



# Harold Frederick Schuknecht



Harold Frederick Schuknecht (Hal) was born on February 10, 1917 in Chancellor, South Dakota, into a deeply religious family. Even as a youngster, he demonstrated a capacity for independent thinking. By the time that he graduated from the University of South Dakota in 1938, he had decided to become a doctor and received an M.D. two years later from the Rush Medical College in Chicago. He served a one-year rotating internship at Mercy Hospital in Des Moines, Iowa, where he met a laboratory technician, Anne Bodle, who became his bride on June 30, 1941, just before the fateful events on December 7, which unexpectedly altered their lives. Hal served for two years as a general medical officer, followed by two years as a flight surgeon in the U.S. Army Air Force. In 1944, he rescued a pilot from a burning B-24

in Cerignola, Italy, for which he received the Soldiers Medal, the highest award for a non-combatant. A fellow South Dakotan who served with Hal in Italy was George McGovern, who became a close personal friend.

After the war, Hal was attracted first to Ophthalmology, but eventually applied for a residency program in Otolaryngology at the University of Chicago (the two specialties separated during the war). As a flight surgeon, he had noticed that bomber crews who regularly flew above 20,000 feet with only oxygen masks (pressurization not yet being common) often developed ear problems. World War II had proved the efficacy of antibiotics in treating bacterial infections, so mastoid surgery for chronic ear infections (the main income-generating procedure for otologists) was seen as a disappearing therapy so most medical students thought of Otolaryngology as a dying specialty. Thus, Hal was eagerly accepted into a Chicago program that emphasized teaching and research. Otolaryngology at Chicago, as a section of the Department of Surgery, was then headed by John Lindsay, who introduced Hal to temporal bone anatomy. Other senior faculty there were Henry Perlman and Heinz Kobrak, both otologists engaged in research on

hearing.

While a resident, Hal co-authored three papers: one on perforations of the tympanic membrane, one on Hand-Schüller-Christian syndrome, and one on benign cysts of the paranasal sinuses. More importantly, he met W. Duwayne (Dewey) Neff, a new faculty member in psychology, who had been broadly trained in auditory research. Neff had served during the war as a psychologist evaluating personnel for submarine duty and was just then organizing a new basic science laboratory to study hearing. These two young men were soon collaborating on experiments to determine the effects of inner-ear lesions on hearing. By the time Hal joined the faculty as an instructor in 1949, his interests had focused on Otology. From 1950 to 1953, Hal was an Assistant Professor who produced accurate frequency maps of the human cochlea by creating a variety of lesions in the cochlea or auditory nerve and assessing the results behaviorally, electrophysiologically and histologically. Along with Neff and Neff's students (among whom were Stanley E. Lindquist, Joseph E. Hind, Jr., Samuel Sutton, Nelson Y.S. Kiang, and Richard Woellner) Hal assiduously sought every practical means of exploring the effects of damage to the inner ear and eighth cranial nerve. In all, 18 papers eventually emerged from the Chicago years. A significant relationship that developed during these formative years was with Dr. Lindsay's temporal bone laboratory technician, Robert S. Kimura, who would later join Hal at Harvard.

Hal's last non-otological paper (on "carcinoma of the oral cavity and jaw") was published in 1953 when he moved to the Henry Ford Hospital in Detroit as an Associate Surgeon. There, Hal organized a laboratory to continue his research in spite of a very busy clinical schedule. By then, antibiotics had indeed eliminated the need for most mastoidectomies, but in conjunction with the operating microscope, they also made feasible new surgical approaches to middle-ear problems. Reconstructive surgeries for improving hearing, such as tympanoplasties quickly developed, especially in Europe. As physiological acoustics became better understood, first fenestration (Julius Lempert), then stapes mobilization (Samuel Rosen), and eventually stapes replacement (John Shea) were successively introduced to alleviate conductive hearing losses resulting from fixation of the stapes by bony overgrowths commonly seen in otosclerosis. Suddenly, Otology emerged as a dynamic, even glamorous specialty, characterized by delicate surgical manipulations based on sound physical and biological principles. Hal introduced metal prostheses to replace the stapes entirely and rapidly became the leading surgeon performing stapes surgery. With two operating suites, he could schedule patients efficiently, to perform many stapedectomies in a day.

In research, Hal found new colleagues at Henry Ford and Wayne State University. With John Churchill and Rosemary Doran, he demonstrated acetylcholinesterase activity in the fibers and endings of the centrifugal pathways in the cochlea. These pathways, earlier described by Grant Rasmussen at the University of Buffalo, remain an active area for research to this day, illustrating how the central nervous system can influence the operations of sensory organs as part of a feedback control system. Hal's clinical practice also stimulated his interest in vestibular function. He devised transcanal procedures for surgical ablation of vestibular structures in order to relieve vertigo and explored medical-surgical

approaches to obtain similar results by controlled use of ototoxic drugs such as streptomycin. Thus began a long-lasting interest in Ménière's Syndrome, classically described as consisting of vertigo, hearing loss, and tinnitus, the combination of which pointed to the inner ear as the site of abnormal function.

