

Ophthalmic plastic and reconstructive surgery has evolved from these beginnings into a distinct discipline of ophthalmology. Fellowship training programs in ophthalmic plastic, lacrimal and orbital surgery ranging from one to two years are offered by most large training programs in the United States.

New techniques in laser lacrimal surgery for correcting nasolacrimal duct obstruction have been developed in Hawaii. Endoscopic assisted orbital surgery for removal of orbital tumors, repair of orbital fractures and orbital decompression for Graves' ophthalmopathy has been advanced in Hawaii. The first large long term study of the adjunctive use of Mitomycin C in endoscopic laser assisted dacryocystorhinostomy has been completed and submitted for publication.

Endoscopic Laser Assisted Dacryocystorhinostomy

Obstruction of the nasolacrimal drainage system may cause problems ranging from troublesome epiphora to chronic infection, and formation of a dacryopyocele with abscess formation. Because the medial angular veins drain into the cavernous sinus, these infections are considered to be a medical emergency requiring prompt treatment. (Fig. 1)

The time honored method of correcting a blocked tear duct is an external dacryocystorhinostomy which has an over 90% success rate.[5] This operation, however, does have disadvantages such as the skin incision between the bridge of the nose and the medial boundary of the eyelid; the potential for significant intraoperative bleeding from the medial angular vessels and nasal mucosa; postoperative pain requiring pain-suppressants, and the need for approximately a week of recovery time.

The use of the endoscope, with the pulsed high-powered Hol-

Fig 1.—Three year old female child with untreated congenital nasolacrimal duct obstruction forming lacrimal sac abscess.

Fig 2.—Intraoperative intranasal photograph of osteotomy with silicone stents in place immediately after endoscopic laser assisted dacryocystorhinostomy.

Fig 3.—Thirty six year old Hawaiian female with malignant exophthalmos and optic neuropathy causing severe visual loss in both eyes.

Fig 4.—Same patient after undergoing endoscopic assisted three wall orbital decompression to both eyes with recovery of visual acuity bilaterally.

Fig 5.—Nine year old male status post enucleation of both eyes due to retinoblastoma with severe orbital atrophy and socket contracture.

Fig 6.—Same patient after bilateral implantation of hydroxyapatite implants and fitting of ocular prosthesis.

mium: YAG laser (Coherent Medical Group, Palo Alto, California) has resulted in the evolution of intranasal endoscopic laser assisted dacryocystorhinostomy.[6] The advantages of this surgical approach are (1) the absence of a skin incision, (2) significantly less bleeding, due to the hemostatic properties of the laser, (3) less pain postoperatively due to the micro-invasive nature of the procedure, and (4) return to normal activities the day after surgery.

The procedure involves placing a lacrimal light pipe into the lacrimal sac, and using a videoendoscope attached to a monitor to visualize the junction of the lacrimal sac and the blocked nasolacrimal duct. A laser fiber, passed through a handpiece, is used to create a byspass osteotomy. Silicone stents are then placed through the osteotomy to keep the opening patent (Fig. 2).

The disadvantages of the procedure are the difficulty learning the procedure, and the cost of the laser and ancillary equipment. The societal benefit of earlier return to normal activities, and patient comfort outweigh these disadvantages. (Akin to the difference between laparoscopic and open cholecystectomy).

In our series of 250 operations performed in Hawaii, and a follow-up as long as 5 years, the overall success rate of the procedure is 95% as compared to a 90% success rate for external dacryocystorhinostomy.

Endoscopic Orbital Surgery

In the last decade, the use of the endoscope has become commonplace in orthopedic, general, obstetrical, urological, otolaryngological, thoracic and plastic surgery. Endoscopic surgery is widely accepted in these surgical specialties because the surgery performed through a small incision, allows less invasive surgery and quicker rehabilitation.

Orbital surgery can be performed with the adjunctive use of an endoscope attached to a videomonitor. When combined with transcaruncular and subconjunctival approaches to the medial and inferior orbits, a skin incision can be avoided. Indications for endoscopic-assisted transcaruncular and subconjunctival approaches to the orbit include: 1) the repair of medial and floor fractures; 2) the biopsy and removal of medial and inferior orbital tumors and; 3) two-wall orbital decompression.

The advantages of endoscopic orbital surgery include a smaller incision, decreased need for retraction and disruption of delicate ocular adnexal tissues, better visualization, less bleeding and postoperative pain, and quicker rehabilitation. Teaching new orbital surgical techniques is facilitated with the use of the videoendoscope. Procedures can be videotaped and used subsequently for educational purposes. Shown in Figure 3 and 4 is a patient before and after a three wall orbital decompression.

Other uses of the endoscope in orbital surgery include its potential use in the transnasal endoscopic approach to expose the medial rectus muscle from the annulus of Zinn to the penetration of Tenon's capsule.[7] A combined transconjunctival and intranasal approach for decompression of the optic canal has recently been described.[8] In ophthalmological surgery, other uses of the endoscope include ciliary process photocoagulation for end-stage glaucoma[9], intraocular lens implantation[10], and vitreo-retinal surgery.[11]

Laser Surgery of the Eyelids and Ocular Adnexa

The use of the CO_2 laser in cosmetic and reconstructive eyelid surgery is gaining increasing acceptance in the field of oculoplastic surgery. Since the publication on laser eyelid surgery by Baker,[12] not until the advent of ultrapulsed and continuous wave $C0_2$ laser and the development of laser-safe surgical instruments has this technique become widely used in the United States.

The superpulsed CO_2 laser (Coherent Medical Group, Palo Alto, California) allows for computer controlled vaporization of the epidermis, papillary, and reticular dermis of the thin eyelid skin for removal of superficial lesions and rhytids.[13] The continuous wave mode of the CO_2 laser allows precise surgical incisions with excellent hemostasis. The advantage of laser eyelid surgery is early rehabilitation due to increased hemostasis and decreased postoperative swelling and bruising.

The continuous wave CO_2 laser in eyelid surgery is used for repair of ptosis, correction of eyelid malpositions such as entropion and ectropion, as well as the removal of benign and malignant eyelid lesions. The pulsed mode of the $C0_2$ laser is used for the vaporization of seborrheic keratoses, xanthelasmas, and the cosmetic improvement of periocular rhytids.[14]

The increased cost of the use of the laser is offset by the shorter recovery phase. Postoperative pain after laser eyelid surgery is minimal or absent. It is theorized that laser cauterization of sensory nerves may account for this relative lack of discomfort. Proper ocular protection of the patient, as well as the operating room staff is necessary during laser eyelid surgery.

Advances in Enucleation: The Hydroxyapatite Orbital Implant

An enucleated eye is replaced by placement of an orbital implant to prevent orbital atrophy and superior sulcus deformity. In the past, the orbital implants were spheres of glass, polymethlymethcrylate, silicone, or bone harvested from the iliac crest or rib.

