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ECHOES

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Celebrating 25 Years of Newman Fund Awards in Architectural Acoustics

William J. Cavanaugh

On May 24th 2011 at the 161st Meeting of the Acoustical Society in Seattle a special technical session of invited papers celebrated the 25 years that have elapsed since the first Robert Bradford Newman Student Medals were awarded in 1986 to students for *merit in the study of architectural acoustics*. To date Newman Medals have been awarded to students at more than fifty academic institutions where there are established courses in architectural acoustics and opportunities for students to apply the principles learned in their course work.

Participants in the Newman session: Carl Rosenberg, co-chair of fund advisory committee; Mary Newman, widow of Robert Newman and honorary chair of advisory committee; Bill Cavanaugh, co-chair of advisory committee; Michelle Vigeant, past Newman medalist and member of advisory committee

Bob Newman was a gifted teacher in architectural acoustics on the faculties of both the MIT School of Architecture and the Harvard Graduate School of Design as well as a popular invited lecturer at numerous schools of architecture throughout the world. Several of his former students including this author serve on the Newman Fund Advisory Committee and presented papers in the 25th anniversary session. Bob was also a founding principal of the pioneering acoustical consulting and research firm, Bolt Beranek and Newman (BBN), which grew rapidly from its formation in 1948 to provide acoustical consulting assistance for the new United Nations headquarters in New York from its initial office in Cambridge and subsequently from branch offices in Los Angeles, New York City, Chicago, Houston and San Francisco during the 1950s through the 1970s. BBN's plethora of new and interesting assignments in building acoustics provided Bob with a never ending supply of stories to illustrate fundamental principles in architectural acoustics. I often wondered where Bob acquired his unique highly effective teaching style until I became acquainted early in my own consulting career with the late Dr. C.P. Boner with whom Bob had studied while obtaining his BS and MS degrees in Physics at the University of Texas at Austin. Once a student heard explanations of the simplest to the most complex acoustical concepts, often colored with humorous application examples, from either one of these extraordinary teachers they would never forget their essential teaching point!

Sadly at the peak of his teaching and consulting career Bob Newman succumbed to a sudden and unexpected aortic aneurism on 2 October 1983. Shortly after Bob's death a group of his friends and colleagues met periodically to see if there was some way that Bob's memory could be honored as well as continuing his self imposed teaching mission to "spread the word" in architectural acoustics. Bob constantly expressed the idea that, if architects are to produce really "well designed" buildings they must be exposed to at least one basic course covering the fundamentals of architectural acoustics preferably during their academic years or early in their professional practice. When the late Dr. Richard Bolt organized the first program in architectural acoustics at the MIT School of Architecture in the immediate post WWII years, with then graduate architectural student Bob Newman as his teaching assistant, there were perhaps no more than a half dozen formal courses in architectural acoustics at schools of architecture throughout the US and many of these of these were simply a few lectures by an often disinterested lecturer from the Physics department. At the time of Bob's death the number of schools with courses in architectural acoustics had more than doubled many taught by Bob or his former students as well as consulting colleagues at BBN. Fulfillment of the growing need for effective courses and teaching programs in architectural acoustics at institutions providing professional training for all those concerned with designing and engineering buildings of all types was the primary motivating factor for establishing the Robert Bradford Newman Student Award Fund.

As of the 25th Anniversary celebration the Newman

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We hear that . . .

- **Joichi Ito** has been named director of the Media Laboratory at the Massachusetts Institute of Technology. He will be the fourth director of the Media Laboratory, founded in 1985 by Nicholas Negroponte.
- From 1000 applicants, AKG (acoustics and cinema equipment company) selected 10 winners in their **Scholarship of Sound program**. Winners were transported to Berlin for the award presentation and a week of workshops and mentoring sessions on sound, covering music creation through to mastering and promotion.
- **Benjamin Clough**, a doctoral student at Rensselaer Polytechnic Institute, has won a $30,000 prize for developing a technique that uses sound waves to boost the effective distance at which terahertz spectroscopy can detect hidden explosives from a few feet to several meters. His method uses sound waves to remotely "listen" to terahertz signals and identify a target. First, two laser beams are focused into the air to create small bursts of plasma, which in turn create terahertz pulses, according to a story in the May issue of *Photonics Spectra*.
- ***Acoustical Science and Technology***. published by the Acoustical Society of Japan, will shift to an online-only journal at the beginning of 2012. Initially published as the *Journal of Acoustical Society of Japan (E)*, the name was changed to *Acoustical Science and Technology* in 2000. An archive of the articles will be sent annually to the members on CD-ROM.

