Leo Beranek
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Leo Beranek, internationally known teacher, scientist, consultant, entrepreneur, and author of 12 books, was asked by his family to write them a book recollecting his life experiences. Fortunately, he is willing to share his memoirs with those beyond just his family in *Riding the Waves; A Life in Sound, Science, and Industry*, to be published in March 2008. Beranek's descriptions of "the roller-coaster swings - the success and failures, joys and sorrows," along with "what worked so well for me - and what clearly did not," carry the reader along chapter by chapter in his fascinating life journey.

Beranek tells his story in ten chapters filled with interesting details and insights. These begin with his early years growing up and attending college in Iowa among German-American farmers during the great depression, his graduate education at Harvard University, his direction of several important wartime projects in aircraft noise control and communications engineering, and his professorship and role as technical director of the acoustics laboratory at MIT, followed by the initial formation and growth of the consulting firm Bolt Beranek and Newman. We learn of Beranek's participation in the introduction of commercial jet transportation in the US, his lifetime involvement with the acoustics of music and architecture, and his roles in the formation and management of WCVB Channel 5 in Boston, which became one of the best television stations in the US. The memoir also describes his work with a variety of nonprofit organizations and his most recent service as acoustical design consultant for world-class halls in Japan. In the book's prologue, Beranek discusses his experience of providing acoustical consulting for New York's Philharmonic Hall. In the epilogue (followed by an impressive list of degrees, awards, and honors) he concludes that most important to him are the many people in his life - the human connections he has made and enjoyed.

Beranek has been asked: "what is your secret to being alive and kicking at your age?" On pages 209 to 211 he offers his view of the contributions that exercise and his highly disciplined intake of specific foods have made on his maintaining his health in advancing years with most of his "joints and marbles still intact".

Leo Leroy Beranek was born at home 93 years ago, a healthy and strong 8-pound baby, in the small town of Solon, Iowa, where for many years his grandfather served as mayor. Two years later, after the failure of his father's livery business, his family returned to farming. They moved out of Solon to the nearby family homestead, without electricity or indoor plumbing, where his great-grandparents first settled after emigrating from Bohemia and where his father and grandfather had been born. Within a period of three years his family moved to three different farms.

Beranek's schooling began in September 1919 as his mother walked him down a small unpaved road to a one-room, twelve-grade schoolhouse a mile from home. Some years afterward his mother offered advice he followed and still remembers: "Leo, study hard, get ready for college, and make a decent life for yourself." Twenty-one years later in 1940 he earned the Doctor of Science degree in Communication Engineering from Harvard University, specializing in the field of acoustics.

Even as a youngster Beranek was developing the independence and entrepreneurial spirit that has served him so well throughout his lifetime. For two years while in junior high school he earned a regular income working part-time for the Real Silk Company, selling stockings and fabrics for silk lingerie and blouses to local women. He also became proficient at playing trap drums. By the time Beranek reached high school his father stopped farming to join his cousin Gilbert as coowner of Beranek Hardware in nearby Mount Vernon, Iowa. After taking a correspondence course in how radios work, Beranek set up his own radio repair shop in a room above the hardware store and became known as the local "radioman," earning money he saved for college. While at college he continued to earn his way with many part-time jobs - pursuing his radio repair and electrical wiring businesses, playing his trap drums with local dance bands, waiting on tables in a restaurant, working during summer months as a hired hand on a local farm, and serving as an assistant in the engineering department at Collins Radio. Also, for the Cornell College of Iowa's speech department, he recorded students' voices before and after their speech training - his introduction to acoustics.

In 1936, after receiving his bachelor's degree from Cornell College, Beranek traveled by train from Mount Vernon, Iowa to Cambridge, Massachusetts to attend the Graduate School of Engineering at Harvard University on a Gordon McKay Scholarship. For Beranek, a young man from the farmlands of central Iowa, this venture represented "a risky plunge into the unknown." With just $450 of savings to carry him through the academic year, he found a small second-floor room for $4 per week and to save money cut back to two meals daily, costing 50 cents total. He studied hard to prove himself in the intimidating Harvard academic environment and after earning A's and one B for the year, was awarded the Master of Science degree in June 1937.

Beranek was Professor Frederick V. (Ted) Hunt's first doctoral candidate and, from 1937 to 1939, served as a research assistant to Professor Hunt at Harvard's Cruft Laboratory, where they first worked together on the development of a lightweight phonograph pickup and later on room acoustics.

From 1940 to 1945 Beranek devoted his full efforts to directing essential military projects at Harvard's laboratories. The first of these dealt with development of a lightweight acoustical material that could be installed in bomber cockpits to reduce the intense propeller noise that was thought to cause pilot fatigue. A related follow-on research project concerned development of upgraded cockpit communications equipment designed to provide better speech intelligibility during combat flight operations. The US Army funded work for the design and construction of a large test chamber to be used in the evaluation of powerful military loudspeaker systems. The Navy also sent a vital wartime project to Harvard to be performed under Beranek's direction. Since hundreds of US naval ships were being damaged or destroyed by kamikaze suicide bomber pilots, Beranek's project was to study the combat information centers and communication channels onboard US Navy ships in order to reduce the time between initial detection of the incoming threat and alerting of the weapons stations. This work for the Navy was performed at the Systems Research Laboratory commissioned as the USS Beavertail in Jamestown, Rhode Island. Beranek's autobiography makes clear the urgency, scale, and significance of these wartime projects.

