

## Riding the Waves – A Life in Sound, Science and Industry

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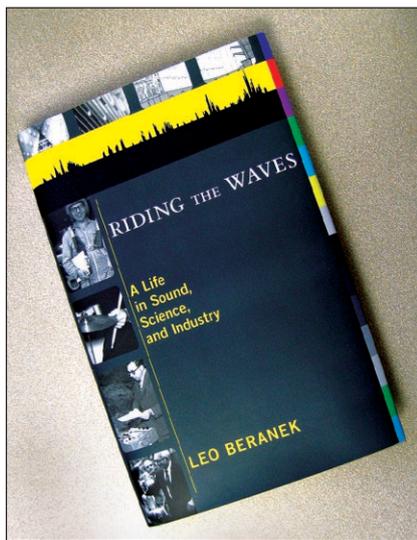
Leo Beranek's mother offered him this advice when he was young – advice he followed and still remembers: "Leo, study hard, get ready for college, and make a decent life for yourself." Twenty-one years later he earned the Doctor of Science degree in Communication Engineering from Harvard University, specializing in the field of acoustics and 62 years later, he was invited to a ceremony at the White House to receive the 2002 National Medal of Science from President George W. Bush "For his leadership, dedication and contribution to the art and science of acoustics, for co-founding one of the world's foremost acoustical research and consulting firms, and for sustained contributions to scientific societies and civic organizations."

Leo's family asked him to write a memoir about his nine decades of experiences, and this memoir appears in the book *Riding the Waves; A Life in Sound, Science, and Industry*, published recently by MIT Press. His life journey is told in 10 chapters filled with interesting details and insights describing "the roller-coaster swings – the success and failures, joys and sorrows," along with "what worked so well for me – and what clearly did not." And I was prompted to write this editorial especially to draw attention to this book and to "what worked . . . and what did not."

Leo grew up in Solon, IA, a small farming town where his great-grandparents from Bohemia had settled and his grandfather and father had been born. By the time he was a high school student, he had taken a correspondence course in how radios work and established a repair shop for radios above his father's hardware store. Money he earned was saved for college expenses. While at college, he continued working at many part-time jobs, including radio repair, electrical wiring, waiting tables at a restaurant, playing drums for local dance bands, and assisting engineers at a radio company.

After graduating with a bachelor's degree from Cornell College in 1936, he was accepted on a scholarship to the Graduate School of Engineering of Harvard University. He worked hard in this challenging environment, received high grades, and earned his Master of Science degree the following year. He then continued his studies as Professor Frederick V. (Ted) Hunt's first doctoral student at Harvard's Cruft Laboratory and served as his assistant working in room acoustics and electro-acoustics.

From 1940 to 1945, Leo directed important and urgent wartime projects at Harvard's laboratories. These projects dealt with, for example: enhancing systems for



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in-flight cockpit voice communications, reducing the loud noise in bomber cockpits (to reduce pilot fatigue during long-range operations), and improving combat information centers and communication channels onboard U.S. Navy ships.

For many of us, the best known aspect of Leo's life is his formation 60 years ago and the growth and success of the acoustical consulting firm Bolt Beranek and Newman (BBN). He resigned the tenured faculty position he held at MIT in 1958 to join BBN on a full-time basis. The partnership of Richard (Dick) Bolt and Leo Beranek (Bolt and Beranek; Robert Newman came aboard later) began with a major project dealing with the acoustical design of the then new headquarters building of the United Nations.

There soon followed another project of considerable significance: developing defensible noise criteria whose acceptance paved the way for commercial jet aircraft travel. The Port of New York Authority required that the new Boeing 707 jet not be noisier than the four-engine propeller planes then flying in and out of Idlewild airport (now JFK); enabled by acceptance of the newly developed noise criteria, Pan American and BOAC flew the first two transatlantic jet aircraft passenger flights between New York and London airports on the night of October 26-27, 1958. Additional information about acoustical consulting at BBN is provided in the book *Sound Ideas* available from the ASA on-line book store <http://asa.aip.org/publications.html#pub32b>.