To the editor:

Rise of acoustics in China

We read a lot about the growing economic clout of China, such as its rise to become the number three seat in the World Bank after the United States and Japan. But what about its rise in the field of science, especially acoustics? In order to gain some insight into this area I asked Dr. Jain (Jerry) Tian, past president of the Acoustical Society of China, how many graduate students are studying acoustics in China, knowing that students represent the future in any field. He called some professors at different universities and got results that are astounding to me. I have cut and pasted his answer below.

- Institute of Acoustics, CAS, 400+, Master and Doctor Degree Postgraduates
- Nanjing University, around 120 undergraduates + 75 Masters + 30 Doctors
- Harbin University of Engineering, around 800 undergraduates +500 postgraduates in which about 1/3 are doctoral degree candidates
- North-West Polytechnic University, 120 postgraduates in which about 1/3 are doctor degree candidates.
- Other Universities and Research Institutes, around 200 postgraduates.

In total, his estimate totaled more than **2,200 students** in acoustics compared to the 1,110 student members in the ASA. I don't know if we can fully comprehend the magnitude of the Chinese investment into all phases of acoustics and how they will be a major factor in acoustics research in the near future. The number of students studying acoustics in our different universities is miniscule in comparison. So the time is ripe for all of us to consider engaging our Chinese colleagues-networking, discussing common problems and solutions, developing new relationships and planning collaborative efforts. It is also an opportunity for many in Asia to get to know us; many of us are known of but not known on a more personal basis. Finally this is an opportunity to showcase our work to a different part of the world that we might not be accustom to.

One concern expressed by many at the Seattle ASA meeting was the cost of registration for Acoustics 2012 – Hong Kong. In reality, the registration is comparable to Acoustics 2008 – Paris, which cost approximately $700, the same as the Hong Kong preregistration three years later. Therefore, the Hong Kong meeting is in line with other international meetings. However, our attitude should be one of engaging a growing economic power, a nation which has focused a large amount of assets to build their future capabilities in acoustics.

In summary, I hope you will make the time to attend this historic event as we build inroads to advancing our field in collaboration with new partners. I believe that the ideas, discussions and cutting edge research that will come out of this conference will provide opportunities for you and our field.

Whitlow Au
University of Hawaii

ECHOES

Newsletter of the Acoustical Society of America

Provided as a benefit of membership to ASA members

The Acoustical Society of America was organized in 1929 to increase and diffuse the knowledge of acoustics and to promote its practical applications.

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Newman Fund Awards

Celebrating 25 years, *continued from page 1*

Student Award Fund has evolved into three distinct programs: the Newman Student Medals–for merit in the study of architectural acoustics; the Schultz Grants–for advancement of education in architectural acoustics, and, the Wenger Student Design Prizes–for excellence in acoustical design

Newman Medals–Through 2010, Newman Medals have been awarded to 227 students at more than 55 schools of architecture, architectural engineering and at a few schools of music throughout the world where there is at least one basic course of study in architectural acoustics and opportunities to apply fundamental acoustical design principals in their student work or applied research.

The medal was designed by Richard H. Bolt and at the request of Bob's wife, Mary Shaw Newman, Dick incorporated an image of a tuning fork which Bob often used for demonstrating basic acoustical principles. The final design which depicted sound waves radiating outward from the tuning fork also depicted "the expansion of knowledge" in acoustics as mandated in the by-laws of the Acoustical Society. It is interesting to note that Dick Bolt had also designed the Acoustical Society's unique Gold Medal and had earned a professional degree in architecture before he did graduate work toward his PhD in Physics. Incidentally it was Dick Bolt who had urged Bob Newman to first get a degree in architecture before continuing graduate studies in physics as Bob had intended when he enrolled at MIT in 1946. By the time Bob had earned his MArch in 1949, he had accepted a faculty position in the MIT Department of Architecture, BBN was already growing by leaps and bounds and he never returned to pursue his original goal of a PhD in physics.