Problems associated with these implants include infection, delayed or immediate rejection and extrusion, as well as lack of motility.[15] Furthermore, the weight of the prosthesis supported by the lower eyelid caused laxity and ectropion of the lower eyelid.

Hydroxyapatite is a new orbital implant material which has a unique interconnected porous matrix derived from marine coral with a mineral composition similar to bone. This orbital implant undergoes fibrovascular ingrowth of the patient's own tissue, becoming truly integrated and less likely to reject, migrate or extrude. The hydroxyapatite implant may be used with other surgical techniques, more complex than standard enucleation.[16]

Since the orbital implant integrates with the patient's own tissues the extraocular muscles can be attached directly to the implant, allowing postoperative motility synchronous with the fellow eye.[17]

This property of the integrated hydroxyapatite implant offers several advantages to the patient undergoing enucleation: 1) Motility of the prosthesis; 2) Less weight bearing by the lower eyelid which lessens the chances of lower eyelid ectropion; and 3) Less rejection of the hydroxyapatite implant because of the vascular ingrowth. Once the hydroxyapatite implant has vascularized, the implant is drilled and a motility implant sleeve or a motility peg is attached and coupled to the artificial eye (Fig. 5 and 6).

Vascularization of the implant has to be established before the artificial eye is attached. Technetium-99m-methylene diphosphonate (MDP) scintigraphy is a non-invasive method for determining the

vascularity of the hydroxyapatite ocular implant.18 Another method is the use of a gadolinium DPTA-enhanced MRI with surface coil.[19]

After the implant has successfully integrated into the orbit, a motility implant sleeve is drilled into the hydroxyapatite implant and a peg attached to the prosthesis is connected. This final stage couples the implant to the prosthesis and allows for extraocular motility.

The hydroxyapatite implant is popular with oculoplastic surgeons because of the natural eye movement, resistance to extrusion, rare complications, and flexibility in fitting the socket. Hydroxyapatite spheres are contraindicated in those situations other orbital implants are contraindicated; ie, severe trauma with possible orbital infection and orbits with poor vascularization and healing qualities, such as after irradiation, and orbital infection.

Complications of the procedure include infection, conjunctival dehiscence, and rejection of the implant. Currently, research is being done on other types of synthetic orbital implants such as a porous polyethelyene implant with properties similar to the hydroxyapatite implant.[20]

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Corneal & Refractive Surgery

Gilbert K. Yamamoto MD, FACS

Excimer lasers and high technology instrumentation have ushered in a new era of vision improvement surgery in Hawaii, replacing the more traditional forms of refractive surgery: cataract surgery, corneal transplant surgery, and radial keratotomy. Corneal surgery has been enhanced by new techniques of microsurgery and a more effective tissue procurement system for donor corneal tissue. Several laser centers provide the latest in FDA-approved excimer laser procedures including PRK and PTK. Mild to moderate myopia and astigmatism may now be corrected. Off-label use of LASIK, too, may soon be realized.

Corneal Surgery

As on the mainland, corneal surgery in the Islands has provided excellent visual results for patients with opacification and diseases of the cornea. Among the most common causes of corneal disease in Hawaii are corneal damage from previous eye surgery (cataract operations), misshapen corneas (keratoconus), corneal injury and scarring, and corneal dystrophies (granular corneal dystrophy, and Fuchs' endothelial corneal dystrophy).

The most common of the corneal operations done locally is the corneal transplant — which replaces the opacified cornea with a clear donor cornea. Besides the expertise of an experienced corneal surgeon, successful transplant surgery also requires the assistance of a local organ donor bank in procuring suitable tissue that is properly screened and processed. Patients with corneal disease are carefully evaluated by the cornea specialist, and then are placed on waiting lists maintained by the local eye bank. As soon as the donor tissue becomes available, the surgeon is notified, and the patient is brought to the hospital for outpatient surgery. Most corneal transplants can be done under local anesthesia (few still requiring hospitalization) with operating times just under one hour. Many of the hospital centers are well equipped with the latest operating microscopes, experienced assistants, trephines, viscoelastics, and fine sutures to insure precise removal of the central 7-8 mm of the recipient, replacing it with a donor cornea.

Recovery after the corneal transplant surgery along with the ensuing visual rehabilitation process requires a long time. Often a "triple procedure" can be done in which the transplant surgery is coupled with removal of a cataract, and implantation of an intraocular lens implant. Intraocular lens implant exchanges can also be performed with techniques of suturing lens implants into the sclera when there is no support in the posterior chamber. These combined procedures require skillful management to determine the proper power of the lens implant to closely match the resultant eye power after the cornea operation.

Adjustment of corneal sutures and wounds postoperatively has become one of the greatest challenges for corneal surgeons. Another advanced technology in Hawaii is videokeratography and corneal topographic analysis which have helped the surgeon with this problem of corneal shape management postoperatively.

The success in restoring good vision after corneal surgery depends on many factors. The surgical manipulation is critical, but so is the effective management of potential complications such as graft failures, secondary glaucoma, and corneal rejection reactions. Although most corneal surgeons have successful results in over 80% of their grafts, adverse outcomes may warrant repeat transplants in 10-15% of cases despite the precautions of using topical antibiotics, steroid eye drops, and immunosuppressive agents.

Eye Banking in Hawaii - Hawaii Lions Eyebank and Makana Foundation

The Hawaii Lions Eyebank & Makana Foundation has been in operation since 1980, when the late Dr Kent Bennett of Straub Hospital & Clinic, and I obtained the support and commitment from the Hawaii Lions of District 50 to adopt the Makana Foundation as one of its major projects. The Eyebank and its major supporters have served our community well by procuring, processing, and distributing donor eye tissue, and promoting organ and tissue donations. It has provided our patients with eye tissue for nearly 1,700 surgical procedures, a majority of which were used for corneal transplantation. The HLEB & NIF has a full-time executive director, a medical director, and a full-time technical director. It is accredited by the national eye bank organization, Eye Bank Association of America, and is part of a network of cornea banks working together to facilitate tissue procurement and distribution nationwide. There is a close working relationship between the Hawaii Lions Eyebank & Makana Foundation and the Organ Donor Center of Hawaii, which handles recovery and processing of the other transplantable organs. The Eyebank processes donor corneas and stores them in special tissue culture media prolonging their viability, and also examines and tests the tissue for transmittable diseases such as hepatitis and AIDS.

It has been estimated that our needs in Hawaii range from 120 to 140 corneas annually, of which three-quarters are obtained here. There are 16 ophthalmologists here and on neighboring Guam and the Philippines, who use the HLEB & NIF for cornea and scleral tissue. Patients are placed on the transplant list in the order in which they are registered by their eye surgeons. The wait for donor tissue averages three to six weeks. Through the dedicated effort of the Lions of District 50 and the Eyebank directors, local donations have tripled during the past 3 years despite the diversity of ethnic and religious preferences here in the Islands. There are approximately 38,000 organ and tissue donors registered here in Hawaii.

