THE AUDIOLOGIST
SATISFIES THE LAYMAN'S DOUBTS
ON
HEARING, HEARING LOSS AND REHABILITATION

Reg.No.M9013

AN INDEPENDENT PROJECT IN PART FULFILMENT FOR THE FIRST YEAR M.SC. (SPEECH AND HEARING), UNIVERSITY OF MYSORE, MYSORE.

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1991

Daddy, Mummy and Chimmi

For all the love you've always gives
For all the small and great things you've done
For being the wonderful people you are
Forever thanks • • • •

CERTIFICATE

This is to certify that the Independent Project entitled: " The Audiologist Satisfies the Layman's Doubts on Hearing, Hearing Loss and Rehabilitation" is the bonafide work in part fulfilment for M.sc., in Speech and Hearing, of the student with Reg.No,M9013.

Mysore
1991

Director
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CERTIFICATE

This is to certify that the Independent Project entitled: "The Audiologist Satisfies the Layman's Doubts on Hearing, Hearing Loss and Rehabilitation" has been prepared under my supervision and guidance.

Mysore
1991

GUIDE

DECLARATION

This Independent Project Entitled: "The Audiologist Satisfies the Layman's Doubts on Hearing,Hearing loss and Rehabilitation" it the result of my own study undertaken under the guidance of Dr.(Miss) S.Nikam, Prof. and Head of the Department of Audiology, All India Institute of Speech and Hearing, Mysore. and has not been submitted earlier at any University for any other Diploma or Degree.

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XXX

This work represents the contributions of many.
They share the responsibility for its fine points.
The flaws are all my own.

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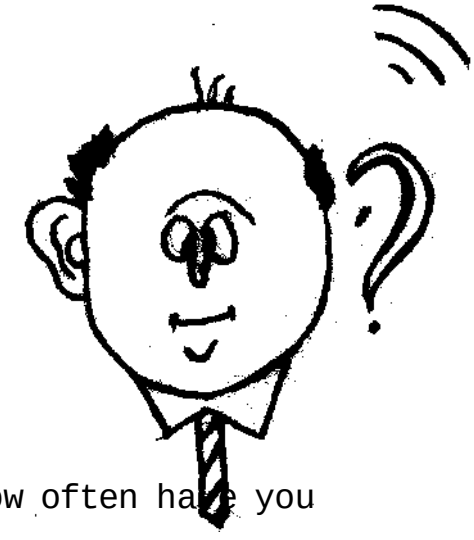
INTRODUCTION