Bob Newman

Many past Newman medalists have gone on to successful careers in architectural practice, serve on faculties at universities or have opted for careers in acoustical consulting. Several past medalists, Lily Wang, Andy Carballeira, Linc Berry, Donna Ellis, and Michelle Vigeant serve on the Newman Fund Advisory Committee which meets regularly at ASA meetings. The Advisory Committee reports to and is structured as a sub-committee of the Technical Committee on Architectural Acoustics with administrative support from the ASA office under the very capable direction of Elaine Moran and Louise Vollmer.

Each year some 10-15 Newman Medals are awarded to individual students along with a cash stipend and several books on architectural acoustics from the ASA Bookstore. It is expected that the number of institutions qualified to offer the medal as well as the number of students nominated for Newman Medals will continue to increase in the years ahead.

Schultz Grants–Theodore John (Ted) Schultz was a colleague and friend of Bob Newman, a gifted researcher and Technical Director of the Architectural Technologies Division of BBN. Ted was also a charter member to the Newman Fund Advisory Committee. He passed away suddenly and unexpectedly of a heart attack in 1988 and through the generosity of his many friends, relatives and colleagues the Advisory Committee established the Theodore John Shultz Grant program. A modest grant of $3000 is awarded about every 2 or 3 years from the Newman Fund to a teacher or researcher in architectural acoustics to partially support the development of a teaching aid or research in architectural acoustics education. The first Schultz Grant was awarded in 1990 to Prof. Gary W. Siebein, at the University of Florida School of Architecture to partially support the production of a videotape "*Demonstration of Basic Acoustical Principles using Scale Models.*" The 10th Schultz Grant was awarded to Prof. Ralph Muehleisen of the Illinois Institute of Technology toward developing "*Virtual Acoustic Instrumentation Software for Teaching Architectural Acoustics.*" Proposals for the 11th Shultz Grant are due at the ASA Office in Melville, NY by December 31, 2011 and the 11th Grant will be awarded in early 2012.

Wenger Prizes–Harry Wenger was a music educator in Owatonna, MN who during the pre-WWII era invented and produced, initially in his home garage, several devices that were useful in the teaching of music. The popularity and increasing sales of his inventions soon led to founding of the Wenger Corporation in 1946 which has become a large manufacturing operation and major employer in Owatonna. In the early 1960s Harry engaged Bob Newman as a consultant on Wenger's first portable music shells as well as other equipment, materials and systems Wenger had planned to develop to enhance the acoustical environments of music rehearsal and performance spaces. The passion for music and acoustics developed during those early consultations between Bob Newman and Harry and his son Jerry, now President, still permeates the Wenger Corporation today as well as its relationships with the Acoustical Society and members of the acoustical consulting profession.

Ron Freiheit Technical Director at Wenger is a past Chair of TCAA and maintains an active interest in the committee's activities including the Student Design Competitions now sponsored annually by TCAA, with the support of the National Council of Acoustical Consultants and the Newman Student Award Fund. Through Ron's efforts the Wenger Foundation, a non profit foundation established following Harry Wenger's death and funded by the Wenger Corporation, has been a continuing annual donor for First Honor Wenger Prizes of $1250 and four Commendation Wenger Prizes of $700 each. The results of the Student Design Competitions held at ASA meetings from 2001 through 2010 may be viewed at the Newman Fund website: www.newmanfund.org as well as the competition

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Echoes from Seattle

From the Student Council

Alex Sell

Greetings from Seattle! The student contingent of the society was well represented by the 364 students who attended this most recent ASA meeting. We continued our tradition of the Monday evening student icebreaker, Wednesday evening student forum and reception, and debuted the Interdisciplinary and Student Council Session titled, "Introduction to Technical Committee Research and Activities, especially for Students and First-Time Meeting Attendees." This session was held to introduce the different technical areas of the Society to first-timers, and talks were given by seasoned members of each technical committee. The student council would like to thank all of the presenters at this session and plans to sponsor similar sessions once-yearly at domestic meetings.