In 1957 Leo convinced J. C. R. ('Lick') Licklider to join BBN and authorized the purchase of their first computer for \$30,000. At the time they were not sure what the

computer would be used for, but both believed that it would help the firm expand into new and important areas. And expand the firm did. As just one example of new computer applications, BBN designed, built, and operated the ARPANET – the first operational international packet-switching network, which was the precursor to the global Internet we take for granted today. Some say that BBN was involved in the development of the Internet superhighway when it was just a dirt trail.

Leo helped to form and managed Boston Broadcasters Incorporated to operate Channel 5 television in Boston. His book describes the difficult and protracted regulatory, financial, and technical challenges that lasted nine years, involved dozens of people, four hearings at the Federal Communications Commission, four appearances at the U.S. Court of Appeals, and three hearings before the U.S. Supreme Court. It also involved considerable bank debt and near bankruptcy, but broadcast approval finally was received and WCVB-TV went on the air on March 19, 1972. Soon there appeared an article in the *New York Times* headlined: *Some Say This Is America's Best TV Station*.

Music and architecture have always been important in Leo's professional life. He has applied his technical expertise while consulting on the acoustics of performance spaces, including most recently the concert hall at Tokyo Opera City and the adjacent New National Theater – of which it is said that "Art + Physics = Beautiful Music." As a sideline, Leo has also served various non-profit organizations, including the Boston Symphony Orchestra and the American Academy of Arts and Sciences, pulling both out of financial difficulties.

In summary, *Riding the Waves* provides human, as well as technical and professional insights. In response to the question he is often asked as he approaches his tenth decade, "what is the secret to being alive and kicking at your age?" He provides his views on the benefits of exercise, specific foods, and mental attitude, which he credits for his being healthy with most of his "joints and marbles still intact." Clearly this book should be read by both acousticians and non-acousticians, and particularly by anyone working at, managing, or wanting to start a technical consulting firm. Read, enjoy, and learn from this interesting book about a pillar of our profession. I had Acentech purchase 60 copies to be autographed by Leo for our employees. 

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## Can You Hear Me? – Making the World a Quieter Place

Ewart A. "Red" Wetherill, FASA and Warren E. Blazier, Jr., FASHRAE

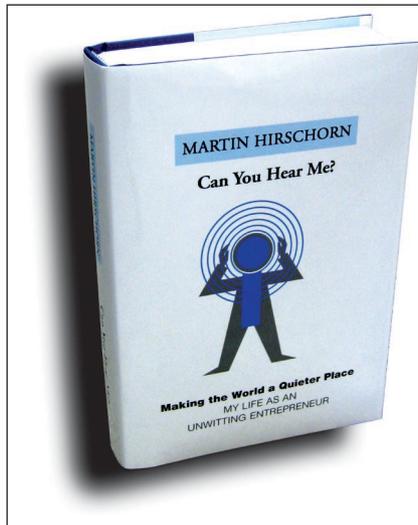
This is a story of achievement on a grand scale, of the fulfillment of a lifelong vision by the creation of an innovative and widely respected company adapting and manufacturing noise control products to meet the needs of new and challenging industries. From a childhood in near poverty and, as a Jew growing up in Berlin during the 1930s with little prospect of a better future, Martin Hirschorn built a path to success by a combination of early family support, good fortune, determination and hard work. The first part of his story is written as a narrative that intertwines personal, political and business aspects of his life.

The description of a struggling family in the turbulent between-war setting of western Europe sets the stage for his determination to do better. With the encouragement of his parents (who remained in Berlin) and support from an overseas relative, he emigrated in 1937 to England, where he completed his technical education prior to a second emigration and an engineering and manufacturing career in the United States. The remainder of the story describes the creation of a company finely tuned to the expanding need for noise control methods in the post-war years.

Hirschorn's graphic description of the difficulties encountered by his family living between Germany and Poland, in the era when restrictions on people of Jewish descent first began to make themselves felt, should be of interest to anyone who had the blessing of a government-supported university education. From the stimulating post-war environment of the GI Bill, our own society has now evolved into one where the shortage of unskilled work and the constantly increasing cost of higher education are together depriving many young people of the chance for a productive future.

