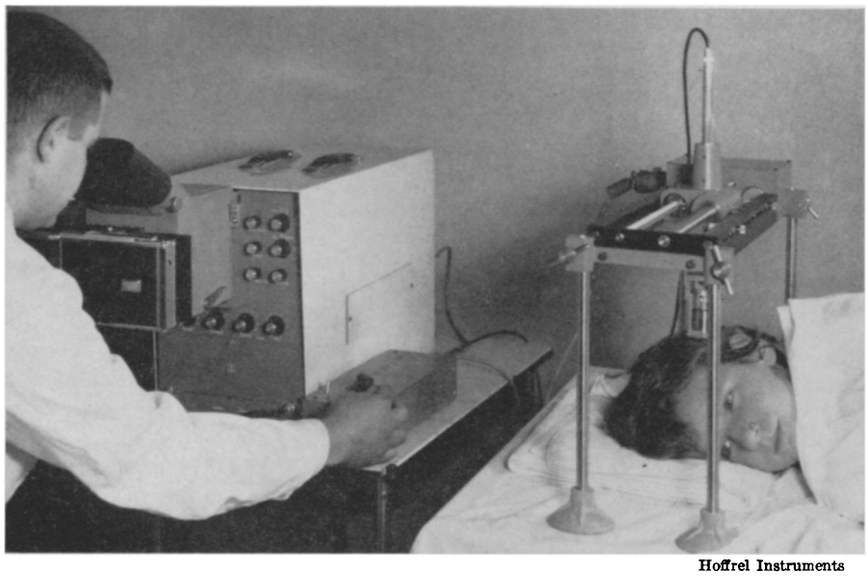

Hoffrel Instruments

ULTRASONIC DIAGNOSIS—The brain of a young patient is being mapped by a device that uses ultrasonic waves for detecting brain tumors. Analysis of the photographs of the ultrasonic wave patterns shows the location of the mass lesion.

ACOUSTICS

Ultrasound 'Sees' Tumors

Photographs of the pattern of reflected ultrasound waves introduced into the brain and displayed on an oscilloscope can help detect mass lesions in the brain—By Ann Ewing

➤ ULTRASONIC WAVES are being successfully used to detect brain tumors.

This new method of examining what is inside the head shows promise of telling surgeons whether the trouble-causing mass is a tumor of the brain itself or a cancerous invader from another part of the body.

Typical pictures made by mapping the brain with ultrasonic waves were shown to the Acoustical Society of America in Washington, D.C., by Dr. John F. Belford, a physicist with Hoffrel Instruments, Inc., Norwalk, Conn. Dr. Belford, with Russel L. Uphoff and Donald P. Relyea, also officers of Hoffrel Instruments, developed the methods that make the new technique possible.

Ultrasonic waves have been used for several years to search for tumors in other parts of the body, kidney stones, and foreign objects in the eye, among other applications.

However, only within the past 18 months have scientists learned to read the photographs that result when the head is scanned by ultrasound with sufficient accuracy to use the method as a clinical procedure.

They still have much to learn about interpreting the ultrasonic "tomograms," as the photographs are called.

Nevertheless, as Dr. Belford sated, "in most cases the position of the mass lesion in the brain can be determined." It is seen either directly on the tomogram or inferred from a shift in the location of structures within the brain, such as the midline.

The ultrasonic waves, usually at a frequency of two megacycles per second, are introduced into the brain by a transducer, which changes electrical energy into mechanical, or sound, energy, and vice versa. The reflected sound, which is bounced back by any surface at which the density changes, is detected by the same transducer.

The pattern of reflected sound, which changes as the transducer is moved around, is displayed on an oscilloscope, a TV-like screen, and photographed. Such a photograph can be obtained with no discomfort whatsoever to the patient, and can be repeated as often as necessary without danger.

This is in contrast to many of the methods in current use for visualizing the interior of the head, most of which are not only painful but also open up the possibility of after-effects.

In the case of X-ray examinations, Dr. Belford noted that it is not desirable to repeat them too frequently. The ultrasonic method has been used to follow the shrinking of a tumor as it responds to treatment without the danger of X-rays.

A complete ultrasonic scanning system costs from $5,000 to $15,000, and about 20 hospitals around the country have them or are installing them. New York Medical Center and Bellevue Hospital Center in New York and Children's Hospital Medical Center in Boston were the first in this country to use the technique.

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Aid Underwater Hearing

➤ UNDERWATER swimmers can tell the direction of sounds they hear using a new device described to the Acoustical Society of America.

Normally a man under water loses most of his natural sense for perceiving the direction from which sounds come. This is because in air man depends upon the dimensions of his head to establish the differences in time and intensity between hearing in the two ears, and thus to detect the direction of sound.

Sound travels four and a half times faster in water than in air, reducing the differences between the two ears by the same amount. It is as if the diameter of a man's head had suddenly shrunk to the size of a golf ball.

Scientists at Columbia Broadcasting System Laboratories in Stamford, Conn., found a way around this difficulty. They determined that, even under water, sounds arrive at the inner ear, which is the real mechanism of hearing, through the ears in normal fashion.

They then constructed small hydrophones that duplicated electronically the delay man normally hears between the two ears. This "conclusively established" the feasibility of directional communication under water, B. B. Bauer and E. Torick found.

"When assembled into a unified miniature communication system mounted on his head, man-in-the-sea will be able to perceive the direction of arrival of all sounds within the normal frequency range of hearing," they concluded.

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Noise Pollutes Air

➤ THE WORLD around us is filled with noise, noise, noise.

Unwanted and unnecessary sounds are a form of air pollution not receiving the attention their high nuisance value deserves, a Canadian sound expert believes.

Dr. George J. Thiessen of Canada's National Research Council called for an "integrated attack on the ever-increasing menace of traffic noise." But before such an attack can be successful, the public's attitude toward unnecessary sounds must change.

This attitude is now "schizophrenic," Dr. Thiessen told the Acoustical Society of America meeting. As homeowners or apartment dwellers, most persons would like to enjoy an evening out-of-doors in peace and quiet.

As motorists, however, many persons want their cars to have the highest possible power to give the greatest acceleration.

This divided attitude, Dr. Thiessen said, is probably the main reason that laws are not passed applying tighter control on noise producers.

The automobile industry, muffler manufacturers, trucking companies, legislators, community planning officials, traffic engineers and acoustic consultants need to combine efforts to reduce the traffic noise that threatens to erode "the good life" technology is capable of providing.

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