Refractive Surgery in Hawaii

Cataract and corneal surgery are the traditional forms of refractive surgery that are performed on eyes with sight-threatening disorders. Hundreds of these procedures are done in Hawaii each month and many Island ophthalmologists are well versed in the indications, techniques, and complications (see cataract surgery segment of this monograph). However, radial keratotomy and the newer forms of excimer laser refractive surgery that are currently available are significantly different in that they are:

a) considered elective procedures,
b) surgeries done on structurally normal eyes - increasing risk/benefit ratio,
c) not reimbursed by health insurance, encouraging a "consumer" attitude,
d) technically more challenging, require expensive accessories, computerized lasers, and
e) associated with advertising, media coverage, co-management with para-ophthalmic practitioners.

Radial keratotomy (RK) has been performed on hundreds of island residents since the late 1980s, with excellent results for those who had low to moderate nearsightedness and astigmatism. Although few are performed today, the procedure was relatively simple, requiring diamond-blade knives, steady hands, a microscope, and pachymeter. Four, eight, and sixteen-cut incisions of varying lengths were capable of flattening the corneal shape to provide 20/40 or better vision to 90% of patients. Despite comfort during the procedure with topical anesthesia there were several days of pain and discomfort after the surgery. Fortunately, there were few complications, but the worst were overcorrections, induced astigmatism, and persistent glare in highly myopic patients. RK may still have some usefulness in patients who require visual enhancement surgery for low corrective and mild astigmatic refractive errors after cataract surgery. For many refractive corneal surgeons, the RK diamond blades can now be **useful** for making sharp, clean incisions for no-stitch cataract surgery.

Photorefractive keratectomy (PRK) has now replaced radial keratotomy as the treatment of choice for patients with mild to moderate nearsightedness and astigmatism. It is an outpatient excimer laser procedure that can reshape the cornea by (ablating) removing small amounts of tissue in the central visual axis, instead of making radial incisions into the peripheral cornea as in radial keratotomy surgery. PRK has resulted in patients not requiring glasses or contacts, with as many as 95% having been made to see 20/40 or better — well enough to pass their driver's licensing eye exam. There are three laser centers in Hawaii — one using the Summit Apex laser and two using the VISX Star laser to perform refractive keratectomies, requiring only topical anesthesia and a few minutes under the laser beam. The physician
and skilled technicians operate the excimer lasers using integrated computers and pre-programmed laser cards designed to deliver precise cuts according to the patient's refractive errors.

Phototherapeutic keratotomy (PTK) uses the excimer laser to ablate superficial scars from the corneal surface. Successful removal of granular corneal dystrophy scars has been performed locally. Other applications may prove useful in patients with recurrent corneal erosion syndrome. Although not intended to be a refractive procedure, PTK, effecting the removal of tissue from the cornea, may cause eccentric corneal thinning and induce refractive changes. Moreover, corneal opacities from dystrophic conditions could return after several years.

Automated Lamellar Keratoplasty (ALK)

ALK is used to reduce high levels of nearsightedness, and can also be used for farsightedness. The procedure requires a microkeratome which slices across the superficial cornea creating a thin flap. The second part requires another slice across the corneal stroma, removing a thin disk of tissue. The flap is replaced without sutures. For farsighted eyes, only the thin flap is made, and no stromal disk is removed. Over- and undercorrections are significant with ALK results, with irregular astigmatism also causing decrease in best-correctable vision. ALK had a place in refractive surgery during pre-excimer days, but it is all but being replaced by a more precise and predictable LASIK procedure.

Laser-assisted In-Situ Keratomilcusis (LASIK)

LASIK is a procedure which also corrects the moderate to high degrees of nearsightedness. LASIK is the combination of ALK and PRK, in which the surgeon uses a keratome to shave a thin layer of tissue off the center of the cornea as a flap, and completes the process with excimer laser to remove a thin layer of tissue from the corneal stroma. The flap is replaced without sutures. LASIK is now being done regularly at many laser refractive centers in Canada, Europe, and South America, however, in the United States, it is still considered an "off-label" procedure, similar to use of certain approved medications for non-approved circumstances. Many Hawaii residents have already had this procedure in Colombia or Canada with good results. More investigational studies are required by the FDA before LASIK can gain approval for general use in the U.S. Reports so far have been very encouraging in determining its safety and long-term predictability. Many who have had the procedure claim that there is very little discomfort after the procedure. Since LASIK relies on precise shaving of the corneal cap, surgeons performing this operation must be adept with both highly technical tools — the microkeratome and the excimer laser.

Current Status of PRK, PTK, RK, AILK, and LASIK

Radial keratotomy is a relatively simple procedure. It has the longest record of scrutiny by researchers and the FDA, and can claim results of 90% of patients seeing 20/40 or better in those lower degrees of myopia. There has also been a large accumulation of literature worldwide, covering every facet of RK complications and what to do about them. Radial keratotomy surgery does require touch-up surgery in 30-50% of cases, but everything is done using inexpensive equipment in an outpatient office setting.

On the other hand, laser refractive surgery is still in its infancy. Fewer than 500 patients have had PRK in Hawaii since laser centers opened 1-2 years ago. Setup expenses are high for refractive laser surgeons who must increase their malpractice liability, invest in specialized equipment (laser center access fees, videokeratometers, and microkeratomes), and gain certification for PRK by taking

mainland workshops and performing one procedure under supervision at a laser center. The length of the learning curve varies for each surgeon especially for the more technically-challenging microkeratome/excimer laser combination procedures of ALK and LASIK. Lasers need constant maintenance for precise energy output and beam quality, and can be fallible during power failures, and computer glitches. In all procedures patients must be carefully screened by an ophthalmologist since there is a growing list of eye problems that are contraindications to laser refractive surgery. Refractive surgery is not a casual procedure that anyone can do and do well. An experienced LASIK surgeon advised that in order to keep up with the procedure, that at least one procedure per week be done. There are risks (2-3%) which may leave a patient losing 2-3 lines of best-corrected vision after refractive surgery! And, just as I would have strong reservations about allowing optometrists to perform laser surgery, I personally would also have a problem sharing a patient with a nonmedical eye care practitioner in a co-management arrangement.

Interest for the surgery has increased rather slowly in our community perhaps due to high out-of-pocket costs for the procedure and the unstable economy. But more so, I believe this may be due to the cautious attitude of conservative island residents who demonstrate aversion to risk. For most patients the mild-moderate discomfort for a few days are tolerable in return for good vision without need for glasses. However, in a small number of cases there may be annoying fluctuating vision, and a hazy quality of vision that may persist for weeks after surgery. In cases where undercorrections or induced astigmatism are obtained, additional enhancements can be done but are sometimes more difficult with PRK. Overcorrections must be corrected with either glasses or contact lenses, too often with some difficulty. Central corneal haze can be treated with manual debridement or topical steroid drops and should disappear. Other problems such as secondary glaucoma from use of steroid drops, corneal infections and scarring occur rarely.

