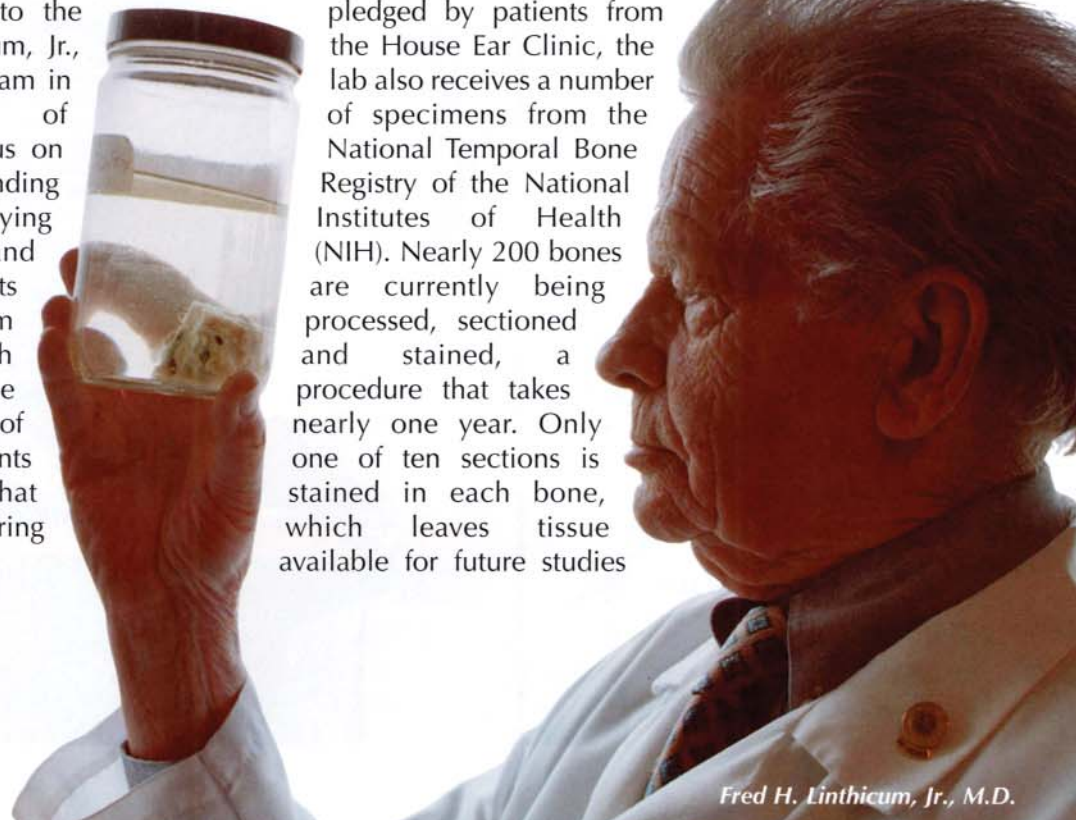


# The Bones Tell the Story

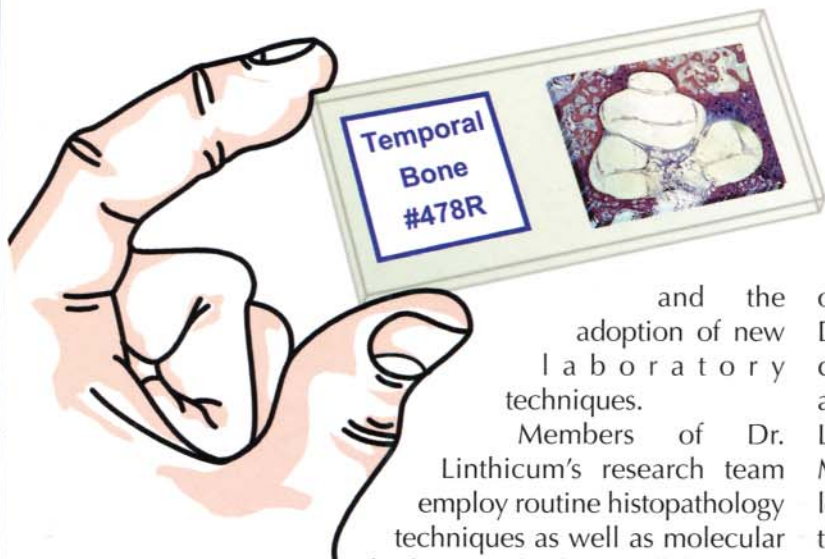
*To resolve the complex problems of hearing loss, we must first understand the cause. Meticulous study of the human temporal bone, which contains and protects our delicate hearing mechanism and balance system, is crucial to this goal.*

The House Ear Institute boasts one of the most comprehensive temporal bone collections in the United States. HEI's collection is unique in that a complete clinical history and diagnosis accompanies more than 700 pairs of temporal bones processed and stored in its Temporal Bone Laboratory. This clinical information is essential to the work of Fred H. Linthicum, Jr., M.D., and his research team in HEI's Department of Histopathology, who focus on enhancing our understanding of the pathology underlying disorders of hearing and balance. These scientists examine the ear system contained within each donated bone to study the pathologies and effects of surgery or other treatments for hearing problems that each donor received during their lifetime.

The Eccles Foundation established the Temporal Bone Laboratory in 1946 when Howard P. House, M.D., began asking patients to pledge their temporal bones to the Institute for further study. The positive response to these requests allowed Dr. House to expand the lab and its research program. In addition to the bones pledged by patients from the House Ear Clinic, the lab also receives a number of specimens from the National Temporal Bone Registry of the National Institutes of Health (NIH). Nearly 200 bones are currently being processed, sectioned and stained, a procedure that takes nearly one year. Only one of ten sections is stained in each bone, which leaves tissue available for future studies



Fred H. Linthicum, Jr., M.D.



and the adoption of new laboratory techniques.

Members of Dr. Linthicum's research team employ routine histopathology techniques as well as molecular biology methods in collaboration with the Gonda (Goldschmied) Cell and Molecular Biology Department in

the analysis of the investigation of cellular function of the temporal bone. Researchers also have access to HEI's imaging laboratory for additional studies, including 3-dimensional reconstruction of microscopic structures. Analysis of each bone contributes new findings to the existing clinical record in the computerized database.

The Department of Histopathology has several ongoing projects including the identification of the herpes simplex virus DNA as a possible cause of Meniere's disease. Meniere's is an inner ear disorder that is incapacitating for many of its sufferers, who typically experience symptoms of dizziness. It's still not known exactly why the disease occurs. One idea being explored by Drs. Linthicum and Emam Saleh, in collaboration with Dr. David Lim's research team, is whether the presence of viral diseases, such as the herpes simplex virus (the virus that causes fever blisters), might trigger the onset of some cases

of Meniere's disease. Based on this research, Jennifer Derebery, M.D., of the House Ear Clinic is currently conducting an ongoing study to determine if the use of anti-viral medications can prevent the attacks. Drs. Linthicum and Saleh hope their collaborative studies on Meniere's disease with other scientists in the Institute will lead to the development of new preventions and cures for this debilitating condition.

Another project is the investigation of an unrecognized cause of presbycusis, the hereditary progressive hearing loss that often occurs in older patients. This study has required the development of new methods of measuring the loss of the nerve fibers that transmit sound impulses within the inner ear. A third project is the microscopic evaluation of the effects of the cochlear implant on the balance mechanism of the inner ear. Rigorous investigation and analysis of the temporal bone yields clues to the vast array of hearing and balance disorders, and ultimately improves our ability to solve them. ❖



*Dr. Linthicum with part of HEI's temporal bone collection*