Harold Frederick Schuknecht, 1917-1996

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Harold Frederick Schuknecht, MD, Professor Emeritus of the Department of Otolaryngology at Harvard Medical School and Chief Emeritus of the Department of Otolaryngology at the Massachusetts Eye and Ear Infirmary, who has died, at the age of 79, on October 19, 1996, was a world renowned clinical otologist, otopathologist, teacher and scholar. Harold Schuknecht was born in South Dakota in 1917. He received his undergraduate training at the University of South Dakota and graduated from the Rush Medical College at the University of Chicago in 1940. He completed his residency training in otolaryngology at the University of Chicago Clinics in 1949. It was there that he came under the tutelage and influence of John Lindsay, Henry Perlman, Heinz Kobraak, and William Neff, who profoundly influenced his subsequent scientific career.

Harold Schuknecht was an accomplished and innovative otologic surgeon. He started his career as a member of the full-time faculty at the University of Chicago School of Medicine. At that time, his clinical activities were largely confined to head and neck surgery and endoscopy. In 1953 he accepted a position as Associate Surgeon at the Henry Ford Hospital in Detroit where he concentrated his clinical work in otologic surgery and pursued basic scientific investigations into the pathophysiology of deafness. He was recruited as the Walter Augustus LeCompte Professor and Chair of the Department of Otolaryngology at the Harvard Medical School and Chief of Otolaryngology at the Massachusetts Eye and Ear Infirmary in 1961, a position he held until retiring from his administrative and clinical activities in 1987. He was among the first surgeons in the United States to perform the modern stapedectomy procedure. He developed and introduced several prostheses for stapes surgery, many of which are still in use worldwide. His innovations and equipment which he designed for mastoid tympanoplasty are still in wide clinical use. In 1956 he simplified and perfected transcanal labyrinthectomy for ablating vestibular function in Ménière's disease, and also described the use of intratympanic aminoglycoside therapy for this disorder. He expanded the use of streptomycin by describing its use by the intramuscular route for individuals with bilateral Ménière's disease in 1957 and later in 1970.

In addition to his clinical expertise. Harold Schuknecht was an accomplished and world-

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recognized investigator in anatomy, physiology and pathology of the ear. His early research work included the determination of auditory thresholds in experimental animals and the use of behaviorally conditioned animals in a series of classical experiments, including the study of

traumatic hearing loss, the behavioral effects of partial section of the auditory nerve, and apical lesions of the cochlea. While at the Henry Ford Hospital, he and his associate, John Churchill, demonstrated that cholinergic nerve fibers were present in the organ of Corti and that these were probably of efferent origin from the olivocochlear bundle. He also demonstrated a system of channels, the 'canaliculi perforantes Schuknechtii', in the osseous spiral lamina by which perilymph comes in direct continuity with the neural supply of the ear and basal poles of hair cells. Other experiments demonstrated the patency of the cochlear aqueduct sufficient to allow passage of red blood cells, the independent origin of endolymph in the auditory and vestibular systems, and the pathologic effects of fistulae of the cochlear duct. At the Massachusetts Eye and Ear Infirmary he significantly expanded his research activities. With the collaboration of his good friend, Robert Kimura, the Electron Microscopy Laboratory was developed. In addition, Harold Schuknecht supported the research efforts of the Eaton Peabody Laboratory, which had very recently been established under the direction of Nelson Kiang. Harold Schuknecht's academic accomplishments were described in detail by Beecher and Altschule [1].

The principal focus of Harold Schuknecht's research work at Harvard both during his tenure and following professional retirement was the importance of the underlying anatomy and pathology of the ear to the understanding of the pathology of the ear. The clinical problem was underlined by the quote from Joseph Toynbee [3] with which Schuknecht chose to begin the second edition of his text: 'If we carefully survey the history of the rise and progress of aural (surgery), as a distinct branch of scientific surgery, one main cause of the disrepute into which it has fallen may be traced to the neglect of the pathology of the organ of hearing.' His interest in temporal bone anatomy and pathology began under the tutelage of John Lindsay. Study of otopathology and his active and innovative clinical practice thus became a logical continuity. It can be said that Harold Schuknecht reestablished the histologic and scientific basis for modern medical and surgical otologic intervention, based on his lifelong study and documentation of human temporal bones. His contributions to this area are many, but of particular interests were studies on otosclerosis, Ménière's disease and other vestibular disorders, and presbycusis. Examples of this fruitful marriage between otopathology and clinical practice were many. In 1962 he described his concept of positional vertigo based on sediment of high specific gravity on the cupula of the posterior semicircular canal. In association with his colleague, Robert Kimura, he demonstrated that obstruction of the endolymphatic sac in experimental animals produces endolymphatic hydrops similar to that seen in human Ménière's disease. In the following years there were several articles describing the effects of Ménière's disease in the human including rupture and healing of inner ear membranes and degeneration of the apical spiral ganglion. Based on his earlier research experience in Chicago, he was the first to develop an auditory frequency map for the human. This he developed and perfected over the years in conjunction with his logical and convincing categorization of subtypes of presbycusis, namely, sensory and neural degeneration, atrophy of stria vascularis, and degenerative changes in the supporting structures of the inner ear. As a clinician-scholar, Schu-

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necht was never content with simply descriptive pathology. Instead, he was always searching for clues to the pathophysiology of disease processes. The second edition of his magnum opus, *Pathology of the Ear* [2], was completed in 1993 and will remain a classic in otopathology, and

at the same time provides fundamental information for every otologic surgeon. His scholarly career includes the publication of over 300 original articles, editorials and reviews, and seven books devoted to anatomy, pathology, and surgery of the ear.

In addition to his clinical expertise, Schuknecht was a willing and gifted teacher. His temporal bone collection established at the Massachusetts Eye and Ear Infirmary now contains over 1,500 sets of well-documented specimens. This collection and his willing expert mentorship attracted residents and postgraduate students from many nations. Students honored him in 1973 by the establishment of the International Otopathology Society, also known as the Schuknecht Society. Although originally starting with former research fellows, the Society now includes the students of former fellows and others with a serious interest in human otopathology. The Society has more than 120 members from 30 countries who meet in scientific sessions every three years. During his professional career, Harold Schuknecht received many prestigious awards, including the Award of Merit from the Association for Research in Otolaryngology, the Shambaugh Prize in Otology from the Collegium Otorhinolaryngologicum Amicitiae Sacrum, the Award of Merit from the American Otological Society, and the distinguished award for contributions in clinical otology by the American Academy of Otolaryngology -Head and Neck Surgery. He served as President of the New England Otolaryngological Society, the American Otological Society, and the American Neurotology Society. He was a member of the Editorial Board of *Acta Oto-Laryngologica*, *Annals of Otology, Rhinology and Laryngology*, *Archives of Oto-Rhino-Laryngology*, *American Journal of Otolaryngology*, *Otolaryngology-Head and Neck Surgery*, and *Laryngoscope*. He was an Honorary Fellow of the Royal Society of Medicine of London, Royal College of Physicians and Surgeons of Glasgow, and Royal College of Surgeons of Edinburgh.

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