Canadian Audiologist

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Happenings

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Canadian Hearing and Auditory Research Translation (CHART) Group

Left to Right: Back Row: Kimberley MacKenzie, David Purcell, Ian Bruce, Larry Roberts, Robert Harrison, Brian Westerberg, Brian Blakely, Andrew Dimitrijevic, Matt Lucas. Front Row: John Pepperell, Nicole Synowskie, Lindsay Thibault, Susan Scollie, Steve Aiken, Manohar Bance, Prudence Allen, Sylvie Hebert, Mary Smirle, Navid Shahnaz. Absent from photo: Marshall Chasin, Vincent Lin.

The Hearing Foundation of Canada recently supported the second annual meeting of the Canadian Hearing and Auditory Research Translation (CHART) group, with sponsorship from Vivosonic Inc and Cochlear. This is a pan-Canadian and truly interdisciplinary panel of audiologists, otologists, engineers, and basic scientists interested in pushing forward the frontiers of hearing research, assessment and diagnosis. The CHART researchers met to try and grapple with the “big issues” in hearing health, and diseases and disorders that threaten it. Specifically, the effects of hearing loss

on communication, ability to enjoy music, relationships, mental health, educational and life trajectory are well recognized. This has major public health consequences in Canada that need to be addressed.

There were two major themes that CHART decided to concentrate on.

1. Assessing hidden hearing loss:

We increasingly recognize that hearing damage starts well before we can measure it with the usual clinical hearing tests. This damage impairs normal hearing in many ways, but can be overlooked because our current tests seem normal. Many people have problems with communication, such as not being able to understand speech in background noise or tinnitus, with “normal” hearing tests. Others, such as newborns, and the elderly with dementia, are difficult to test for hearing loss, even though it is vital to detect in these populations. Yet other groups, such as teenagers listening to loud music, people working in noisy environments, and military recruits, cancer patients undergoing chemotherapy, and the elderly, are known to be at high risk for developing hearing impairment with time.

If we could detect these group’s hearing impairment early, we could potentially change the course of their hearing loss and life experience with time. Interventions might include limiting noise exposure, education, reducing chemotherapy or fitting with hearing aids and other hearing technologies. In time, we may well develop medical therapies that could arrest or even reverse the hearing loss, if we could catch it early.

CHART felt a major priority was to do much better with our hearing tests. There are a lot of sophisticated tests being developed in laboratories in Canada, but few are being applied systematically to patients to test hearing impairment. Chart identified the need to give a diagnostic “voice” to silent hearing loss, the tsunami of “hidden hearing loss” that exists in Canada. To do this we identified several themes.

1. Beyond the Audiogram (current hearing tests): Researchers decided to pool their knowledge and skills to develop a test battery that would test all aspects of hearing, far more than is currently tested. We felt this would give us a more comprehensive picture of hearing impairment, where it is, and detect it far earlier than the audiogram. This will take systematic cooperation between all the groups in Canada.
2. All ages applicability: The test types include both behavioral and objective tests so that we can test those who can’t respond easily, such as infants, children, and mentally impaired adults. The tests minimize the need to speak English to maximize our reach.
3. Real world hearing: The tests tap into a wide range of hearing abilities that are important for hearing well in real world environments, by measuring hearing abilities that reflect hearing clarity and hearing well with two ears.

2. Our auditory system is still a “black box”

In people who have known hearing loss, measured and detected by our current hearing tests, there is still a huge lack of knowledge about which parts of the hearing system are affected. The tests are generally a “black box” and tell us there is a hearing loss, but not how it’s affecting hearing ability and where the problem might be. By taking our sophisticated battery of tests we are developing in (1) above, we can begin to separate out these hearing losses into different types, and also begin to understand how they truly affect hearing ability. This is the first step to understanding where the biology is breaking down in these patients, and what mechanisms are at play. Only then can we hope to develop treatments that are guided by a rational understanding of what is actually going wrong, and so have a chance of arresting or curing the hearing loss. It also would help us apply

current therapies, such as hearing aids, cochlear implants and similar technologies in a more tailored way to each patient.

As part of the translating this research to actual practice, we will need to find ways to automate testing with software, validate them and test in normal subjects to find normal ranges, find ways to pool data in national database open to all researchers, and develop clinical training materials and outreach to teach other clinicians how to do the tests and what they mean.

FOR MORE INFORMATION CONTACT EITHER DR. MANOHAR BANCE, MD AT BANCE@DAL.CA OR DR. STEVE AIKEN, PhD AT STEVE.AIKEN@DAL.CA.

