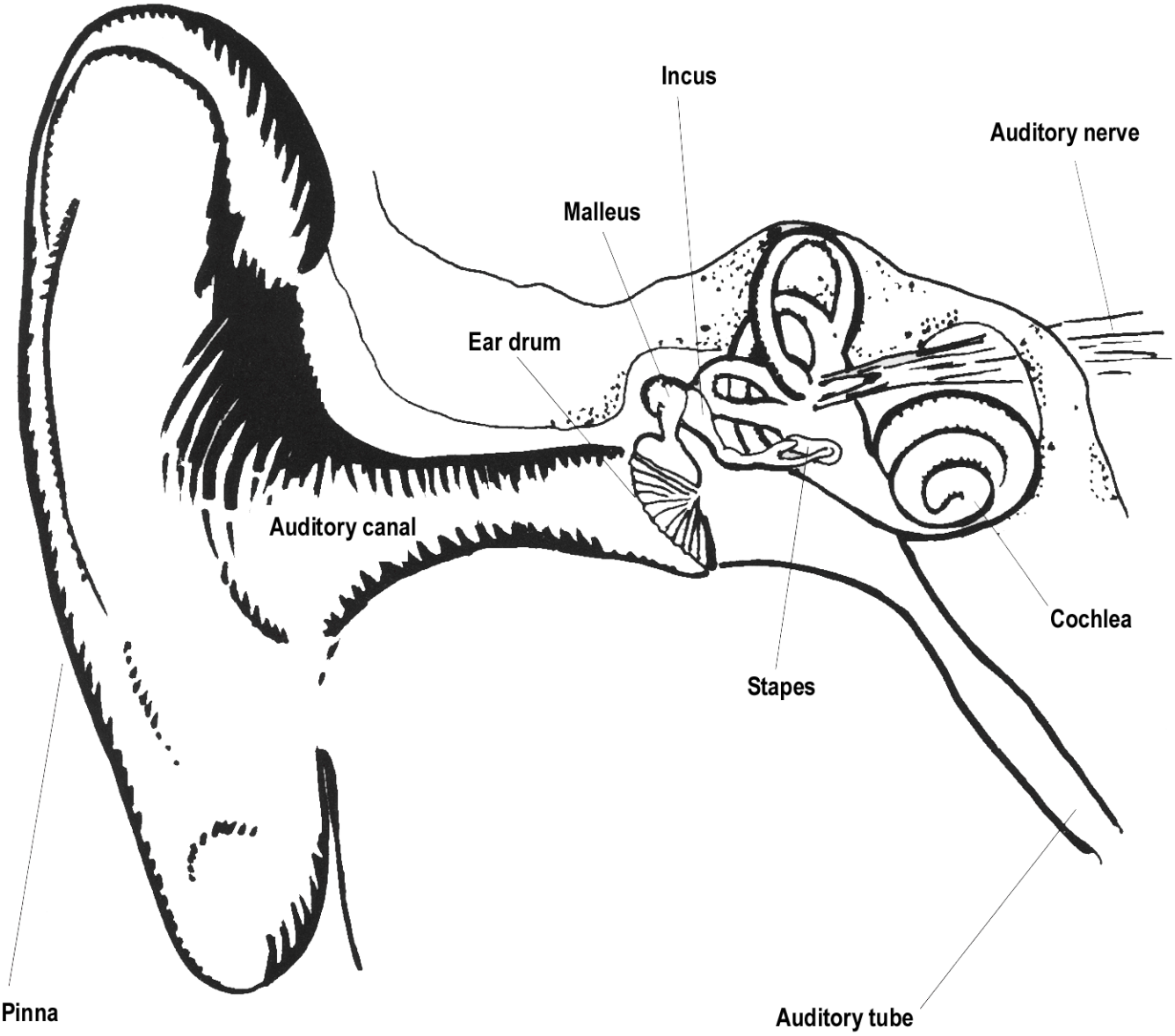

Incus
Auditory nerve
Malleus
Ear drum
Auditory canal
Cochlea
Stapes
Pinna
Auditory tube

HOW DO WE HEAR?

Hearing depends on a series of mechanical events that transform sound waves in the air into electrical impulses in the nerves which are then carried to the brain.