Wound healing in refractive surgery plays an important role in determining results. Age and sex are significant factors with young females more apt to have varying visual results from hormonal influences. It is important to stress to patients preoperatively that refractive surgery has risks as well as promise of vision improvement without contact lenses and glasses. Remember that PRK patients in the U.S. have only had a 3 year follow-up period. There still may be those unexpected problems associated with a thinner cornea that could affect such things as inaccuracy measuring intraocular pressures in unexpected glaucoma patients, and vision loss affecting high altitude mountain climbers.

If a physician you care about is at risk...
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Ophthalmology in Hawaii 1997 and Beyond

Russell T. Stodd MD

While we have served, performed, studied and prepared, almost before any of us have realized it, the 21st century is at our door. The date represents a junction, or perhaps a new beginning in our minds, for the future of ophthalmology and eye care in Hawaii, but it is merely a continuum.

The dynamics of the evolution in the preservation of sight for Hawaii's people border on fantasy. As the various articles in this Journal testify, the level of care in Hawaii today rivals any metropolitan community in the western world.

The tools available for eye surgeons of 1960, were not significantly better than the tools of one hundred years previous to that time. One wonders, did we actually perform eye surgery without microscopes? Was it possible to care for patients without lasers? Did we not always have viscoelastics, exotic gases, steroids, multiple antibiotics, glaucoma valves, intraocular lenses, ganglionic blockers, enzymes and enzyme inhibitors?

What has evolved in America and the world of scientific medicine is a system of communication and cooperation which permits ideas, devices, medications and procedures to be shared electronically in the blink of an eye. Here in the islands, the most remote from any continent, we enjoy ophthalmic medical facilities of the finest quality, and the most modern in development, with matchless technical equipment. Moreover, there prevails an abiding desire in the medical community to maintain a level of unexcelled skill and knowledge.

Conferences, seminars, courses, forums, and open meetings abound in various locations all around this state. Scholars, professors, and research scientists from around the world are constant visitors to our islands. In addition, Hawaii has a broad collection of skilled and knowledgeable opthalmic physicians who have been educated and trained in the most prestigious eye centers in the world. Contributions in research by Hawaii's ophthalmologists are ongoing and are frequently published in current opthalmic literature.

Twenty-two years ago, eye surgeons of Hawaii joined together to establish the Hawaii Ophthalmological Society. This organization has enlarged and prospered, welcoming all qualified eye physicians. It has grown to become the voice of medical eye care in Hawaii, offering regular scientific meetings, participating in educational fairs, and offering testimony before the state legislature on medical issues.

Along with this unparalleled development of physicians and equipment, the desire to provide access for all is unquestioned. Sponsored by the American Academy of Ophthalmology, many of Hawaii's ophthalmologists participate in the National Eye Care Project. The NECP maintains a comprehensive listing of physicians who agree to provide services for the medically indigent. This system records each patient request for free eye care and assigns a Hawaii ophthalmologist in rotation. No one is denied access for lack of ability to pay.

As the year 2001 approaches, the citizens of Hawaii as well as organized medicine can take pride and satisfaction in what has been built for comprehensive eye care. Moreover, the future for the perfection and preservation of eyesight is bright and the vistas limitless. The goal of eliminating the fear of blindness from vascular disease, glaucoma, diabetes, macular degeneration, and other conditions, is a reasonable one and is within our grasp.

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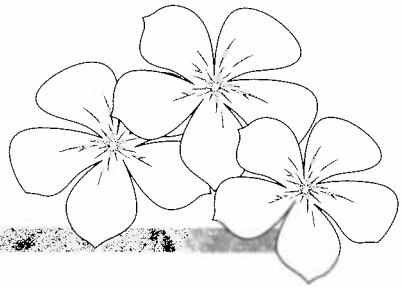

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Council Highlights

Friday, August 1, 1997
Roger Kimura MD, Secretary

The meeting was called to order by Dr Spangler, President at 5:38 p.m.

Those present were Drs L. Howard, President-elect; C. Lehman, Immediate Past President; C. Kelley, Treasurer: R. Kimura, Secretary; AMA Delegates: C. Kam, A. Kunimoto; Alternate AMA Delegate: F. Holschuh, Vice-Speaker: P. Blanchette; County Presidents: W. Dang Jr. - Honolulu, G. McKenna - Kauai, A. Bairos - W. Hawaii; Councilors: P. Chinn, C. Goto, M. Shirasu, R. Stevens, W. Young, M. Yolles, P. Kim, C. Kadooka, B. LeeLoy; Past Presidents: W. Dang

HMA Staff: J. Won, B. Kendro, N. Jones, P. Kawamoto, J. Asato, A. Rogness-recording secretary.

Minutes: The minutes of the July 11/97 Council meeting were approved as circulated.

• Dr Spangler reported: 1) that the President of the American Society of Reproductive Members wrote an article urging physicians to join the AMA. 2) he received a letter from the HMA Alliance stating that they will not be holding their annual meeting in conjunction with HMA's Annual Meeting; 3) he called for volunteers to be on the adhoc committee to meet with pharmacists regarding concerns. Drs L. Howard, S. Wallach, J. McDonnell and Dr Spangler will be members of the adhoc committee.

For Action

• A motion was passed by Council to co-sponsor a Patient Advocacy Forum with the purpose of helping to bring groups together for discussion. Mr Won will keep an accounting of HMA staff time. (The focus is on patient advocacy groups that represent their particular constituency on how to understand the political processes and to work with their physicians.)

• A motion was passed by Council to support the Advocacy Resource Center Participation. This Center has been developed as a way for the AMA to support and provide a number of services to state and county medical societies.

• A motion was passed by Council to allow Drs Kam and Kienitz to send their Workers' Compensation Survey to Specialty Societies.

Component Society Reports

Honolulu.—Dr W. Dang Jr., reported that Tuesday, August 12, Dr B. Fong will be giving a presentation on the new changes from the switching of Medicare from Aetna to the North Dakota group.

Maui and Hawaii.—No report.

West Hawaii.—Dr Bairos reported that he and Dr LeeLoy are having a meeting to discuss how to get physicians interested to attend meetings from their County.

Kauai.—Dr McKenna reported that Kauai County recently had a general membership meeting and 38 members attended. Eight (8) were new members. Members were brought up-to-date on what the HMA Council is doing. The Kauai Alliance also gave an update on its activities. Dr Bill Shankel gave a talk about his experiences as a POW in Vietnam which was very interesting and well received by all who attended.