From the fall of 1947 through 1958, Beranek taught at MIT and served as the technical director of the Acoustics Laboratory. He did private consulting work, wrote several books, expanded his family with the birth of two sons, moved to a new home in Winchester, Massachusetts, and learned to ski. The lion's share of funding for Beranek's technical work at the Acoustics Laboratory came from the US Navy. Among his consulting clients were the General Radio Company, the Hush-APhone Corporation, and a series of movie theaters in Brooklyn, New York. (The Hush-A-Phone product is said to have marked the beginning of the changing array of telecommunications products and services available today.) During this time he also served on the Executive Council of the Acoustical Society of America and assumed its presidency in 1954. In 1958 Beranek resigned his tenured faculty position at MIT to work full time at Bolt Beranek and Newman, the consulting firm he started with Richard Bolt at MIT in 1948.

Beranek began his downhill skiing in New England in 1950 but soon graduated to enjoy the superb powder-snow conditions in Alta, Utah and in Switzerland. Skiing was not simply a sport he enjoyed for its beauty and the social aspects of being with friends and family, but it constituted a serious commitment of his time and energy. He taught his son Jamie to ski when he was three years old. He took private lessons from experts and mastered the many technical challenges presented by difficult black-diamond trails, eventually reaching in Switzerland the "Gold Badge" status of a first-class skier.

Several of the important projects in which Beranek was involved during the early growth of the acoustical consulting firm Bolt Beranek and Newman are described in his memoir. These include the sound systems for the United Nations permanent headquarters building in New York City, design of what likely is the world's largest muffler for jet engine testing in a supersonic wind tunnel, quieting the twin-engine Convair Model 340 passenger aircraft, and developing defensible noise criteria for the Port of New York Authority that permitted the introduction of commercial jet aircraft at New York's Idlewild Airport on October 26, 1958. This memoir also describes the firm's entry into a wide range of computing applications, including the purchase of the first Digital Equipment Company PDP-1 computer, the development and demonstration of computer time sharing, and building and operating the world's first operational packet-switching network, the ARPANET –forerunner of the global Internet.

Music has been of great importance to Beranek throughout his personal and professional life, from the time when as a teenager working in the radio repair shop above Beranek Hardware he listened to opera from records on a wind-up phonograph. He has attended performances at more than 100 of the world's most highly acclaimed concert halls and opera houses, studying both the technical aspects of their acoustics and the subjective impressions of their sound, and he has met with and interviewed many conductors and music critics. He has devoted years to developing qualitative and quantitative measures and fundamental technical understandings of the acoustics of performance spaces and has applied his expertise to the design of numerous projects. Recent examples include the world-class 1,632-seat concert hall at Tokyo Opera City and the 1,810-seat opera house at the adjacent New National Theater - where "Art + Physics = Beautiful Music". Beranek has shared his technical understanding in numerous papers published in the Journal of the Acoustical Society of America and in his books, which include *Music, Acoustics, and Architecture* (Wiley, 1962), *Concert and Opera Halls: How They Sound* (for the Acoustical Society of America, 1966), and *Concert Halls and Opera Houses: Music, Acoustics, and Architecture* (SpringerNew York Verlag, 2004).

Regarding concert halls, Beranek says he is often asked: "Why did the acoustics of the Boston, Vienna, and Amsterdam halls come out so well when they were built so long ago, in 1900 or before?" His book includes an answer and also an interesting discussion of the historical contributions made in 1898 to the design of Boston

Symphony Hall by Harvard's assistant professor Wallace Clement Sabine. Equally fascinating is Beranek's description of the many unfortunate events leading up to and following the failures experienced at New York's Philharmonic Hall.

In late 1962 Beranek became president and CEO of the group of stockholders who formed Boston Broadcasters Incorporated (BBI) to apply for the license to own and operate Channel 5 television in Boston. Their application, submitted to the Federal Communications Commission in March 1963, was denied 3 1/2 years later. Beranek describes in considerable detail six more years of intense legal, financial, regulatory, and technical challenges. These involved dozens of people and four hearings before the FCC, four before the US Court of Appeals for the District of Columbia, and three before the US Supreme Court, as well as significant bank debt and near bankruptcy before BBI finally succeeded in receiving broadcast approval and on March 19, 1972, went on the air as WCVB-TV Channel 5. Following nine years of increasingly successful broadcasting, the New York Times published a full-page article about WCVB programming with the headline "Some Say This Is America's Best TV Station." Beranek remained involved with the station as president, CEO, or chairman of the board until 1983.

Beranek has also served with distinction at nonprofit organizations. For example, while a member of the Boston Symphony Orchestra board of overseers he originated the popular "Trustees-Overseers Handbook" and formed the Hundredth Year Anniversary Fund, which succeeded in eliminating the symphony's previously crippling annual operating deficit. Beranek came to serve as president of the American Academy of Arts and Sciences at a time when their finances were suffering annual deficits; he instituted changes that reduced operating costs and launched a successful campaign that doubled the academy's endowment.

In 2003 Beranek received the 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."

Beranek's intellectual talents and managerial abilities have attracted numerous particularly bright colleagues and friends worldwide. He has served as a mentor to many, generously sharing his knowledge and insights, and certainly earned his reputation as an outstanding pillar of the noise control engineering and acoustics professions. I highly recommend this well-written, thought-provoking book to acousticians and non-acousticians alike.

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