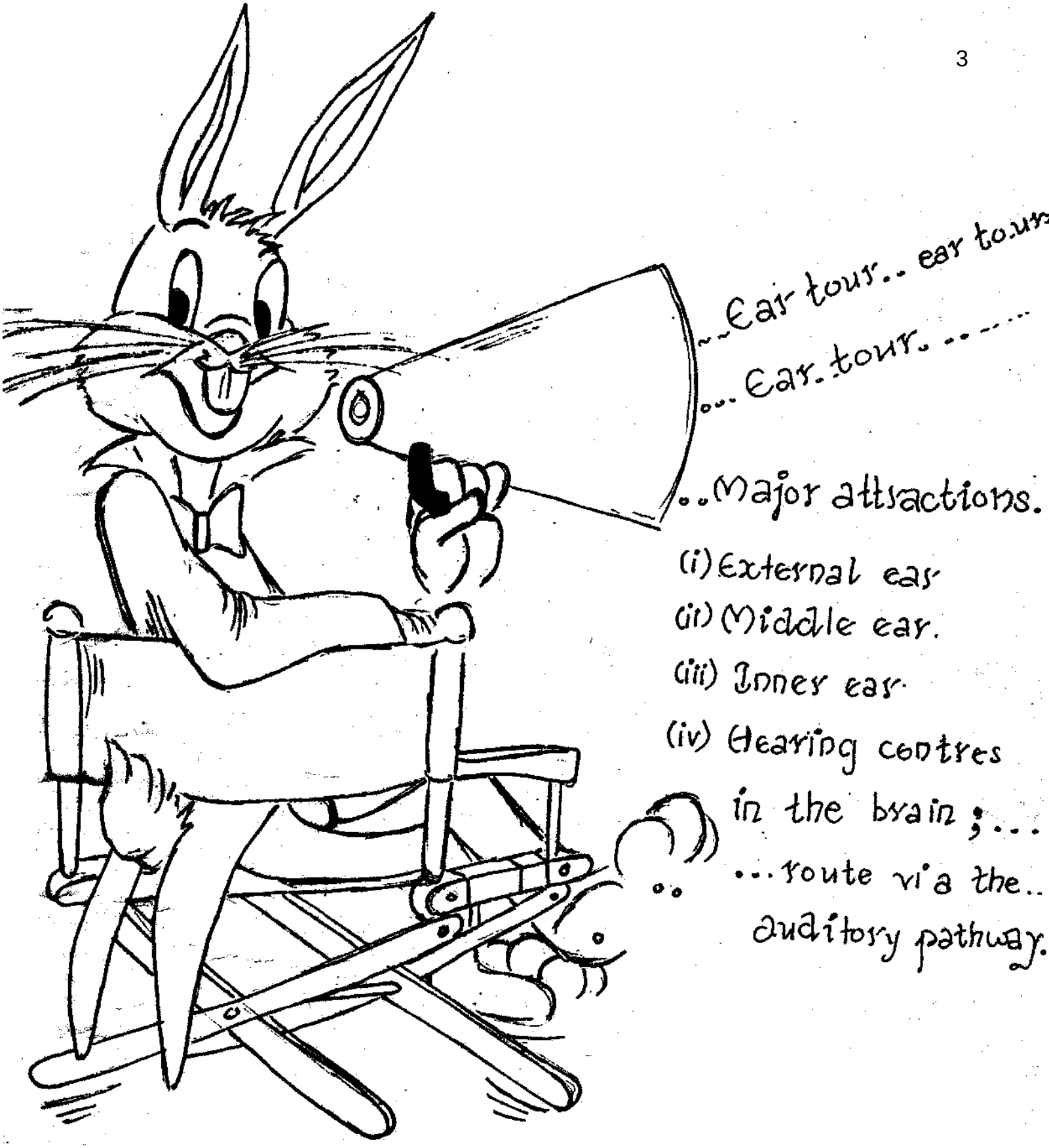


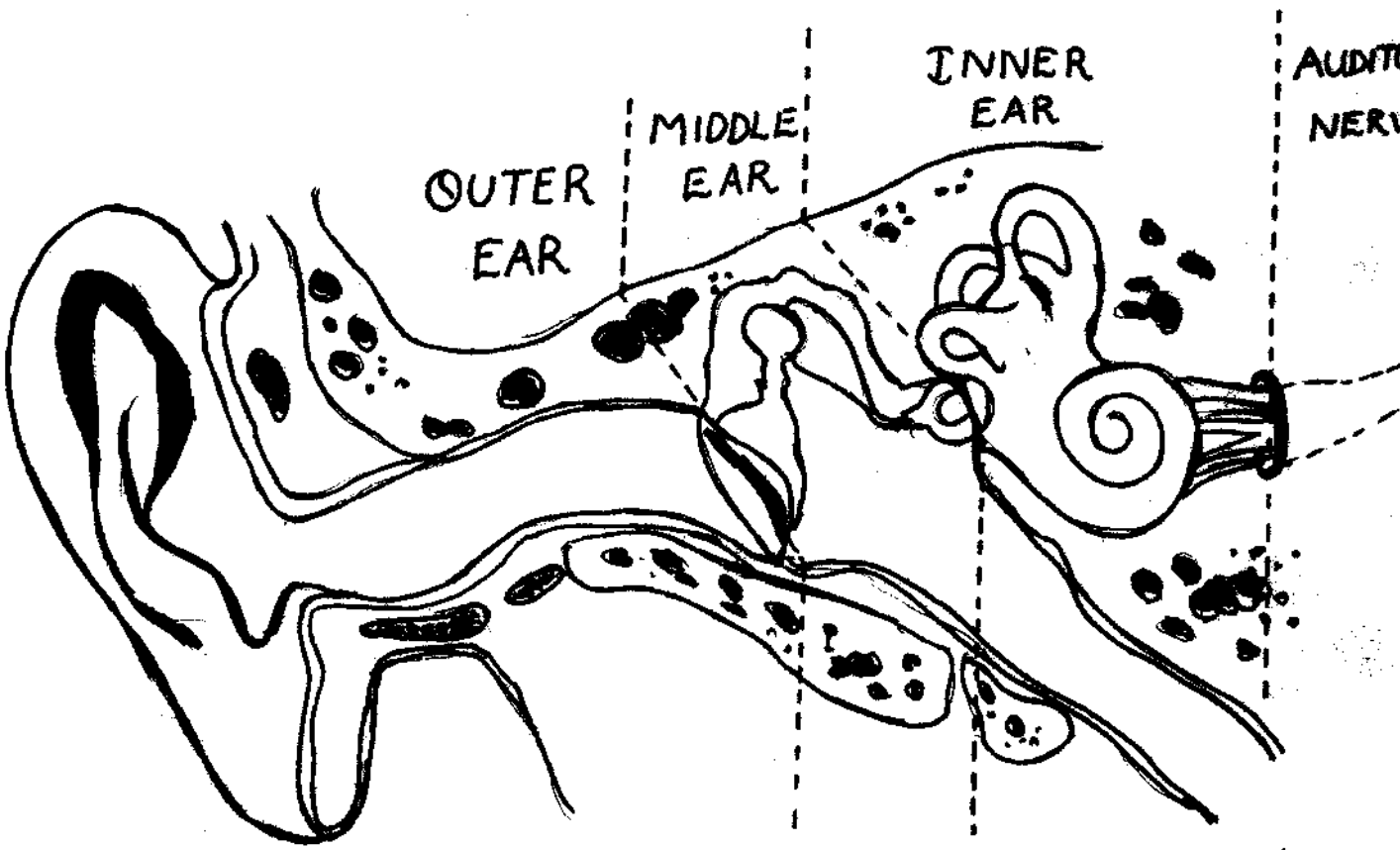
How well do you know your ear? How often have you stopped to think - How do I hear? It is only when we atop hearing sounds do we start giving importance to that little structure in onr body- 'The Ear, And then, when numerous doubts cross our minds and we wish to obtain answers to all of them, yet another problem arises "whom do we go to who can satisfy onr doubts?".