For Information

Bylaws Committee.—The committee presented its draft of the bylaws to Council for consideration. A few changes were made and the bylaws will be mailed out to membership via the newsletter at least 30 days before the annual meeting.

Recognition of Dr Calvin Sia.—Nine outstanding individuals were honored by the National Governor's Association. Dr Sia was honored in the private citizen category for championing the creation of responsive and effective services for young children and their parents.

PGMA.—Drs L. Howard, J. Spangler, Mr J. Won and HMA's attorneys met with Mr Rey Graulty, the insurance commissioner, his assistant and their attorney. Par or Nonpar physicians cannot seek reimbursement for PGMA's share of outstanding claims, however the portion paid by the patient can be billed. All claims after March 7, 1997 are to be paid in full. It was noted that payment of the claims would probably not occur in the near future. HMA will receive a letter from the insurance commissioner stating that the hospitals and physicians will be treated equally. Mr Graulty plans to propose a bill this legislative session to increase the financial reservea that mutual benefit societies must carry. The HMA Officers will keep Council informed of developments.

Physician Contract Review.—HMA was asked by a number of physicians to comment on the University Health Alliance Contract. HMA's attorney reviewed the contract and submitted comments.

Program on Pain Management.—It was announced that the program sponsored by Knoll Pharmaceutical will be held on Sept. 18 on the Big Island, Hilton Waikaloa and on Sept. 19 on Oahu at the Hilton Hawaiian Village. The program for Kauai and Maui will be scheduled in mid November. Flyers for the program will be sent out shortly and the cost is $10 per person which includes dinner and all registration materials. It will start at 5:00 p.m. and will be about a three hour program.

Annual Meeting.—Dr Shirasu reported that the annual meeting brochure/registration was sent out and encouraged the Presidents of the Component Societies to remind their members to attend and to register early.

Meeting was adjourned at 7:40 p.m.

News and Notes Henry N. Yokoyama MD

Life in These Parts

Appointed, Elected & Honored

Straub oncologist ***Reginald C.S. Ho MD*** was awarded the prestigious La Salle D. Leffal Jr. Award for his outstanding and continued work with cancer patients. Reggie received the award on April 26 during the 6th Biennial Symposium on Minorities, "The Medically Under Served & Cancer."

While ACS National President, Reggie was concerned about the national surveys which showed that pain in cancer patients was inadequately treated and that most cancer patients died in pain. He organized a task force of cancer pain experts which helped ACS develop a program to correct the issue. Reggie states, "No cancer pain should be endured. Cancer pain can be relieved 90% of the time with relatively simple treatments and with more effort, the rest of the time. Patients should not be afraid to take pain medication at the dosages prescribed by their doctors; patients rarely become addicted. It's also very helpful for the cancer patient to develop a positive attitude with meditation and prayer. And I recommend that cancer patients understand their right to expect pain relief."

Ruth Matsuura, Hilo pediatrician and wife of the late Senator Richard Matsuura was honored in June with Hilo's Distinguished Humanitarian award.

EMS physician ***Samuel Gingrich*** was awarded the prestigious "Livingston M.F. Wong Lifetime Achievement Award" in an awards ceremony at the 12th Annual Pre-Hospital Emergency Care Symposium on May 17 at Kuakini Medical Center.

National News

Hi Lites of Tobacco Deal:

Penalty—Tobacco companies pay $360 billion in the first 25 years and then 15 billion a year.

Nicotine—The FDA could regulate nicotine as a drug, but could not ban it until 2009.

Cigarette Corporations' Liability—Sick smokers could still sue the industry.

Marketing—

- No bill boards or other outdoor ads.
- No humans or cartoons in ads or on cigarette packs.
- No brand name sponsorship of sporting events.
- No cigarette vending machines.

****Settlement ends 40 state lawsuits seeking to recover Medicaid money spent treating sick smokers and end 17 class action suits against the industry.*

Losers—

- Smokers could pay 75 cents to a dollar per pack.
- Farmers, mostly in south, might suffer from dropping tobacco sales.
- Convenience stores, which sell half the cigarettes in the U.S. lose business.
- Lawyers lose out - people suing cigarette companies can only recover actual damages eg. medical costs.

Medical Tid Bits *(Gleaned from PlayBoy June 97)*

Oil of Oleo—

Joaquine Brear, clinical dermatologist, U. of Illinois says, "The best over the counter treatment for dry skin is CRISCO."

Name that Symptom *(From Stitches June 1997)*

Name that Symptom—

The other day a 25-year-old Chinese patient came into the clinic complaining of neck pain.

After examining him, I concluded that he had a neck strain. I wanted to prescribe Naprosyn, and asked if he had asthma (for which the drug is contraindicated). He didn't understand me, so I made a gesture towards his chest and asked him if he'd experienced wheezing.

With great excitement, he pounded his chest and repeated, "Yes! Me wheezing! Me wheezing!"

I looked at him with great confusion, he knew I didn't understand his excitement, so he pointed to his chart, where it revealed his name: Wei Zeng. *(Sheila Rothstein, Ottawa)*

New Appreciation for "Dr Dara's Diary" in Stitches June '97

(Excerpts therefrom which we find true in our own practice)

Monday—

"But the day was very busy and trying. In between the sick and dying were many who in politically correct days were called 'inadequate' and, prior to that, just plain 'whiners'."

Wednesday—

"I do hate it when spouses say to me, 'Tell him/her not to... but don't say I told you.' The problem is I'm such a bad liar."

Friday—

"I unfortunately had to inform an old lady, the last patient of the day, that her dementia had now made her a liability, on the road, and that she would have to give up her driver's license. 'I guess you're right,' she said. 'I often forget where I wanted to go and after a fruitless drive around town, I give up and go home, though sometimes I have difficulty finding that'."

Conference Notes

"Nihonsan Study", *Katsuhiko Yano, MD, PhD*

(Ni=Japan Hon=Honolulu San=San Francisco)

Ala Moana Hotel Plumeria Room on May 29.

History

Organized in 1965 and included: 2,000 men (ages 45 - 69) in Hiroshima, 8,000 men in Honolulu and 1,800 men in San Francisco

Purpose

Comparative study of cancer, cardiovascular disease and osteoporosis.

Results

CAD Incidence:
Hawaii men have 2 times more than Hiroshima men; S.F. men have 50% more than Hawaii men.

CVA Incidence:
Hiroshima men have 3 times more than Hawaii and S.F. men.

Obesity:
Hawaii and S.F. have more obese men than Hiroshima.

Hawaii men have higher levels of:
Total cholesterol, uric acid, and hyperglycemia

* Conclusions: (after 200 autopsies in Hiroshima and 300 in Honolulu)

re Cerebrovascular Disease

The incidence of hemorrhagic strokes is the same for Hiroshima and Honolulu men.

Incidence of cerebral infarctions is greater in Japan (esp in small intraparenchymal cerebral arteries which is associated with hypertension rather than atherosclerosis) The incidence of major cerebral artery atherosclerosis is higher in Hawaii men.

