

INSTRUCTION FOR THE EAR MODEL

The frame of the model is made of PVC and the labyrinth unit of the model is housed within a straight tube of plexiglass. The ear-drum (2) and the mobile part of the basilar membrane with hearing cells (8) are made of silicone-rubber. The basal part of the cochlea with the oval window (6) and the round window (7) is also made of silicone-rubber.

The ossicles of the middle ear (the hammer (3), the anvil (4) and the stirrupbone(5)) are made of polyurethane plastic just as a part of the basilar membrane in the cochlea. When the model is used, the cochlea is filled with water.

The function of the model

By a crank device on the back of the model, the ear-drum (2) can be made to flutter with different low frequencies ("pitch of Sound"). The crank device has 2 positions for the driving rubberbelt (gear ratios) giving different Speeds that results in alternative patterns of flutter. The flutters are led via the ossicles (3) (4) (5) and the oval window (6) to the fluid (water) in the cochlea. The wave motion in the fluid also makes the basilar membrane with the sense-cells (8) to vibrate. Low frequencies make the membrane to vibrate most in the top of the cochlea. High frequencies make the membrane to vibrate most in other parts.

The amplitude ("volume of sound") of the vibrations can be adjusted in two positions. If the hub of the spindle ahead of the ear-drum (1) is unscrewed, the transmission to the ear-drum can be altered.

In the cochlea, the vibrations of the Sense-cells are transformed to nerve impulses, which on the model are indicated with nerve fibres on the underside of the basilar membrane (10).

The mirror and the cloth

The mirror is placed in a suitable way so that it is possible at the same time to watch the moving parts of the model in function. By studying the pictures (and text) of the cloth and by utilizing the possibilities of the ear model, it is easier to understand the building and function of the ear.

Filling of water to the cochlea

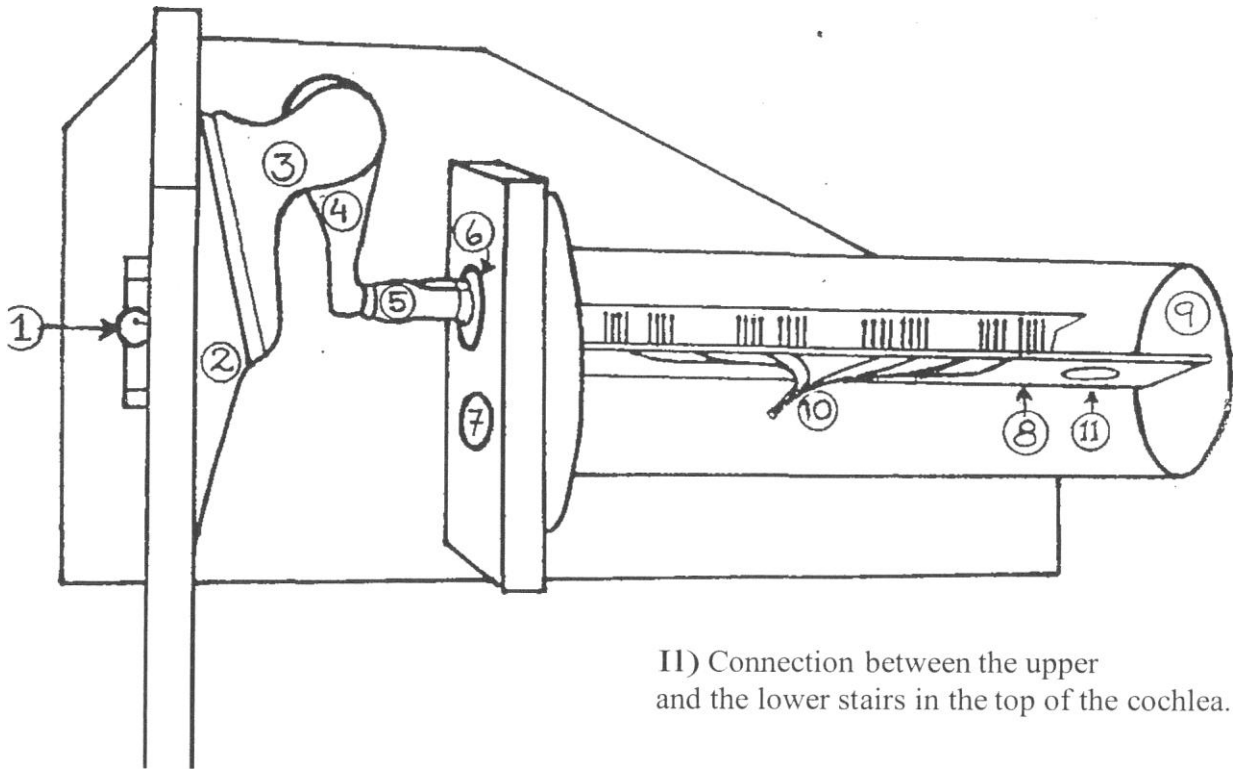
Put the model on its end so that the tube's (the cochlea's) top with the two plastic screws (9) is turned upside.

Unscrew both the plastic screws.

Turn the crank so that the stirrup-bone (5) with the oval window (6) is in its central mid position (rest). Use the syringe and carefully fill water through the screw holes (9) so that the whole tube will be filled. Remove the bigger air bubbles but leave the minor ones.

Because of the water pressure, the round window (7) bulges too much. Move with your finger the round window (7) back to its central position and keep it there while the two screws are put in position again.

The model is ready to be used



II) Connection between the upper and the lower stairs in the top of the cochlea.

NOTE

DO NOT expose the model for blows and knocks. The basilar membrane of silicone is thin and easily moved and can be put out of its position if the model is carelessly handled.