Passing of Earl Harford Courtesy of Hearing Review

Tribute: Earl Harford, PhD, Educator and Innovator in Audiology
Published on October 4, 2016

Earl Harford with his wife, Jennifer.

Earl Harford, PhD, a renowned educator, clinician, and innovator in the field of Audiology and hearing healthcare, died on September 24, 2016 at his home in Tucson, Ariz. He was 86. Dr Harford was well known for his professional and academic career in Audiology which began at McGill University. He then spent 17 years at Northwest ern University, where he taught, mentored, and published with luminaries in our profession including Raymond Carhart, Jim Jerger, Bill Rintelmann, Fred Bess, Joe Barry, Richard Wilson, and many other historical and current scientists and leaders in the profession. His contributions to clinical research are well known and are the foundation for many current clinical activities.

A true pioneer in audiology, Earl's efforts helped shape the profession for the past 65 years. He had decades of experience in academia, including influential roles at Northwestern University, Vanderbilt University, and the University of Minnesota Medical School. He introduced CROS hearing aids for unilateral deafness while at Northwestern in the mid-60s. His early publications on CROS resulted in the development of open-canal amplification for high frequency losses. At the University of Minnesota, he helped develop *in situ* measurements of the ear, placing miniature microphone deep down into the ear canal. This led to the commercial development and adoption of real-ear measurements in clinical practice; as a result he is considered by many to be the "father of real-ear measurements." He was among the earliest researchers to introduce tympanometry, acoustic reflex measurements, and real-ear measurement in the United States.

He left the University of Minnesota after establishing possibly the first for-profit dispensing practices in a University setting in the United States. After a decade in private practice in Minnesota, where he was one of the first audiologists in the state to dispense hearing aids, Dr Harford sold his practice and was asked to join Starkey Laboratories Inc. His greatest contribution at Starkey was the development of the Student Internship Program. Earl and Jim Curran developed a program that granted scholarships and supported Audiology graduate students at Star key for 6

weeks, where students actively participated and learned about product development, research, production, hearing aid fitting, and all aspects of the manufacturing and distribution process. More than 150 audiolo gists went through this program and many of our current lead ers in the profession were mentored by Earl in this program. It also influenced the development of other manufacturer-academic bridge-building programs throughout the profession.

Harford had long believed that existing audiology education was not adequately preparing students to enter the profession with the knowledge and skills necessary for independent clinical practice. As an advocate for Audiology and the AuD, Dr Harford delivered the Carhart Lecture at the combined meeting of the American Auditory Society (AAS) and the American Academy of Audiology (AAA) in 1993. It was there that he provided a rationale for an inde pendent profession, including the foundation for changing the existing model of master's level education and transitioning to doc toral profession, thereby creating an autonomous profession of Doctors of Audiology. Dr Harford was also honored in 2012 by AAA with the Samuel F. Lybarger Award for Achievements in Industry for significant pioneering activity within the field of hearing.

The last chapter of Harford's professional journey came 5 years ago when he was asked to join the Board of Directors of the Starkey Hearing Foundation. In his work with the Foundation, he pursued and supported the Foundation's development of training programs to make the mission of the Foundation to fit and distribute hearing aids to indigent and needy hearing-impaired people of all ages around the world sustainable. With his influence, the Foundation began training local people to provide hearing care, thus giving not only the gift of hearing to millions, but helping provide more economic stability within economically deprived regions of the world—giving people a way to improve their own lives and those of their neighbors in their local communities. The Foundation opened its first training program, The Starkey Hearing Institute in Lusaka, Zambia, with 12 students from 9 African countries this past spring. The program will provide an 11-month training to individuals who will return to their countries and provide hearing healthcare. Dr Harford was working on this and related projects until the last day of his life.
Dr Harford is survived by his loving wife, Jennifer, four children, and six grandchildren.

Hearing Review thanks Dr Barry Freeman for this tribute, as well as the Harford family for the photograph.

Bill Rintelmann (1930-2016)

By Wayne Staab On August 30, 2016

His exemplary academic career in audiology started with his graduation from Arizona State College, followed by M.A. and Ph.D. degrees from Indiana University. Bill took time off from his academic career to serve as a Lieutenant in the U.S. Army Field Artillery for three years. He was the first post-doctoral student in audiology in the United States working with Raymond Carhart at Northwestern University in the early 1960s. Bill chaired audiology departments at The University of Pennsylvania and Wayne State University. He also served on faculties at the University of North Dakota, Northwestern and Michigan State Universities. He retired from Wayne State University in 1995.