1 Sound waves first enter the ear through the fleshy, cup-like portion of the outer ear which collects sound and funnels it towards the brain.

2 These sound waves then travel a few centimeters down the auditory canal, the pathway to the middle ear, before striking the delicate tympanic membrane, commonly known as the ear drum.

3 This thin, skin-covered membrane, which separates the external and middle sections of the ear, vibrates with incoming sound waves and transmits these vibrations to three tiny bones in the middle ear, collectively referred to as the ossicles. The ossicles amplify ear drum vibration and carry them to the inner ear.

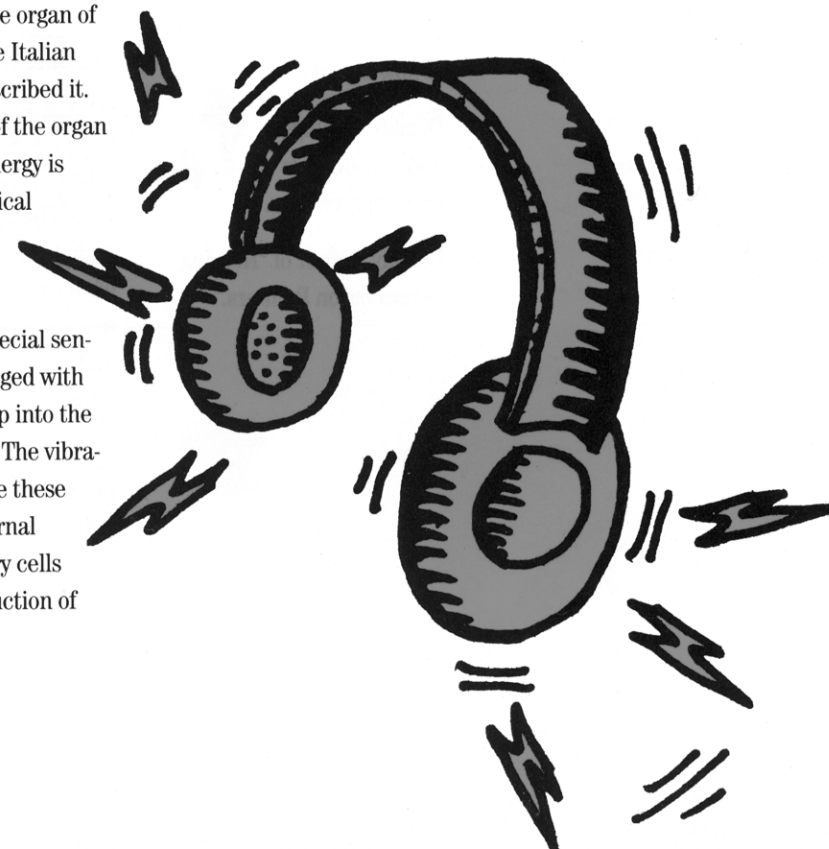
4 More amazing than this smooth transition of sound waves is the size of the ear's high-fidelity equipment. For example, the three bones of the ossicles — the malleus, incus and stapes (or the hammer, anvil and stirrup) — are spectacularly small and fit into an area the size of an orange seed.

5 The third bone of the ossicles, the stirrup-shaped stapes, transmits the amplified vibrations through the oval window and into the fluid that fills the inner ear.

6 The final destination for sound vibrations is the snail-shaped cochlea. The fluid-filled cochlea coils about itself three times and contains the organ of Corti, named after the Italian scientist who first described it. It is in the hair cells of the organ of Corti that sound energy is transformed to electrical nerve impulses.

7 Hair cells are special sensory hearing cells fringed with fine hairs that stick up into the fluid of the inner ear. The vibrations in the fluid move these hairs and trigger internal changes in the sensory cells that lead to the production of electrical signals.

8 Finally, the hearing or auditory nerve carries electrical signals to the brain.

In summary, sound waves are funnelled into the outer ear and amplified in the middle ear. Sound waves are then carried through the oval window and into the fluid of the inner ear. Waves of fluid in the inner ear, in turn, move the ultrasensitive hair cells. Sounds of different frequencies and intensities move the hair cells in slightly different ways, thus allowing the brain to differentiate between sounds.

MORE THAN 28 MILLION AMERICANS HAVE A HEARING LOSS.