Come one, come all ! Attend this enlightening session on the ear. The audiologist will try to provide answers to all your questions on how you hear, whet is hearing less and how to face the challenge of hearing less - which is what aural rehabilitation is all about.

Ear Show

Welcome to the "Ear show". We shall take you on a long but interesting journey through the ear. You will now visit all the nooks and corners that you'd never dreamt of visiting ! At every turn you are bound to find something new ! It will be a guided tour folks, so do go ahead and voice your doubts - your guide will be happy to satisfy them.


..Ear tour.. ear tour..
...Ear tour. ....
..Major attractions.
(i) External ear
(ii) Middle ear.
(iii) Inner ear.
(iv) Hearing centres
in the brain;...
...route via the..
auditory pathway.



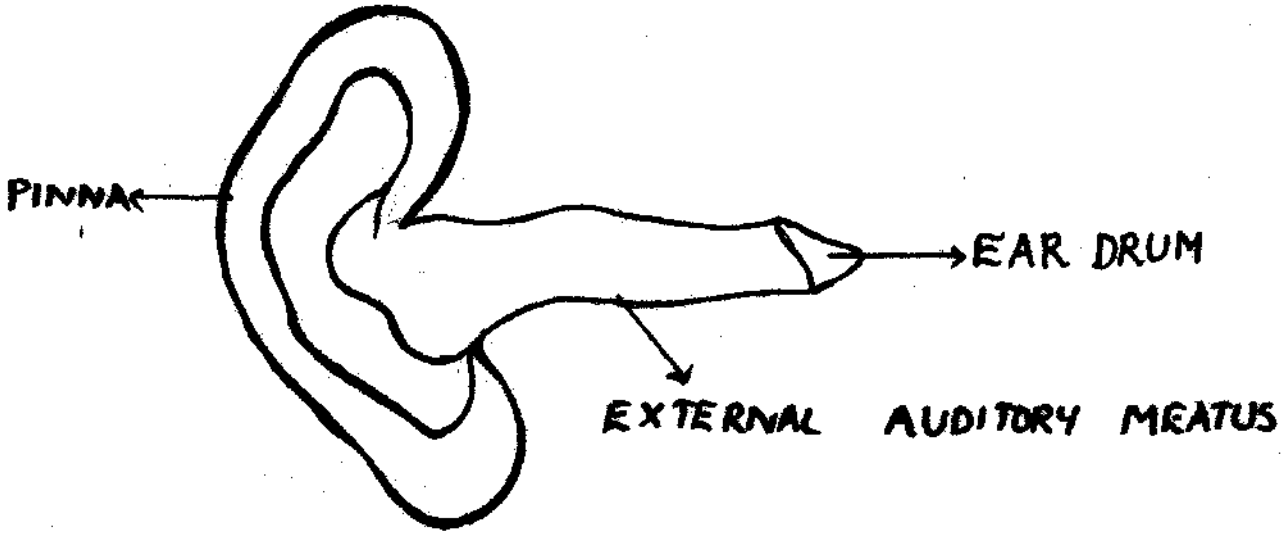
CROSS-SECTION OF THE EAR

(i) EXTERNAL EAR

1. Is there more to the ear than that flap of skin we see from the outside?

   Oh yes! Below that flap of skin which we call the pinna lie structures of such delicacy that you never dreamt you possessed.