In other news, the Student Council elected its new Chair, Eric Dieckman. We would like to thank our outgoing Chair, Lauren Ronsse for her service to the Society. Also, three positions for technical committee representatives to the Student Council are open, effective immediately, and three more will open following the ASA meeting in San Diego, this fall. Interested students should visit: http://www.acosoc.org/student/council/council.html for more details.

If you would like more news on student events, check out our Twitter feed, @ASAStudents, or sign up for the ASA student mailing list: http://lists.acosoc.org/mailman/listinfo/asa_student. We look forward to seeing many more students in San Diego this fall!

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Celebrating 25 years, *continued from page 3*

program for the 2011 Student Design Competition held recently at the 161st ASA meeting in Seattle on May 23-27. The results of the 2011 competition will be posted soon on the Newman Fund website.

The presenters at the 25th Newman Award Fund technical session in Seattle provided additional information and detail on the Fund's three major programs as well as experiences with particular programs at their schools. The papers are being assembled and will be posted soon on the Newman Fund website. Following the technical session a reception, complete with an anniversary cake, was held in the Cirrus Room in the Sheraton Seattle Tower.

Clearly the first 25 years of the Newman Fund has made great strides in expanding knowledge in architectural acoustics throughout the educational institutions that produce professionals who design, engineer and contribute toward achieving satisfactory acoustical environments in and around buildings. Perhaps the next twenty five years will see building industry move closer to fulfillment of Bob Newman's vision where all professionals involved will have at least a conceptual understanding of the fundamentals of architectural acoustics needed to produce truly well designed buildings.

William J. Cavanaugh
Co-chair, Newman Fund Advisory Committee
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New fellows: George Frisk (ASA president), Brent Edwards, Gioria Rosenhouse, Michel Heinz, J. Brian Fowlkes, Ronald Kastelein, Thomas Moore, Stephanie Shattuck-Hufnagel, Mark Schafer, Benjamin Munson, Roger Waxler, James C. Presig, Donal Sinex, Magdalena Wojczak, Judy Dubno (ASA vice-president).

Echoes from Seattle

Participants in the Vision 2020 meeting in Seattle, May 21-22. Standing: Andrea Simmons, Whitlow Au, Peter Dahl, Georgel Frisk, Brigitte Schulte-Fortkamp, Brenda Lonsbury-Martin, Thomas Rossing, Wendy Adams, Diane Kewley-Port, Judy Dubno Michael Stinson, Paul Schomer, Susan Blaeser, John Haynes, Mardi Hastings, Michael Buckingham, David Feit, David Bradley, Clark Penrod; Seated: Anthony Atchley, Christy Holland, William Yost, Allan Pierce (photo by Charles Schmid).

Participants in the Manfred Schroeder memorial session: Birger Kollmeier, Josh Atkins, Julian Schroeder, James West, Peter D'Antonio, Alexander Schroeder, Anny Schroeder, Jean-Dominique Polack, Ning Xiang, Roland Kruse, Gerhard Sessler, Peter Cariani, Bishnu Atal (photo by Charles Schmid).

Scanning the journals

Thomas D. Rossing

• A xenon gas bubble suspended in phosphoric acid in a falling steel cylinder has been **driven to sonoluminescence** by impacting the cylinder against a steel base, according to a paper published 4 May in *Physical Review E* (**83** 056304). This produces a 150-ns flash of light whose peak intensity exceeds 100 W and has a spectral temperature of 10,200 K. This bubble system, which yields light with a single shot, emits very powerful sonoluminescence. A xenon bubble, introduced into the cylinder, is collapsed by a strong acoustic pulse travelling upwards in the fluid following the impact, producing a higher density and temperature than previously achieved.

• A fossil from the Early Cretaceous Period provides insight into the **evolution of hearing apparatus** in mammals, according to a paper in the 14 April issue of *Nature*. Evidence gathered in 120-million-year old lake sediments in China indicate that anchoring the eardrum was an essential step in freeing the middle ear from the jaw. The exceptional preservation of fossils in the Jiufotang Formation has offered up a cornucopia of knowledge about fish, pterosurs, and feathered dinosaurs, including skulls with tiny bones of the middle ear attached to the lower jaw.