Projection: *Recent changes in environment and life-styles in Japan may lead to more CAD in Japan a/c with higher cholesterol levels, and more obesity and less strokes with better control of hypertension.

re Mean BP levels

Same for Hawaii and Japan, but higher in California. BP 160/95: Japan 25%; Hawaii 15%

re Diet

Lower animal fats and protein in Japan

re Smoking

75% men in Japan; 45% men in Hawaii; and 35% men in S.F. Heavier smokers (Over 20 cig/d) in Hawaii men.

re Alcohol Consumption

Japanese men drinkers number 2 times more than Hawaii men and 3 times more than S.F. men.

re Longevity

Japanese men in Japan are the longest lived in the world, but Japanese men in Hawaii are even longer lived by 4 years.

Conference Notes

Health Insurance in Hiroshima (100% coverage)

Dr Hiroki Nakatani, Director-General, Dept. of Health & Welfare Services, Hiroshima Prefecture

At present, private insurance 47%; prefectural 53%; 40 years ago, 60 to 70% of health insurance was private. Separate health insurance programs

for employees, farmers, and the elderly.

re Malpractice cases

There are 300 court cases in all of Japan; while 10 times or 3,000 cases are settled out of court.

re Japanese Health Insurance

- Self employed: covered by city or prefecture
- Large companies eg. Sony and Toyota have their own health insurance programs
- Farmers and the elderly have separate programs (nursing home insurance for the elderly)

re Fee Scale

Fees for service (universal) reviewed twice a year. Problem with the increasing elderly population. There are 1.8 workers to each retiree; the ratio may be 1 to 1 in the future.

Conference Notes

"Treatment of Alzheimer's—New Developments and Implications for the Future"
QMC April 4, ***V.P. Robert Bradshear III***, Assistant Professor of Neurology and Psychiatry, University of Virginia.

Dementia

- Alzheimer's D
- Vascular Dementia
- Mixed Dementia

Impact

- Alzheimer's is an age related disorder. 4.5 million cases in the U.S. Any treatment will help health care survival. Definitive therapy needed.

Diagnosis of Dementia Syndrome

- Loss of intelligence sufficient to impair social or occupational functions.
- Memory impairment
- Defect in judgement, abstraction, language, custodial abilities
- Diminished alert state of consciousness

Causes of Dementia

(70 to 80 diseases involved)

Ddx: Vascular, Infectious, Metabolic etc

- Vascular causes
  - Hypertension affects white matter
  - Lacuna strokes
  - Multiple infarcts
  (Most common cause of dementia)
- Infectious causes
  - Neurosyphilis
  - Bacterial, viral, protozoan etc.
- Traumatic causes
  - eg subdural
- Toxic causes
  -Medications: eg benzodiazepines, barbiturates, sleeping pills etc.
- Metabolic causes
  - eg B_{12} deficiency
- Inflammatory causes
  - Multiple sclerosis
  - Inflammatory arthritis
  - Limbic encephalitis
  - Malignancy
- Systemic diseases:
- Hydrocephalus
- Neurodegenerative diseases
  - Pick's disease a/c Cr 17
  - Huntington's disease
  - Parkinson's disease: 1/3 dementia
  - LewyBody Variant of Parkinson's

Pathogenesis of Alzheimer's D

- Neuro-imaging to exclude other diseases
- Dx is histological
- NSAID's may have protective value
- Vascular amyloid
- Neurochemical changes in A.D. and P.D. (Alzheimer's and Parkinson's diseases)

	A.D.	P.D.
Acetylcholine	↓↓↓	↓–
Somatostatin	↓↓↓	↓–
CRF	↓↓	–
Substance P	↓–	↓
Serotonin	↓–	↓

Clinical Aspects of Dementia

- Reversible Dementia <5%
- Treatable Dementia 10%
  Total 15%
- A.D. (Alzheimer's)
- P.D. (Parkinson's) =
  Vascular Dementia 2/3

Criteria for the Clinical Dx of Probable A.D.

- Clinical exam and neuro-psychologic test
- Deficits in at least 2 cognitive areas
- Progressive worsening of memory and cognition
- No disturbance of consciousness
- Onset ages 40 to 90
- Absence of other causes of Dementia

Routine Testing for Dementia Workup

• CBC	$15
• Chem 17	$31
• Thyroid scan	$71 (TSH & T4)
• B_{12} (folate)	$45
• Serology	RPR $12 MHA TP $10
• ESR	$17
• Neuroimaging	Unenhanced CT $318 + $234 (professional fee)

Diagnostic Algorithm

Cognitive Impairment
↓ (Exclude delirium, depression, malingering, etc)
- Meet criteria for dementia

Dementia
↓ (Exclude treatable dementia, static encephalopathy)
- Lab testing, neuroimaging

Primary Degenerative Dementia
↓ (Exclude other disorders)
- Meet NINCDS/ADRDA criteria

Probable Alzheimer's Dis.
↓ (Exclude other pathology)
- Pathological exam

Definite Alzheimer's Dis.

Alzheimer's Disease: Good genes/Bad genes?

- Familial A.D.
- B-Amyloid & Amyloid precursor disorder
- Cr 21
- Cr 14
- Dr 19
- APOE

Treatment A.D. & Other Dementia

- Specific treatment for reversible dementia
- Symptomatic treatment—Identity specific behavior
  - Tacrine & other Rx
- Definitive treatment for A.D.—New trials
- Support treatment: Accurate diagnosis & genetic counseling

There's No Excuse for Domestic Violence

Medical School Hotline
Continued from Page 224

University of California at Berkeley, Irvine, UCLA, and Santa Barbara, Universities of Washington, Michigan, Pennsylvania, Vermont and West Florida, Columbia University, Loyola Marymount University, Stanford University, Wellesley College, Brown University, Bryn Mawr College, Creighton University, Linfield College, Marquette University, Northwestern University, New York University, Occidental College, Pacific Lutheran University, Pomona College, Seattle Pacific University, Tufts University, Williams College, and Yale University.

All of the students have Baccalaureate degrees; eight have Masters degrees and one holds a Doctorate. Twenty are Biology Majors and there are two each in the following majors—Psychology, Civil Engineering, English, History, and Human Biology. Other undergraduate majors are—Zoology, Art, Biochemistry, Japanese Language and Literature, Biomedical Engineering, Business Administration, Chemical Engineering, Chemistry, Biological Science, Early Childhood Education, English, Public Health, Genetics, Marine Biology, Mathematics, Microbiology, Nutrition, Pre-Medicine, Psychobiology, Religion, Visual Arts, and Zoology.

The Admissions Committee is composed of ten volunteer members. Equal numbers of male and female members represent the clinical and basic sciences. One member is from the community-at-large. The major ethnic groups in Hawaii are represent, so too are a variety of age levels. The Committee meets from September through the middle of May.