2. Tell me, what does this external ear consist of? Come and have a look for your self.



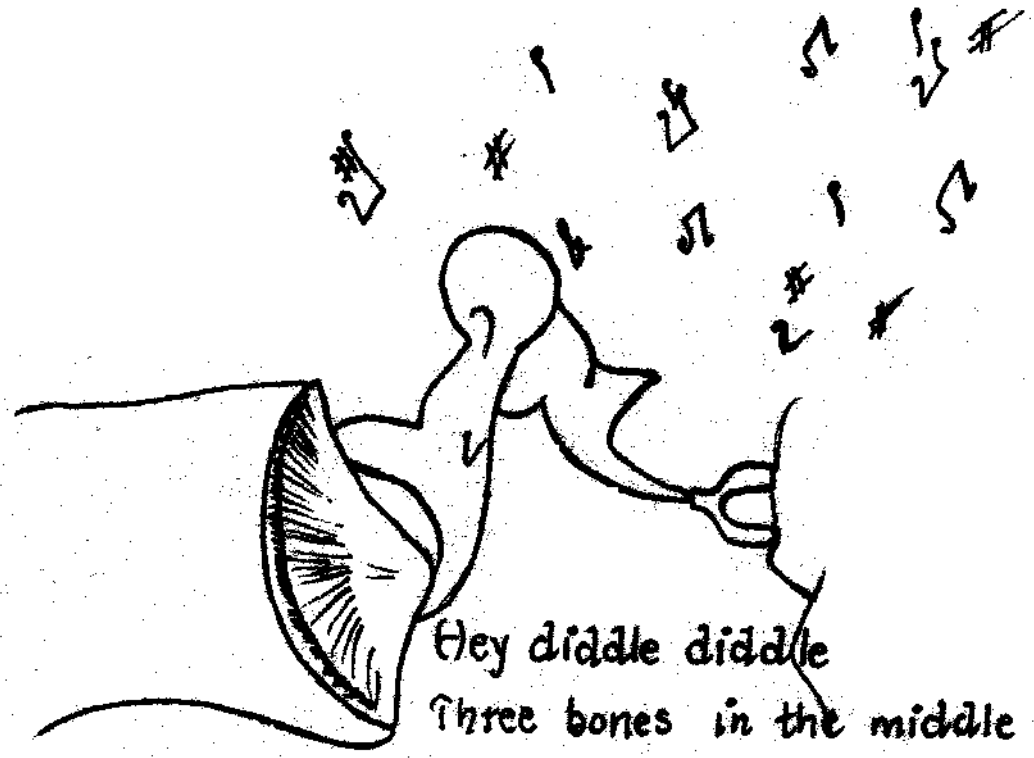
The flap like structure - the pinna is followed by a narrowing canal the external auditory meatus (EAM). At the end of this canal is the eardrum, also called the tympanic membrane.

3. The dog pricks up its ears when it hears sound and the elephant flaps its ears. What does the human ear do when it hears sound?

   The human ear does not move like animal ears. Yet the pinna has the capacity to collect the sound waves from the environment and direct it into the ear canal.

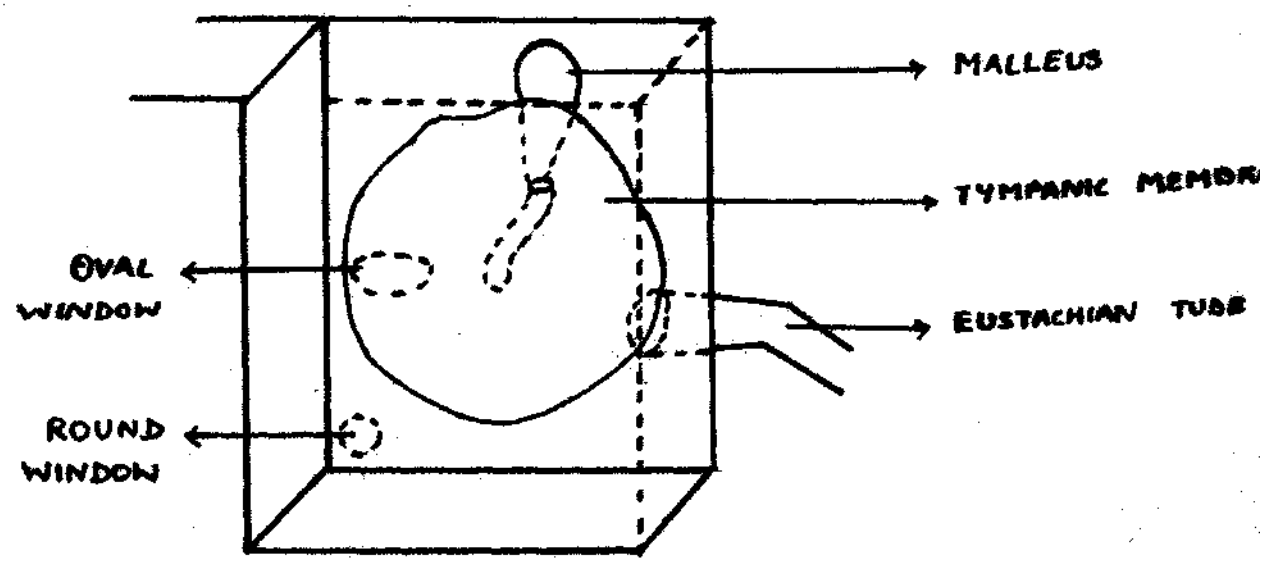
4. What happens to the foreign bodies which enter the ear?