His many contributions to the field included key investigations on word recognition tests, various aspects of diagnostic audiology, and

William F. Rintelmann,

Ph.D. (1930-2016)Those in the discipline of hearing, and many individuals, are saddened to hear that one of the pioneers in our field, William “Bill” Rintelmann, passed away on August 21, 2016 at his home in Carefree, AZ.

he was perhaps the first audiologist directly involved in functional imaging studies at Brookhaven labs in 1979. Bill is credited with over 80 articles in scientific and professional journals as well as 14 book chapters. He also edited or co-edited four popular textbooks in audiology which included first and second editions of “Hearing Assessment” in 1979 and 1991, “Principles of Speech Audiometry” in 1983, and “Contemporary Perspectives of Hearing Assessment” in 1999.

In 1997 he received the “Career Award in Hearing” from the American Academy of Audiology, a fitting tribute to his many contributions to audiology. Bill was also a Fellow of the American Speech-Language-Hearing Association, a member of the American Academy of Audiology, the Academy of Rehabilitative Audiology, and served eight years on the Executive Committee of the American Auditory Society. Bill was a consummate teacher, providing vivid historical accounts of important aspects of audiology to his students, many of whom have become leaders in the field. Moreover, he was a kind and dear friend to many students and professionals in speech and hearing generously sharing his time, expertise and guidance over many years. He will be dearly missed.

Editor’s Personal Note: Bill was first my audiology/hearing science mentor, then colleague, and lastly a dear friend. In some ways we followed each other around. Bill taught at the University of North Dakota, a position that I followed a few years later. I often mentioned to him that I was “fortunate” to inherit his extensive hearing facilities and equipment. This consisted of a Bogan amplifier, an attenuator (0 being no reduction, or the loudest sound), a Western Electric 2A audiometer, a turntable with the loudness controlled by the attenuator and sound directed to either the audiometer earphones or to a speaker on the wall, and a very small “sound-treated” room put together, I assume, by University workers. I believe there was also a Beltone 5A audiometer as well. What more could one want?

When I enrolled at Michigan State University for my doctoral program, Bill was on the faculty and became my mentor: a task master, interesting, a font of knowledge, detailed, intensive, demanding, but always fair and easy to communicate with. One definitely learned about audiology from Bill. He was later my dissertation advisor.

A few years after leaving Michigan State University, I entered the “dark side” of the hearing aid industry. Bill supported my decision and counseled me to ignore the admonitions from the “professional” community and encouraged me to show how I could help affect change in the hearing aid industry, and perhaps even in audiology in my new endeavor. It was great advice, and he followed my career in industry very closely.

After Bill retired, he moved to Arizona where he and I were going to spend time fishing. We did some, but not enough because I moved from Phoenix, something I had never thought I would do. Over the years, we had many good times, professionally and personally – those that I will always cherish.

Thank you, Bill, for everything, and may you rest in peace.

Wayne Staab

Announcing the Passing of Leo Beranek

It is with great sadness that we announce the passing of Leo Beranek, Honorary Fellow of the International Institute of Acoustics and Vibration (IIAV) on October 10, 2016 at his home in Westwood, Massachusetts. He was 102. He was one of the main founders of the prominent acoustical consulting firm, Bolt Beranek & Newman (BBN). Dr. Beranek was also famous for his scientific contributions in acoustics and noise control, including the publication of several important books and design of concert halls. An important contribution was to develop the computer-based network called Arpanet, the forerunner of the Internet. His life is recorded in some detail in his autobiography called Riding the Waves published in 2008 of which a book review follows.

Riding the Waves: A Life in Sound, Science, and Industry
By Leo Beranek
The MIT Press, Cambridge, Massachusetts, 2008
ISBN: 978-0-262-0269-1, 235 pp Price US $24.95