The ranking of the 232 interviewed candidates was determined by the Admissions Committee through secret ballots. Considered in the rating by each committee member were the following: Hawaii residency status, academic scores (Grade Point Average and scores from the Medical College Admissions Test-MCAT), interviews, essays that answer the questions, "Why medicine?" and "Why the John A. Burns School of Medicine?", letters of recommendation, and a biographical sketch and transcripts from the American College of Admission Service (AMCAS). In addition, credits are provided for clinical/health-related experiences (i.e. employment, community services, volunteerism and related research/graduate studies). Finally, the applicant is interviewed by the Chair of the Admissions Committee who is also the School's Associate Dean.

A comparison with the nationwide April, 1996 MCAT scores illustrates that JABSOM's first year students' scores are competitive with the national norms. The averages of all those who took the MCAT in 1996 were: Verbal Reasoning 8.0, Physical Sciences 8.3, and Biological Sciences 8.5. The incoming JABSOM students averaged 8.87 in Verbal Reasoning, 9.12 in Physical Science, and 9.88 in Biological Sciences. (note: the scores cited for JABSOM students are from the 1994, '95, and '96 test results since MCAT Scores are valid for a period of three years for admission purposes to JABSOM. However, the average scores each year do not vary significantly.)

Each student has been assigned a faculty advisor who is in close contact with him/her throughout the four years. Students are encouraged strongly to seek the assistance of their advisors.

The members of the class of 1997 are on their way to an exciting and humanitarian journey which will lead them to a lifetime of fulfillment. They have been selected in the best way we know to ensure that the community will be served by competent, well-trained physicians who are not only scientists but also masters in the art of comforting their fellow human beings.

Classified Notices

To place a classified notice:

HMA members.—Please send a signed and typewritten ad to the HMA office. As a benefit of membership, HMA members may place a complimentary one-time classified ad in HMJ as space is available.

Nonmembers.—Please call 536-7702 for a nonmember form. Rates are $1.50 a word with a minimum of 20 words or $30. Not commissionable. Payment must accompany written order.

Locum Tenens

Experienced Family Practice.—Office coverage including office surgical procedures (Board Certified), and available on regular basis or short notice. Maui only (808) 878-6119.

Take an Afternoon Off.—While your office stays open. Part-time primary care office coverage on a regular or occasional basis by longtime Honolulu physician. Contact John Wichmann-Walczak MD at 739-9483 or 524-2575.

For Sale

Equipment for sale.—Used Bone Densitometry Equipment. DXA - Hologic QDR 1000 (new x-ray tube) $15,000, SXA - Osteoanalyzer 2000. $9,000. Will assist with training and interpretation. Hawaii Osteoporosis Center 592-2626.

Practice for Sale

Cardiology Practice for Sale.—Fully equipped office including stress testing, echo and holter monitoring. c/o Century 59 Hoku St., Hilo, HI 96720.

Announcement

General Practice Opened.—In Kapahulu area by 20-year veteran of St. Francis ER. New patients welcomed; free pkg; convenient hrs; house calls (downtown Honolulu-Aina Haina). John Wichmann-Walczak MD at 750 Palani Ave., Honolulu 96816. 739-9483

Business Opportunity

Veteran Certified Petroleum Geologist.—Wishes to team up with oil and gas investment capital finder. Excellent remuneration. (614) 453-9231 or fax (614) 450-7507.

Misc.

Cars for Catholic Charities.—Give hope to a needy child or family by donating your car to Catholic Charities. Your donation is tax deductible at the fair market value. Call (808) 537-6321, Ext. 303 for more information.

The Weathervane

Russell T. Stodd MD

Bureaucracy defends the status quo long past the time when the quo has lost its status.

In the discussion surrounding the cost of doing business in Hawaii, often overlooked is the added premium to your malpractice insurance provided by the state legislature. Not only is your carrier required to pay 4.165% gross excise tax, but in addition 3.75% for the Hawaii Hurricane Relief Fund. This state surcharge on your malpractice premium amounts to 7.915% compared with an average of 2.89% in other western states. Malpractice premium for hurricane coverage! Lucky (?) you live Hawaii.

Nothing that well meaning people might do should surprise us.

Not only is latanoprost good for glaucoma, and not only will it sometimes darken pale irides, but now it has been claimed to stimulate eyelash growth. So far, it is an observation, and not a controlled study, but Seattle eye surgeon Murray Johnstone claims that 30 of his glaucoma patients are developing longer, thicker eyelashes. Supposedly, the new look is "quite striking" and the doctor has alertly applied for a patent to use the drug to stimulate hair growth. The pharmaceutical company has made no comment on the report.

Confusion not only reigns, it pours.

A study published in the *New England Journal of Medicine*, suggested that Medicare patients use health maintenance organization (HMOs) as a revolving door. When they are healthy, they sign with an HMO. Then they leave the managed care plan when a medical problem is pending. Those who leave the HMO have about 50% more admissions to the hospital within 90 days, compared with patients who have remained in a conventional Medicare program. The results suggest that HMOs are being overpaid by the Medicare program, and of course, the study has been challenged by the managed care industry.

We are with the government and we are here to help.

Attention Hilo docs: a medical education center will be built in Hilo using $10.75 million in federal loans and loan guarantees. Senator Daniel Inouye made the announcement, that plans are for a two-story, 18,000 square foot building to be located across from Hilo Hospital. The building will house a Family Practice Clinic, which will provide training for doctors and nursing students, a cancer treatment and research center, and fiber optic links to Tripler Army Medical Center's telemedicine facilities. The loans and loan guarantees will be through the Rural Development Agency of the U.S. Department of Agriculture.

Whatever the conversation, they are talking about money.

Premarin is the number one prescription drug in America today. Wyeth-Ayerst Laboratories, a division of American Home Products, generates almost $1 billion annually from this pharmaceutical alone. Several plant-based alternatives to Premarin were in production or on the market in Canada and the U.S. until 1991. Then Wyeth-Ayerst alleged that the generics did not mimic Premarin identically, and the Food and Drug Administration pulled the generics off the market. Two companies, Duramed Pharmaceuticals and Barr Laboratories, stuck out the process and finally met all the FDA criteria. Clearing the last hurdle, the companies naively anticipated FDA approval, and that science would prevail. But now, enter the politicians. Wyeth-Ayerst and parent company American Home Products, launched a pressure attack urging Senators Boxer, Bradley, Snowe, Mikulski and Murray to write letters to the FDA to halt the generic drug's progress. American Home CEO John Stafford attended a White House coffee, and shortly thereafter dropped $50,000 on the Democratic National Committee. The FDA decided that it must re-examine new evidence, which had actually been examined and dismissed twice in the past. The generics were hung out to dry. But an internal FDA memo laid waste to Wyeth-Ayerst claims, and observed that the agency's decision on these matters could have the effect not only of impeding generic substitution, but also of reducing the incentive to develop necessary public health information. Moreover, the inspector-general of the Dept. of HHS, chimed in with a report that provides even more questions about the FDA's laggard management of the petition and lack of documentation to support Wyeth-Ayerst. For purchasers of the drug, such as Medicare, it could mean savings of $300 million per year.