   Fine hair is present in the ear canal and sticky wait is also produced her. They help in trapping the foreign body (like dust, insect) and prevent it from Moving further.



Hey diddle diddle
Three bones in the middle
Jumped and danced
To the tune.!!!

(11) THE MIDDLE EAR



1. How big is the middle ear (ME)?

   The middle ear is a cavity of height: ½ inch, width: ½ inch, depth:¼ inch.

2. What are the structures found in the ME?

   The ME is a box like structure with six boundaries.

   Its contains:

(1) 3 Bones (ossicles) namely malleus, incus and stapes.

(2) 2 windows (oval window and round window).

(3) 2 muscles namely tensor tympani and stapedius.

(4) Ligaments (thread like structures) which hold the bones in place.

3. What are the six boundaries of the ME?

They are the roof, the floor, the front wall, the back wall, the outer wall and inner wall.

4. Is the ear have like a house with a roof and a floor?

The roof is made of a thin plate ef bone which separates the ME from the brain Substance above it. The floor is exactly opposite the roof and is also made of a thin plate of bone.

5. Describe the front wall tad the back wall.

A tube (the eustachian tube from the front well connects the ME to the throat. A small opening in the backwall 1eads to a space in the skull (the mastoid antrum) which contains air cells.

6. Describe the outer wall and the inner wall.

The outer well is formed by the eardrum. The inner well separates the middle ear from the inner ear.

7. What work do the bones in the middle ear do?

The bones ie the ossicles serve as a bridge to transfer the sound from the outer ear to the inner ear.

8. What role do the muscles play in the ME?

The muscles help in smooth movement of the ossicles. They also protect the ear from very loud sounds.

9. How can the muscles give protection?

Whenever there is a loud sound, both sets of muscles contract in both ears and thus they protect the ear from damage.

ENTER THE....

"Inner ear"

Knock ! knock ! Who's there?

iii) THE INNER EAR

1. What does the inner ear (IE) consist of?

It consists of two organs.

(1) The organ of hearing and (2) The organ of balance.

2. What does the organ of hearing look like?

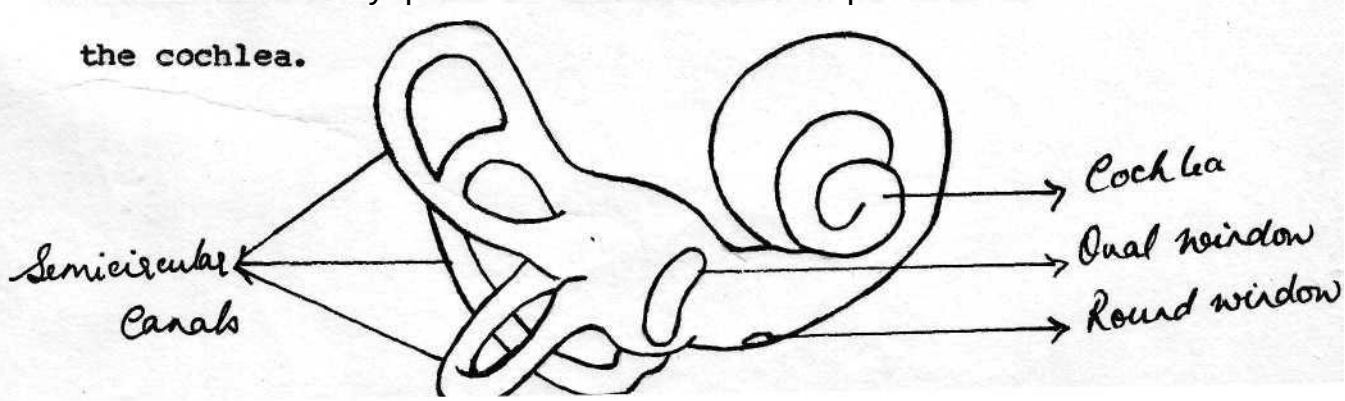
The organ of hearing is also called the cochlea (snail in Latin). It is a small snail shaped organ which is wound on a bony shaft called the modiolus.

3. What does the cochlea consist of?

The cochlea consists of two parts - the bony part and the membranous part.

4. What does the bony part contain?

The bony part is filled with a fluid called the perilymph. It also has two openings or windows into the ME cavity - the oval window and the round window. Within this bony part is the membranous portion of the cochlea.



5. How is this membranous portion placed?

   It is so placed that it divides the perilymph into two galleries - the upper one called the ' scala vestibuli' and the lower one called the 'scala tympani' . At the tip of the cochlea the 2 galleries are connected by means of an opening called the ' Helicotrema

6. What is the membranous portico made up of?

   It is made up of two membranes:

   (i) a thin delicate membrane called the Reissner' s membrance

   (ii) a tougher ' basilar membrane'

   The entire membranous portion is filled with a fluid called the endolymph.