• A **Peregrine soliton** was generated by moving a paddle back and forth at one end of a long water tank, according to a paper in the 25 May issue of *Physical Review Letters*. The interactions that lead to such pulselike waves were described by mathematician Howell Peregrine in 1983, and are thought to explain "rogue waves" such as the 26-meter pulse observed on a North Sea oil rig in 1995. The conventional definition of rogue waves in the ocean is that their heights, from crest to trough, are more than twice the average wave height. A Peregrine solution to the nonlinear Schrödinger equation is localized in both space and time, thus describing a unique wave event.

• Real-time passive **acoustic monitoring of high intensity ultrasound-induced lesions** was demonstrated in ox liver in vitro, according to a paper in the June issue of *Ultrasound in Medicine and Biology*. The formation of lesions in the tissue correlated with a reduction in the magnitude of the scattered signal at integer harmonics of the insonation frequency. The dip could be caused by the absorption of acoustic energy by the tissue as it denatures and becomes stiffer or due to acoustic cavitation. Current clinical monitoring techniques involve expensive magnetic resonance thermometry techniques to monitor lesion development.

• **Forces between clustered sterocilia minimize friction in the ear** at the subnanometer scale, according to a research letter in the 16 June issue of *Nature*. As hair bundles move, the viscous friction between sterocilia and the surrounding liquid challenges the ear's high sensitivity and sharp frequency electivity. Part of the solution to the problem lies in the active process that uses energy for frequency-selective sound amplification, but a complementary part of the solution involves the fluid–structure interaction between the liquid within the hair bundle and the sterocilia. Close apposition of sterocilia effectively immobilizes the liquid between them and reduces the drag. A combination of high-resolution experiments and detailed numerical modeling of the fluid-structure interactions shows how these organelles are adapted to the needs of sensitive mechanotransduction. The tight clustering of stereocilia transforms liquid visconsity into an asset by using it as a simple means of activating mechoanossensitive ion channels in concert, the study concludes.

• **Music can arouse feelings of euphoria and craving**, similar to tangible rewards that involve the striatal dopaminergic system, according to a paper in the 9 January issue of *Nature Neuroscience*. Using positron emission tomography scanning, combined with psychophysiological measures of autonomic nervous system activity, the scientists found endogenous dopamine release in the striatum at peak emotional arousal during music listening. Further experiments with functional magnetic resonance imaging (fMRI) found a functional dissociation: the caudate was more involved during the anticipation and the nucleus accumbens was more involved during the experience of peak emotional responses to music.

• **Charles Wheatstone**, noted for his work in acoustics and electricity (e.g., Wheatstone bridge), began his research career in musical acoustics, a note in the March issue of *American Journal of Physics* reminds us. In 1829 he invented the concertina, and the note includes a photo of one of his concertinas, now in the Smithsonian Institution.

• A multilayed electrode to impove the contollability of **an ultrasonic linear motor** is described in the May issue of *Acoustical Science and Technology*. The transducer with an optimal electrode pattern showed reduced temperatre rise during operation.

• A **computer-controlled ripple tank**, and some of its uses in physics and acoustics laboratories, is discussed in the June issue of *American Journal of Physics*.Water waves are excited acoustically using computer programmable wave shapes. From the propagation of wave packets at three differrent depths, the phase and group velocities are measured in the frequency range from 2 to 50 Hz. In shallow water the compression of a chirped pulse is demonstrated.

• **Scientific writing** is increasingly recognized as a key component of an undergraduate scientific education, a forum editorial in the 20 May issue of *Science* points out. Because students "do" science (as opposed to "learn about" science) almost exclusively in laboratory courses, they need to learn the skills of scientific writing there. The first step toward inquiry-based lab writing is to assign forms of writing that working scientists use. The second step is aligning student writing with lab activity. Eliminating unproductive writing tasks allows students to concentrate on a limited number of skills that are essential for writing science but rarely the subject of extended instruction: how to decide which data to present; how to use graphs, tables, and other visual displays effectively; and how to discuss those graphic supports in the accompanying prose

• "**A backward march of audio quality** has left us listening to tinny, stripped-down MP3s," claims an article in the June issue of *Discover*. However, new techniques to encode music files are being developed. Various 3-D systems are being developed, including 3-D a audio software program which works with gyroscopic sensors in mobile devices to determine which way the device is pointing.