Careful men. They charge when threatened.

Dr J. Trevor Woodhams' reported that the Food and Drug Administration enforcement officers entered his office, and "arrested" a black-box laser. The FDA sources confirmed the doctor's report and claimed the action was taken against the device. This is the first action directed against an unapproved excimer laser owned by an individual ophthalmologist. It was stated that Dr. Woodhams was performing laser in situ keratomileusis (LASIK) at the rate of about 10 cases per week. Of note is that Dr Woodhams practice serves the same area as the Emory Vision Correction Center where LASIK is performed under an FDA investigational exemption. An FDA officer said it was just a "coincidence" that this first blackbox arrest was made in Atlanta.

It is becoming hard to die, because the details of living get in the way.

"The asserted 'right' to assistance in committing suicide is not a fundamental liberty interest protected by the Due Process Clause." So wrote Chief Justice of the United States, William Rehnquist, in the unanimous decision of the Supreme Court. Most major medical groups, including the American Medical Association, generally applauded. However, Justice Rehnquist, whose wife died of ovarian cancer after a protracted battle, conceded that the ruling doesn't foreclose the possibility that dying patients will be granted additional rights in the future. Additionally, several justices in concurring opinions, added that physicians can take aggressive steps—such as providing more and more potent drugs to relieve terminal patient's pain, even if that treatment accelerates death.

Any frontal attack on ignorance is bound to fail.

The U.S. Air Force held a press conference to announce the "final word" about the space alien episode allegedly seen in the desert near Roswell, New Mexico, 50 years ago. The "bodies" seen were actually anthropomorphic dummies used to test parachutes. Scientists and astronomers are laughing at the Air Force. Modern day believers see UFOs and aliens while the ancients saw dragons, giants and mermaids. Considering that the *Heaven's Gate* followers were certain to board the space ship behind Hale-Bopp, and that a surprising percentage of people still believe that the earth is the center of the universe, the Roswell UFO sightings will live on. Meanwhile, the Chamber of Commerce in Roswell hosted a 50th anniversary fair with visits to the crash site, exhibits and talks at the International UFO Museum and Research Center, and an alien costume contest.

Addenda—

- A prion, a protein smaller than a virus, causes the fatal illness Creuzfeldt-Jakob Disease and can cause an infection without an inflammatory response.
- Although the banana plant may look like a tree, it is actually considered a very large herb.
- The average American eats the equivalent of 28 pigs in his lifetime.

Aloha and keep the faith—rts ■

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Telephone: 800-227-4527

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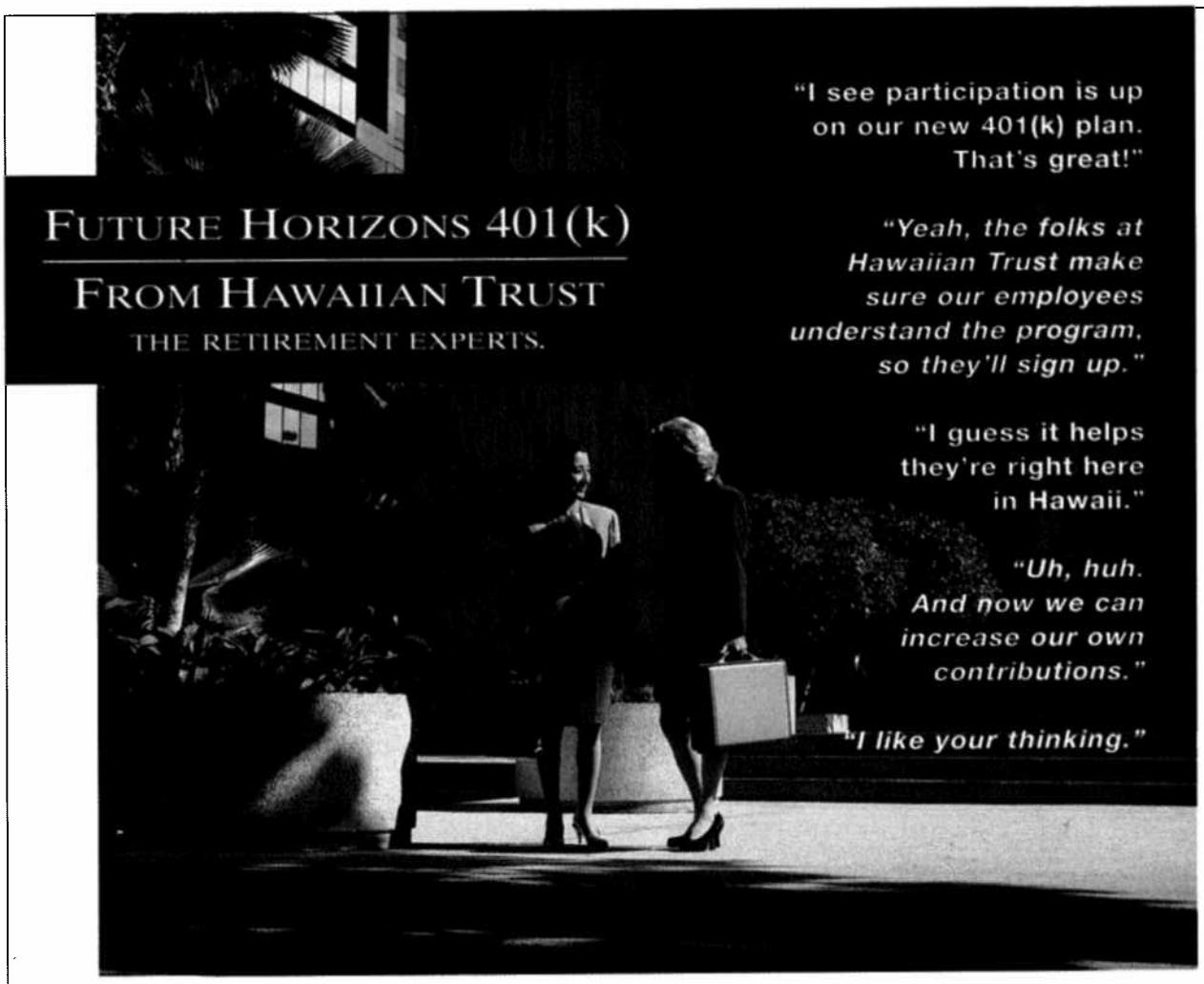
1360 South Beretania, Suite 405, Honolulu, Hawaii 96814
Telephone: 808-545-7231



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