7. Tell me about the basilar membrane.

   On it is found 'The Organ of Corti' . This is an organ which contains sensory cells called hair cells as they have hair like structures on their surface.Above these cells is a jelly like transparent layer called the tectorial membrane.

ORGAN OF BALANCE (THE VESTIBULAR APPARATUS)

1. How does the organ of balance function?

   This organ helps to maintain the balance of the body, no matter which position the head is in and what the person be doing, be he walking or running.

2. What does it consist of?

   It contains 3 semicircular canals and two other sensory structures called the utricle and saccule,

3. What purpose do they serve?

   The three semicircular canals record motion or movement and the saccule and utricle record the position of the head in space.

4. How do they take care of balance?

   When the above mentioned structures are disturbed from their resting position, they send information to the brain which controls the limbs and trunk such that balance is maintained.

5. When the organ 0f hearing and the organ 0f balance are placed close together, are there problems?

Yes, quite often problems arise, as a disturbance in one organ may affect the functioning of the other organ too. Such a disturbance is frequently encountered in a condition called Miniere's disease.

Auditory Pathway

- Route to the brain ...

(iv) THE AUDITORY PATHWAY:

1. You have spoken earlier of the ear and brain being connected. What connects the ear to the brain?

   A nerve called the vestibulocochlear nerve (which is the VIII cranial nerve) connects the ear to the brain. It is more commonly called the auditory nerve (audio refers to hearing) as it is responsible for hearing.

2. What are the structures to which this nerve is connected?

   The branches of the VIII nerve connect both to the organ of hearing (cochlea) and to the organ of balance (vestibular system).

3. Where does this nerve lead to in the brain?

   This nerve leads to the hearing centres in the brain.

4. How many fibres does this nerve consist of?

   It consists of approximately 30,000 nerve fibres.

5. Is there just one nerve connecting both the ears to the brain?

   No. Each ear has its own auditory nerve which connects it to the brain.

6. How does thiS nerve function?

When the hair cells in the cochlea are disturbed due to sound, they activate the nerve to fire messages which travel to the brain. Here they are analyzed and meaning is attached to the sound that is heard.

SOUND AND HEARING

SOUND AND HEARING

1. What is sound?

Sound is said to be produced when some force sets an object into vibration. Examples easy to understand are the veena and the guitar Where the vibrations of the string can be seen clearly. In some objects however the vibrations may net be seen but may be felt (Eg. drum).

2. How does sound travel?

The sound is carried in all directions away from the source and hence called sound wave. This is done by the particles of the medium around the sound source, but it a solid, liquid or a gaseous medium.

3. Is there any way we can describe sound?

A sound wave can be described in terms of its frequency, intensity and quality.

4. What is frequency?

Frequency is related to the pitch of the sound ie it refers to the rate or how/fast the sound source is vibrating per second. Greater the number of vibrations or frequency higher will be the pitch of the sound.

5. How is frequency expressed?

The unit used to refer to frequency was cycles per second (cps). In recent years, the term Hertz (Hz) (eg. 200 cps or 200 Hz) is used in honour of the German Physicist Heinrich Hertz.

6. What is intensity of a sound?

The intensity of a soundwave refers to the "strength" of the particle vibration, or how much of sound energy has been transferred through the medium. In other words, intensity refers to how loud a sound is.

7. How is it measured?

It is measured by measuring the pressure of the sound wave or by measuring the power or flow of energy. It is expressed in decibels (dB).

8. We often tend to refer to a sound as harsh, pleasant, strained etc. What does this refer to?

We often judge the sound according to the impression it makes on our senses and this attribute which sound possesses is called "quality".

9. What do we refer to as noise?

Noise may be defined as any undesired sound. It is usually characterized by irregular frequencies and intensities.

10. How does hearing take place in human beings?

The sound waves are collected by the pinna and directed into the ear canal to reach the middle ear. Here through a complex mechanism sound energy is increased and it is transmitted to the inner ear where it is converted to messages by the movement of the hair cells. These are picked up by the VIII nerve which transmits it to the auditory areas in the brain where meaning is attached to them.

11. What are the different routes by which the sound reaches the cochlea?

There are two routes by which the sound reaches the cochlea. They are -

1) The air conduction route
2) The bone conduction route

12. Hearing by air conduction? How does the take place?

    As described earlier, the external ear and middle ear transfer the sound into the inner ear -which acts as the sensory part. This is called hearing by air conduction.

