Lasker announces 1983 medical awards

The Albert and Mary Lasker Foundation this week cited two neurobiologists, a cardiologist, and two pioneers in the development of a hepatitis B vaccine in its three $15,000 awards for medical research and public service. Often touted as America's most prestigious medical award, the Lasker has frequently heralded further scientific acclaim — in the 38 years since the award's inception, 37 winners have later become Nobel laureates.

Eric R. Kandel, of Columbia University College of Physicians and Surgeons in New York, and Vernon B. Mountcastle Jr., of Johns Hopkins University School of Medicine in Baltimore, shared the 1983 award in basic research for their work exploring the ways electrical connections between brain cells are integrated and modulated to produce perception and learning. F. Mason Sones, of the Cleveland Clinic Foundation, won the award in clinical medical research for his method of precisely identifying the clogged arteries involved in heart disease. Saul Krugman, of New York University School of Medicine, and Maurice R. Hilleman, of Merck Sharp and Dohme Research Laboratories in West Point, Va., shared the public service award for their achievements in virology, particularly in the development of a vaccine against hepatitis B virus.

Kandel's work in learning and memory centers around a sea snail named *Aplysia*, a lowly creature valued less for its intellect than for its easily understood nervous system (SN: 1/22/83, p. 58). Though its behavioral repertoire is limited to little more than eating, mating and escaping, the sea snail's simple network of large neurons is thought to mimic complex brains of higher animals, including man. Kandel became the first scientist to define the complete electrical chain of events that underlie an animal's response to a stimulus. More recently, he has shown on a molecular level that three fundamental forms of learning — sensitization, habituation and classical conditioning — can chemically alter individual nerve cells.

Mountcastle, too, has studied the cellular architecture of the brain, by exploring the way the sensation of touch is relayed to the brain and abstracted into perception. He and his colleagues found that nerve cells in a part of the brain that deciphers outside stimuli are arranged in vertical columns that radiate from the depths of the cerebral cortex to its surface. Cells in an individual column receive information from the same spot on the skin, but respond to varying degrees of pressure in different ways.

Sones invented a method of "photographing" the blood vessels that feed the heart, using X-ray motion pictures and dye injected into specific arteries. In addition to improving the diagnosis of arteriosclerosis, the technique made possible coronary bypass surgery, a method of rerouting the heart's blood around diseased arteries, that saves the lives of as many as 170,000 Americans each year.

Krugman was the first to show that hepatitis A and B, two brands of infectious liver disease, stem from two distinct viruses that are transmitted in different ways. Active hepatitis B can lead to cirrhosis of the liver and liver cancer. Krugman first demonstrated the feasibility of a vaccine against the virus, while Hilleman and colleagues brought the work to fruition with a vaccine, approved by the Food and Drug Administration two years ago (SN: 11/21/81, p. 327). *—D. Franklin*

Organs needed, but not when sold

Though the survival chances for today's transplant patients are better than ever (SN: 10/1/83, p. 218), potential recipients also face a serious shortage of organs in the United States. The outlook for survival received a boost this week when the Food and Drug Administration approved the anti-rejection drug cyclosporine for kidney, liver and heart transplant patients (SN: 3/5/83, p. 150). However, the shortage question not only remains, but is compounded by the efforts of one physician to put a price tag on organs.

Barry Jacobs, who has set-up a brokerage firm for buying and selling organs called the International Kidney Exchange, Ltd., says that the present donor system is a "dismal failure" and that his plan would "save $2 billion per year." Instead of depending on volunteer donors and a telephone hot line attached to an answering machine, Jacobs would pay individuals or their families for the organs. The proposal was discussed last week at a hearing of the House Science and Technology Subcommittee on Investigations and Oversight.

Medical ethicist Robert M. Veatch, a professor at Georgetown University in Washington, D.C., objects to Jacobs' project on practical grounds. He says that if the experience of blood transfusion holds true then the quality of sold organs would be lower than the quality of donated ones. He says, "When an organ source is motivated financially, he or she has an incentive to hide potential problems — a history of kidney disease in the family or an existing illness, possibly even a terminal illness." He adds that a donation system and a market system were potentially incompatible because possible donors would probably refuse if they knew that other people were receiving money.

Albert Gore Jr. (D-Tenn.), who chaired the hearing, says, "It [buying and selling organs] would make the poor a source of spare parts for the rich. And it would auction-off life to the highest bidder." Gore is a co-sponsor of H.R. 4080, which would outlaw payment for an organ and institute a national computerized network for matching organs. *—J. C. Amatniek*

The sound and fury of Arctic icequakes

"It bumps and grinds and tears and squeaks," Peter Stein, a geophysicist at Massachusetts Institute of Technology (MIT) in Cambridge, told a meeting of the Acoustical Society of America last week. He was talking about ice, specifically the ice cap covering the Arctic Ocean. He has coined the forces responsible for the noises "icequakes," not unrelated to their terrestrial counterparts.

Stein and his colleagues in Ocean Engineering at MIT and Woods Hole Oceanographic Institute in Woods Hole, Mass., were studying underwater acoustics in the Arctic Ocean when they noticed the inherent noisiness of the Arctic ice pack. "The background noise level there can be ten times that of the open ocean," Stein said; prompting him to match the noises with the ice cracks that cause them to test for stress buildup in the pack.

Working from a camp pitched on the three meter thick pack covering the 4000 meter deep Arctic Abyssal Plain, the researchers used a complex array of hydrophones to measure the frequency and propagation of sound waves associated with ice cracking. Like earthquakes, the cracking ice sends out two kinds of waves, compressional and shear. The former travel faster than the latter, and by measuring the difference in their arrival rate at a series of stations, a quake's epicenter can be pinpointed. "The earth's crust floats on magma just like ice floats on water," Stein says. "When I saw all the similarities, I called them icequakes."

The basic science of studying Arctic ice — the material and acoustical physics of pack-ice breaking — has already yielded some practical applications for U.S. Naval and private interests within the Arctic Circle. High-stress ice fractures, the kind that smash ships and topple oil-drilling platforms, are associated with low frequency sounds.

Diurnal thermal crackling, associated with high frequency sounds, is generally harmless but can annoy submarine sonar operators. Some ice cracking emits "narrow band" frequencies, as do submarines, which raises the possibility of mistaken identity in submarine detection. Stein hopes his work will help Arctic workers prevent accidents by allowing them to detect the amount of stress the pack is under by monitoring the ambient noises in the Arctic ice. *—M. Wolfe*