• An experiment on **helium speech for an introductory**

Scanning the journals

physics laboratory is described in the April issue of *The Physics Teacher*. The observed increase in formant frequencies can be used to determine the proportion of helium in the lungs after a deep breath of helium gas. A comparison is made with blowing an organ pipe with helium.

- Inexpensive apparatus for **demonstrating longitudinal wave pulses** is described in the May issue of *The Physics Teacher*. The apparatus is built up from NdFeB magnets and washers mounted on a carbon fiber rod. The low friction between the hard magnets and the carbon rod can be further reduced by applying a silicon lubricant spray to the rod.
- Development of an algorithm for modal **analysis by free vibration response** for discrete or continuous systems appears in the 1 August issue of *Journal of Sound and Vibration*. If the structural displacement or acceleration response due to free vibration can be measured, the system response matrices, including the displacement, velocity and acceleration, can be obtained through numerical differential or integration methods.
- **Low-frequency noise in the ocean** has doubled every decade since 1960, according to an article in the 11 June issue of *New Scientist*. In order to reduce the ambient noise, which impacts the ability of whales to communicate with each other, propeller blades on ships should be re-designed to reduce cavitation.
- The July issue of *Applied Acoustics* is a special issue on **noise mapping**.

Acoustics in the News

- Physicists at the University of Cambridge have used sound waves to transport individual electrons over significnt distances between artificial atoms on a gallium arsenide chip according to a story in the 8 April issue of *Science*. The technique, reported at the March meeting of the American Physical Society in Dallas, represents a confluence of electronics, acoustics, and nanotechnology. The mock atoms are quantum dots, which can be either nanometer-sized bumps of semiconductor or simply spots on the surface of a chip. Scientists can use the dot as a quantum bit (qubit) to store information using electron spin to encode information. Sufing along at the speed of sound, an electron covers the distance between dots in 1.5 nanoseconds they reported.
- "Acoustic shadows," which are the result of refraction, absorption and other atmospheric phenomena, are spots where sounds are not well heard even when they can be heard quite clearly at a greater distance elsewhere. They played an important role in several battles during the Civil War (see the Winter 1999 issue of *ECHOES*). An editorial in the April 12 issue of *The New York Times* by the director of the documentary series on The Civil War uses the term to characterize the declining relevance of the Civil War to many Americans.
- Scientists are trying to learn the language of northern elephant seals in order to protect them, according to a story in the March 14 issue of the *San Jose Mercury News*. Armed with microphones, researchers from the University of California Santa Cruz have spent hundreds of hours tracking elephant seals at Año Nuevo State Park and recording their grumbly grunts and growls. Once hunted to near-extinction, the Northern elephant seals have rebounded. Now, scientists are concerned about potential human impacts on the growing population, and they hope that understanding the seals' communication and organization may help protect them. Elephant seals are one of the loudest animals recorded. At a distance of 3 feet, male seals may produce sound levels of 130 dB with frequencies low enough to vibrate the sand around them. Males use loud vocal calls to prevent fighting, and each seal has a distinctive call.
- At sporting events across the nation, but especially at the NBA playoffs in Dallas, noise has become part of the show, according to a story in the June 6 issue of *The New York Times*. The sound system of the Dallas Mavericks involves more than simply pumping up the sound level. It includes "crowd enhancement" and "assisted resonance" from sixty mammoth loudspeakers hanging above the court and more speakers encircling the seating bowl. A team excecutive commented "My clothes are shaking." At one game, rock music was played at 97 dB during timeouts. One season-ticket holder commented, "If you don't like it watch the game at home."
- High-volume portble music players may impare ability to clearly discriminate sounds, according to a story in the March 10 issue of *Science Daily* (online). Listening to loud music through earphones for extended periods of time in a noisy environment can cause neurological changes related to clear discrimination of sounds even if the hearing threshold is normal. The auditory anomaly cannot always be recognized by the usual hearing tests in a quiet environment.
- Birds may navigate by using infrasound according to a story in the April 2 issue of the *San Jose Mercury News*. New findings suggest that birds may use infrasonic signals radiated from land surface for navigational purposes during their homing or migrational journeys. Constant earth tremors, called microseisms, are created by waves in deep ocean waters. The faint tremors emit low-frequency sound waves that radiate off steep-sided terrain, such as hills. Birds fly from sonic landmark to landmark, with younger birds learning the route from their elders.
- "For Montreal Symphony, Shoebox is a Grand Home" reads a headline in the April 19 issue of *The New York Times*. The 2100-seat hall, planned to be ready for inaugural concerts in September, will replace the 3000-seat multipurpose Pelletier Hall in the city's Place des Arts complex. Acoustical consultants are Artec Consultants (reportedly the last project by Russell Johnson before his death).
- In a fourth search for an ill-fated 2009 flight, oceanographers have found the remains of Air France Flight 447 by using sonar, according to a news story in the 8 April issue of *Science*. The search was made by oceanographers from Woods Hole Oceanogaphic Institution using three autonomous underwater vehicles (AUVs), one of which returned to take photographs. A followup investigation using a remotely operated vehicle able to grapple objects will attempt to recover the plane's flight recorders.