13. Then, how does hearing by bone conduction take place?

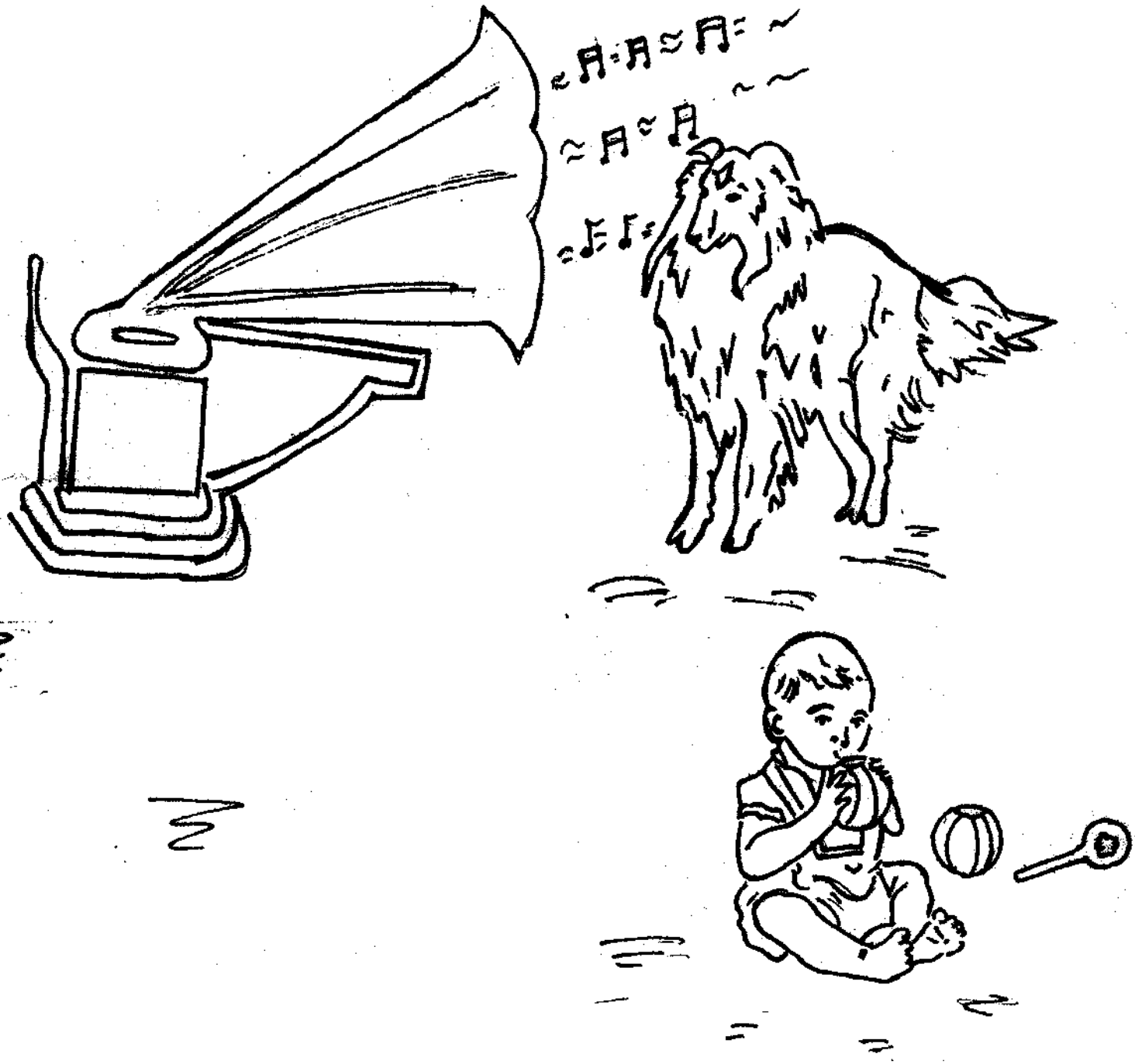
    Since the inner ear is within the skull bones, vibrations of these bones will cause movement of the fluid in the inner ear directly. Then hearing takes place in the usual way as described earlier. This is called as hearing by bone conduction.

14. Can the human ear perceive all sounds?

    The human ear has certain limitations in the frequencies it can receive. sounds which are outside the range of human ear cannot be heard by man.

15. Across what frequencies does human hearing be?

    Although there are individual differences, it can be generalized that the young adult with normal hearing can perceive frequencies from 20 to 20,000 Hz.



HEARING LOSS AND IT'S CAUSES

HEARING LOSS AND ITS CAUSES

1. When do we say a person has hearing loss?

   When a person cannot hear as well as a 'normal' person we say that he has hearing loss.

2. I had gone for dinner to a friend's place. When I called out to his son "Hello Vikram" he did not look up. My friend looked at me sadly and said "We have found out he's deaf". Is deafness different from hearing loss?

   Deafness is often used synonymously with hearing loss. However technically speaking, deafness refers to a 'total or complete absence of hearing sensitivity, while hearing loss or impairment refers to only a partial loss of hearing sensitivity.

3. Who can get hearing loss?

   Anybody from a famous personality to an innocent child can get hearing loss. To quote an example, the President of our country Shri R.Venkataraman has acquired hearing loss.