Thus it was that when Leroy Schall retired as the Walter Augustus LeCompte Professor and Chair of the Department of Otolaryngology at the Harvard Medical School and at the Massachusetts Eye and Ear Infirmary in 1959, Hal was well positioned as a candidate for these positions. Traditionally, these two posts, one academic and one clinical, were held by a single individual selected by a joint Ad Hoc search committee with representation from both Harvard and the Infirmary. Not many candidates were considered able to perform this combination of duties. Some Infirmary staff members were less enthusiastic, preferring candidates more familiar with the local clinical scene. As a "young Turk" Hal had been conspicuous in challenging traditional otologic practices, thus irritating many of the older, more established clinicians. An impasse developed and a temporary solution was achieved by appointing Philip Meltzer as an interim Chief of Otolaryngology. Meltzer had long been a supporter of Hal's. During his two-year tenure as Chief, he helped to convince local clinicians that Hal was the best overall choice to be his successor. Thus, the issue was finally resolved and Hal assumed his new roles in Boston in 1961, bringing with him Richard Gacek as one of his residents.

In the eyes of the institution, Hal's responsibilities were to conduct research, teach and treat patients. The first two were academic duties and would be compensated through the LeCompte Professorship, which, in actuality, has never been fully funded. The fees generated by his clinical efforts would be turned over to the Infirmary, which would then pay his expenses and compensation. It was understood that administration of the staff necessary for the performance of his duties would implicitly be part of the job.

Upon assuming the post, Schuknecht approached his duties with energy and gusto. He not only oversaw clinical Otolaryngology at the Infirmary and advised other teaching hospitals in the Harvard system on ear-nose-throat matters, but also remained an active surgeon throughout his tenure. Justifying the apprehensions of some of the established order, he dissolved the Winthrop Foundation, which had originally been directed toward research, but had evolved into a special clinic for otologic surgery. He quickly became the most prominent otologist, with referrals from all over the world and relinquished head and neck surgery, including laryngology, to others, most particularly Schall's protégé, William Montgomery. On the academic front, he increased the number of residents and fellows and made research involvement mandatory for residents. To emphasize the linkages between clinical and research thinking, he held otopathology teaching sessions on Sunday mornings and drilled trainees in microscopical anatomy until they could visualize the presumed structural changes in the inner ear that could account for the clinical signs and symptoms. Many future professors of otology were introduced to these ideas through the famous "Sunday School". The mother of one resident, a strict Lutheran, was delighted to hear that her backsliding son was now regularly attending Sunday School at Harvard.

On arriving in Boston, Hal needed a completely reliable temporal bone laboratory for his research and recruited his old friend, Robert S. Kimura from Chicago. Hal then sent Kimura to the Karolinska Institute in Sweden to learn electron microscopy of the inner ear from Jan Wersäll. A steady stream of fellows, particularly those from Japan, spread Hal's reputation around the world. Harvard and the Infirmary became the leading training site for academic otologists. The number of temporal bone laboratories (known as banks) increased and at one time exceeded fifty in this country alone. Thus Hal can be credited with continuing the tradition established by Adam Politzer, Paul Manasse, Karl Wittmack, and Luzius Rüedi in Europe and Stacy Guild at Johns Hopkins in systematically correlating human hearing with conditions in the inner ear as revealed by light microscopy.

Much of his basic research contribution survives. His cochlear frequency maps have been shown to be essentially correct. His histochemical observations on efferent neurons in the cochlea were a major finding that have also stood the test of time. His ideas on strial atrophy being a cause for a particular kind of hearing loss have found support in later physiological studies of strial function. His work with Kimura on endolymphatic hydrops generated the only reliable animal models for basic research. Almost all of his ideas have been incorporated into his magnum opus "Pathology of the Ear", the first edition published by the Harvard University Press and then by Lea & Febiger.

As a teacher, Hal was superb, as evidenced by the large number of his students who dominate academic otology. A group of former residents and fellows started an HFS society in 1973 which eventually evolved into the International Otopathology Society. Hal's social skills were best exemplified by the fond regard in which he was held by his colleagues and students, from whom he withheld no technical secrets. By constantly seeking a rational basis for clinical procedures, he enlisted his students in the quest and the best of them learned to question and probe their own knowledge as did he.

Finally, it would not be out of place, here, to observe the unusual loyalty shown by his staff, many of whom devoted virtually their entire careers to supporting Hal's efforts. Their closeness, second only to that of his family, helped make him an extraordinarily productive member of the Harvard Medical School faculty. He is survived by his wife Anne, a daughter Judy Burness and his son Jim, whose affection sustained him throughout a lifetime of accomplishments. He remained active until just before his death on Saturday, October 19, 1996.

Respectfully submitted,

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