Life in wartime England was not as difficult as he might have thought for one born in enemy Germany, according to Hirschorn. Learning a new language with neither money nor family support, but through a variety of jobs he was able to pay for an education and also to test his inventive skills. Completion of an engineering degree eventually led to his decision to seek the greater opportunities of a career in the post-war industrial growth of the United States. Here, the technical experience gained in England facilitated employment and opportunities to take part in designing new noise control devices for industry. With the assurance of a viable skill and confident in his ability to market new ideas, Hirschorn was now ready to start out on his own.

Industrial Acoustics Company, now recognized world-wide as IAC, was launched



*Acoustical Publications, Bay Village, OH, 2007, hardcover, 6-1/2 × 9-1/4 in., 373 pg., ISBN 0-9769816-0-2 - \$25 + shipping. [www.SandV.com/books/form01](http://www.SandV.com/books/form01).*

in 1949 with no resources beyond office space in his aunt's small apartment and his determination to succeed. However, the support of companies interested in his ideas and positive response to an article in an engineering journal paved the way for the first successful IAC projects and the decision to combine manufacturing with his demonstrated abilities in noise control design. Here we begin to see development of the other dimensions of a successful enterprise: a clearly understood goal, attracting and keeping strongly motivated, talented employees and economical production methods, with unceasing dedication to the hard work of gaining recognition in the engineering and architectural industry.

There can be no doubt that the timing was fortunate. Expanding commercial aviation, whole new industries and the advent of large-scale air conditioning for buildings brought with them an immediate need for noise control on a large scale. Early success with large industrial silencers led to systems for control of noise from gas turbines and jet engine test cells that became a major IAC production line. In architectural acoustics, air intakes for the first U.S. high-rise, curtain-wall office building were a step toward developing standard products that were economical to produce and suitable for both outdoor and indoor applications.

Advances in the rapidly growing science of acoustics were harnessed to production of reliable and economical devices for control of noise. An entire range of products was developed to meet the needs of power, manufacturing and building industries. Evaluation of performance through rigorous

testing in special facilities led to participation in establishing standard ratings for silencers and other components.

Factory-built enclosures with sound-absorbing linings for noisy machines were assembled from modular panels adaptable to many other uses, including anechoic chambers, audiometric testing booths, music practice rooms and sound-isolating movable partitions. A close examination of any of these systems will demonstrate the level of understanding required to translate a specified acoustical requirement into a completed product, portable and rugged enough for shipping and readily applicable to both traditional and advanced methods of building construction.

Each of these markets required close attention and product evaluation with design refinement if needed, calling for well organized and trained field representatives and sales staff dealing with innovative designs without losing sight of evolving customer needs. During the course of almost a half century, Hirschorn presided over an impressive series of products that set a high standard of quality and reliability, ranging from jet noise suppressors for the Concordé and very large anechoic test facilities to special duct silencers for hospitals, sound isolating doors and windows, and even an advanced sound level meter.

With the establishment of a viable nationwide operation, IAC embarked on overseas expansion. Branches in England and Germany became very successful but some other markets were less so for reasons ranging from politics and competition to unwise business decisions. After 49 years of heading the company, Hirschorn found a group willing to buy IAC and the sale was completed in 1998.

Hirschorn concludes with a tribute to his late wife and with recognition of the people in the many facets of IAC who espoused the company goals and made substantial individual contributions to its years of success. In summary, this is a fascinating history that will be of interest to people who have known and worked with IAC, to newcomers who know little of the growth of architectural and engineering acoustics and to budding entrepreneurs. This is not the place to look for details of design solutions, or even the origins of most of the design principles employed. However, it provides an insight into how a dedicated group applied ingenuity in acoustics and practical understanding of engineering systems and customer needs to successfully stay ahead of both competitors and imitators for half a century, which in every respect is quite an accomplishment. SV