2. THE EAR AND THE HEARING

The EAR is made up of many moving parts:

From the diagram the ear is divided into three parts: 
the outer .... the middle .... the inner.

OUTER EAR

A. Pinna ......................... flap of cartilage.

B. External Auditory Meatus .......... ear canal.
MIDDLE EAR CAVITY

(Filled with air)

C. Tympanic Membrane ................. ear drum.
     Ossicles ........ 3 separate bones, hinged together.

D. Malleus .................................. hammer.

E. Incus ................................... anvil.

F. Stapes ................................... Stirrup.

G. Oval Window.

H. Round Window.

I. Eustachian tube .... this leads to the back of the throat
     where it is closed by a valve which
     opens during swallowing, coughing
     etc. This tube allows the air
     pressure in the middle ear to remain
     the same as the air pressure around
     us.

INNER EAR

J. Cochlea ....................... coiled tube filled with
     fluid.
k. Auditory Nerve ....................... leading to the brain.

L. Semicircular Canal ...................... concerned with balance.

Since 'Audition' or 'hearing' is concerned with the response of the human ear to auditory stimuli, it is necessary to know something of the hearing mechanism.

The ear is a composite organ with two main functions. It is an organ of hearing - its function is collection, transmission and perception of sound waves. Its second function is not so well known to common people. It is a peripheral organ of equilibration, that is to say, bodily balance.

The ear is divided into three parts: (a) External Ear, consisting of the Auricle or Pinna and the External Auditory canal, which is separated from the Middle Ear by the Tympanic Membrane which is called Ear Drum also. (b) Middle Ear Space, consisting of a Chain of ossicles formed of the Malleus or the Hammer, the Incus or the Anvil and the Stapes or the Stirrup. (c) Internal Ear, consisting of Cochlea, Vestibule and Semicircular Canal. The Cochlea is so named from its resemblance to a snail shell. It is two and a half turns in the human. The Oval Window and the Round Window are situated in the outer wall of the bony casting of the cochlea. Two membranous tubes in the cochlea make
three separate rooms named Scala Vestibuli, Scala Media and Scala Tympani. The rooms are filled with liquid substance. The Scala vestibuli and the Scala Tympani contain perilymph fluid and the Scala Media in between the above mentioned rooms contains the endolymph fluid. Of the two separating membranous tubes, one is Reissner Membrane and the other is Basilar Membrane. On the Basilar Membrane which separates the Scala Media from the Scala Tympani there are about 30,000 hair cells which are called "Organ of Corti". These are sensitive receptor cells or sense organs of hearing from which thousand of nerve - fibres becoming entwined together like the strands of a rope are carried upto to the brain.

Sound enters the normal hearing ear as sound waves travelling down the external auditory canal. These sound waves strike the tympanic membrane and are converted to mechanical energy which is transmitted across the middle ear by the movement of the ossicles and results the movement of the footplate of the stapes. Inward displacement of the footplate of the stapes causes the fluid in the inner ear to vibrate. Thus, mechanical energy is converted to hydraulic energy. The movement of the fluid causes a shearing action of the hair-cells in the inner ear, resulting in electrical impulses. The auditory nerve responds to this electrical current and fires, producing electro-chemical energy which is carried to the brain where the meaning of the
Sound waves, first received by the pinna of the outer ear, is interpreted.

Sound and hearing are as vital as is the ability to see, to speak and to feel. Hearing is the balance wheel that harmonizes the total environment of the human beings. But what is the condition of a hearing impaired child? Hearing impairment is an invisible disability and the extent of its invisibility is unfathomable. The necessity to hear sound in infancy and early childhood is an asset that pays dividends for the rest of the life. Hearing impairment is akin to cancer, in as much that, early detection, assessment and proper intervention provide always a better prognosis.