Leo Beranek's fame as an acoustician largely rests on his several books on acoustics and noise and vibration control, and on the fact that he was one of the main founders of the prominent acoustical consulting firm, Bolt Beranek & Newman. But his recently published autobiography based on his reminiscences, dairies and appointment books, reveals the man and his considerable contributions to acoustics, noise control engineering, music, and broadcasting in much more detail. In Riding the Waves Beranek describes his humble beginnings in rural Solon, Iowa, where he was born in a farm- house in 1914, and where he was taught in a one-room schoolhouse and where in 1935 he earned a bachelors degree from Cornell College, Mount Vernon, Iowa. Beranek's life changed, however, as a result of a chance encounter with a passing motorist, whose Cadillac, with its Massachusetts license plates, stopped with a flat tire in Mount Vernon. Beranek offered his assistance. The motorist, Glenn Browning, turned out to be a former Harvard University engineering professor who subsequently helped him gain admission to Harvard along with a Gordon MacKay scholarship. This opportunity was one that Beranek could never have dreamed of and one which would have been impossible without Browning's help. Arriving in Cambridge in August 1936, Beranek threw himself into his engineering studies and at the same time undertook several part time jobs to make ends meet. His major professor, Ted Hunt, put him to work on developing a light- weight gramophone pick up and on updating laboratory experiments. Hunt and Beranek also worked at developing a better low frequency loudspeaker system. The loudspeaker was comprised of a folded exponential horn and with it a power amplifier was developed. This successful project eventually paved the way to the much improved 12 inch long playing records which became widely available in later years. Beranek describes his interactions with many famous acousticians, such as Maa Dah You, Dick Bolt, students at that time, and with Professor Philip Morse at MIT, and subsequently with many others too numerous to recount here. Perhaps one of the most interesting episodes is his description of his involvement in the US war effort after Pearl Harbor in 1941.

Government money for research seemed to be of no object. Beranek became involved in a crash program to reduce the cockpit noise in American bombers. The noise was so intense that the pilots and aircrew could not communicate properly. Pilot and aircrew concentration, efficiency and fatigue were also serious problems. He was put in charge of a large group of researchers, which led to the development of lightweight sound absorbing materials and to communication headsets with better high frequency performance and improved speech intelligibility. Enormous amounts of

US government money were poured into the Harvard Acoustics Laboratory during the Second World War to fund the rapidly expanding laboratory with Beranek as its director. A parallel psychoacoustics laboratory was set up at MIT under S.S. Stevens, which was involved in speech intelligibly and other related research. A large anechoic test chamber was also built to test Army loudspeakers, with wedges developed by Beranek and the fledgling Eckel Company. In addition a huge effort was started to improve and speed up naval communications at sea to combat the growing kamikaze menace to the US fleet off Japan in the closing stages of the Pacific War in 1944-45. The results of this research effort were never put to use, however, because of the dropping of the atomic bombs over Japan and the subsequent cessation of hostilities. Beranek goes on to describe the relatively tranquil period of his life teaching acoustics and electronics at MIT from 1947-1958. Consulting with the General Radio Company and other companies increasingly interfered with his academic life and with the writing of scholarly papers and books, so that he decreased his MIT teaching and research involvement to 75, then 50% and finally resigned altogether in 1958.

During this period in 1947, Dick Bolt, then director of the MIT Acoustics Laboratory, received an extensive consulting project to manage the acoustics of the United Nations Building in New York. Bolt realised that the project was too big for one person and enlisted Beranek's help. Soon after, New- man was brought on board, eventually leading to the formation of the Bolt Beranek & Newman (BBN) consulting firm, which was formally incorporated in 1953. Beranek reviews the rapid development of the BBN Company both in numbers of personnel and projects, one of which was the ARPANET project undertaken for the US Department of Defense, which eventually led to the development of the Internet. Other BBN projects led to his book, Music, Acoustics and Architecture, Wiley,1962, and eventually to his involvement as acoustical consultant to the new Philharmonic Hall at Lincoln Center. Beranek, himself, describes the opening night performance with Leonard Bernstein as conductor in December 1962 as a debacle. Beranek then describes his involvement with Boston Broad- casters who eventually secured control of Channel 5 in Boston. When Channel 5 was sold in 1982 to Metromedia, Beranek, its CEO, became a very wealthy man. The rest of Beranek's autobiography largely describes family matters, his passion for skiing, and his involvement with various non- profit societies. He also describes how starting in 1992 he worked on the acoustical design of opera houses and concert halls in Japan. In his autobiography Leo Beranek recounts his many successes but he does not omit his failures. This is a remarkable story of the life of a man who rose from very humble beginnings to a career involving some of the most important scientific research, technical decisions and business and cultural activities at the top echelons of American life. For those with an interest in acoustics, noise and vibration control and also for those with a general interest in scientific and technical developments in the last 70 years, this book makes really enjoyable and informative reading.

Malcolm J. Crocker
IJAV Editor in Chief

Detailed obituaries can be found as follows:

http://www.nytimes.com/2016/10/18/business/leo-beranek-dead.html
http://acousticalsociety.org/sites/default/files/Leo_Beranek.pdf
http://www.inceusa.org/node/499

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