PHYSIOLOGY

Loud Noise Damages Part of Ear Not Used to Hear Tones

That Part of Organ of Corti Injured By Loud High Tones Does Not Pick Up Faint Tones of Same Pitch

LONG exposure to loud noise, such as boilermakers experience in the course of their work, causes deafness by damaging part of the hearing apparatus, known as the organ of Corti. Strangely, however, the part of the organ most damaged by loud high-pitched tones is not the part which picks up faint sounds of that pitch, a group of investigators at Harvard and Clark Universities have found.

The investigation which gives new knowledge both of a cause of deafness and of the little understood mechanics of hearing was made by Drs. Hallowell Davis, Moses H. Lurie, Morgan Upton and Arthur J. Derbyshire, of Harvard, and Dr. Edward H. Kemp, of Clark.

The intensity of the sounds necessary to cause damage is sufficient to cause definite discomfort in the ears of a human listener and to cause his ears to ring afterwards. It might be compared to that of a steam whistle or riveter at a distance of a few feet. The power of such tones in physical terms is some 10,000,000,000 times that of the faintest corresponding tones which the human ear can hear.

Because cats and guinea pigs could not tell the scientists just when they stopped hearing tones, the electrical currents generated in their hearing apparatus were tapped somewhat as a telephone conversation is tapped by a lineman splicing a wire from the phone line to his earpiece. In the case of the cats and guinea pigs, the organ of hearing was connected to an apparatus which amplified the currents originating in it and carried these to a cathode ray oscillograph which wrote in light on a fluorescent screen a wavy line corresponding to the fluctuations in the current from the ear.

The sensitivity to sound intensity of normal cats and guinea pigs as determined in this way corresponds quite closely to the normal human audibility curve, the Harvard and Clark investigators found.

The cats and guinea pigs were exposed to sound of varying degrees of loudness for varying lengths of time. With the electrical set-up, the point at which they lost sensitivity to the sound and could not hear the tones was determined in each case. As a check, the tissues of their hearing apparatus were then examined under the microscope for signs of damage.

The results indicate that frequency (pitch) of a tone as well as its intensity (loudness) may be an important factor in determining whether or not it will damage the inner ear, the scientists reported, the tone of 2500 cycles per second (about an octave above high C) being more effective than 600 cycles per second (a tone and a half above middle C).

Considerable individual differences in susceptibility were also indicated. Intense exposure may sometimes cause extensive damage to the inner ear and correspondingly great loss of hearing, it appeared. Some of the cases in which the damage was moderate and localized gave information suggesting that a certain part of the hearing apparatus picks up tones of a certain range in pitch, thus shedding light on a highly complex problem which scientists have not yet settled to their satisfaction.

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PUBLIC HEALTH

Advise FERA on Meningitis In Transient Camps

THE U. S. Public Health Service is advising Relief Administration officials on measures to reduce the hazard of meningitis outbreaks in transient camps and shelters, it was announced following reports that such outbreaks had occurred in camps in Washington, D. C., and at Fort Eustis, Va. The health officials are not yet ready to make public these measures.

The disease is not likely to spread from these camps to the rest of the population, public health officials said, though there may be more cases of meningitis throughout the country this winter than usual.

Comparison of the prevalence of the disease now and in past years shows that there is very much less meningitis now than there was in 1928, 1929 and 1930 but slightly more than in 1932, 1933 and 1934. For the week ending Feb. 2, the latest on which figures are available, 127 cases were reported to the U. S. Public Health Service by state health officers.

While epidemic meningitis is a relatively rare disease, it has been fairly prevalent all over the United States during the past few years. It is known to public health authorities as one of the seasonal diseases, which means that it is more prevalent at some times of the year than at others. In the temperate zone, in which we live, it is most prevalent during winter and spring, reaching a high point in March.

Meningitis is an inflammation of the membranes covering the brain and spinal cord. This inflammation may be caused by various types of infection, such as tuberculosis, pneumonia, streptococcus, etc. The type known as epidemic meningitis is caused by an organism called the meningococcus.

Epidemic meningitis is spread chiefly by healthy carriers who carry the meningococci in their throats and noses. Theoretically, the way to check meningitis would be by isolating all the carriers. This was found to be impractical—in fact impossible—during the World War, when the disease broke out among the soldiers, because the germ may be carried by one person today and by another tomorrow.

Crowded living conditions, such as exist in tenements, in barracks during war time, or sometimes in the steerage of ships, are particularly favorable to the development of epidemics of meningitis.

Sometimes a patient suffering from the disease gives it to others. This must be guarded against by isolating the patient and disinfecting.

Meningitis usually starts suddenly, with more or less severe headache and fever. A very characteristic symptom is the backward bending of the head, which is held rigidly in this unusual position.

Examination of the fluid within the spinal cord for the presence of the germ is the only way of making an absolute diagnosis of epidemic meningitis. For this purpose the fluid is drawn through a needle. The operation is not dangerous and does not cause much pain.

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