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Acoustics in the News

• An obituary of Max Mathews, an ASA Fellow and silver medalist in musical acoustics, appeared in the April 24 issue of *The New York Times*. Max, who spent most of his career at the Bell Laboratories and Stanford University, is often called the "father of computer music;" he died on April 21. He was honored with a special session at the 154th ASA meeting in New Orleans in 2007.

• An article in the May 18 issue of *National Georgraphic News* reminds us that underwater divers have the ability to hear sounds with frequencies above the audibile limit in air. Whether this enhanced hearing is entirely due to bone conduction is not clear.

• University of Adelaide researchers are investigating the causes of wind turbine noise with the aim of making them quieter, according to a story in the June 5 issue of *Science Daily* (online). Turbine noise is described as "trailing edge or airfoil noise," the same sort of noise generated at the edge of aircraft wings as the turbulent air flows over the sharp edge of the blade. What is not yet understood is exactly how that turbulence and blade edge, or boundary layer, interact and how that makes the noise louder. Further complications arise from the effects of multiple wind turbines together.

• Hoping to avoid consumer credit fraud, Russia's largest retail bank is testing a new ATM that includes voice-analysis software to help assess whether the person is truthfully answering questions, according to a story in the June 8 issue of *The New York Times*. The software detects nervousness or emotional distress, possible indications that a credit applicant is dissembling. Questions include "Are you employed?" and "At this moment, do you have any other outstanding loans?" The machine also scans a passport, records fingerprints and takes a three-dimensional scan for facial recognition.

• Recent research has shown that our brains understand music not only as emotional diversion, but also as a form of motion and activity, according to a story in the April 19 issue of *The New York Times*. The same areas of the brain that activate when we swing a golf club or sign our name also engage when we hear expressive moments in music. Brain regions associated with empathy are activated, too, even for listeners who are not musicians.

• Hearing and touch appear to be physically linked in the brain, according to a story in the June 18 issue of *Science News*. Sophisticated imaging of one subject's brain revealed that new links had grown between its auditory part and the somatosensory region, which handles touch. People with normal hearing appear to be much better at detecting the combination of an extremely weak sound and an extremely weak vibration applied to the skin than at detecting either stimulus on its own. Other researchers have shown that hearing a sound can boost touch sensitivity.

• An alligator may use infrasound to attract a mate, according to a story in the June 18 issue of *Science News*. When male alligators quiver their spiky backs underwater, they create Faraday waves, surface waves that move up and down at half the speed of the vibrations. These sophisticated waves, discovered by Faraday in 1813, are generally seen only in man-made devices but now have been observed as having a wavelength about one-third the distance between the rough protrusions on the alligator's back.

• A sensor that uses sound waves to measure temperature in furnaces or nuclear reactors is reported (online) in the 16 May issue of *The Engineer*. The thermometer transmits acoustic pulses through a gas-filled tube to a microphone at the other end.