4. What can cause hearing loss/deafness?

It may be caused by trauma such as head injury, surgical injury to the ear, very loud sounds,infections like mumps, syphilis, tuberculosis, tumours affecting the affecting the

8th nerve, drugs and other diseases and infections which affect the ear.

5. can a child be born with hearing loss?

Yes, sometimes during pregnancy or at the time of birth, problems may occur which could result in hearing loss in the child.

6. Can deaf parents give birth to deaf Children?

Yea. This is a very important factor called "Hereditary" which results in deafness. This means that deafness is passed on in the family from one generation to the other through 'genes' which are the units of hereditary.

7. My neighbour had measles when she was pregnant and her Child was born with hearing loss. Do such diseases which affect the motor cause hearing loss in the Child.

Yes. A Child may be born deaf, if diseases such as german measles, diabetes, syphilis and hypertension affect the mother during pregnancy.

8. When my wife was pregnant many doctors told her not to take drugs unnecssarily. Can the drugs consumed by a pregnant woman cause deafness in the child?

   If the pregnant woman takes drugs such as thalidomide, quinine, streptomycin, Kanamycin or gentamycin during pregnancy, it may affect the baby's hearing.Such drugs are called ototoxic drugs.

9. You said problems can occur at the time of delivery which may affect the child's hearing. What are they?

   Prolonged and difficult labour, forceps delivery with injury to the head, prematurity or lack of oxygen may affect the baby's hearing.

10. I know of a child who was born normal but now has hearing loss. Now does that happen?

    Quite often, diseases such as jaundice, ancephalitis, and meningitis, head injury, viral infections like mumps and measles, ingestion of ototoxic drugs and prolonged exposure to very loud noise may cause hearing loss in a normal child.

11. You had spoken earlier of the EE, ME and IE Are there say conditions specifically of the external ear which may cause hearing loss?

    Excess of wax formation, fungus, foreign bodies in the ear, tumors and certain developmental defects of the external ear may cause hearing loss.

12. What about the ME? Are there any conditions of the ME which cause hearing loss?

    Developmental defects of the eardrum and ossicles, traumatic conditions such as rupture of the eardrum, ossicular discontinuity, fracture of the base of the skull, eustachian tube dysfunction, tumours of the ME and other inflammatory conditions may/cause hearing loss.

13. What are the inner ear causes which result in hearing loss?

    Head injury or surgical injury to the inner ear, very loud sounds, tumors such as acoustic neuroma (a tumor of the VIIIth nerve), Meniere's disease (a disease specific to the inner ear), ototoxic drugs, infective diseases which affect the inner ear, diabetes, hypertension, hypothyroidism, cerebrovascular causes and the aging process of the cells in the inner ear may cause hearing loss*

14. Could you tell me which is the most common condition which results in hearing loss in children?

In India, the most common condition which results in hearing loss in children is otitis media, an inflammatory condition of the middle ear.

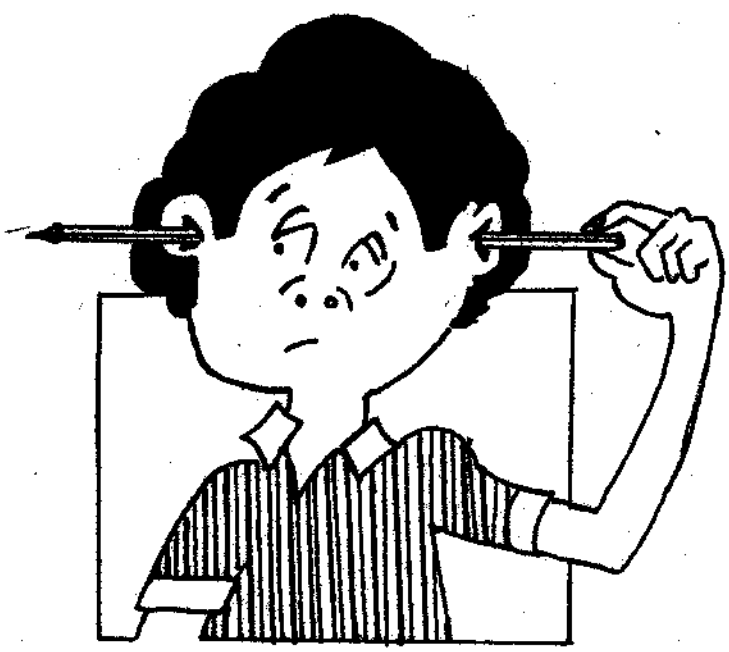
15. Running nose is a very common condition. Is there any condition called "Runny ears".

Oh yes. A runny (discharging) ear readily identified by its foul smell is a sign of swelling and infection in the external ear canal or in the middle ear. On occasions, the discharge may be mixed with blood and is often caused due to poking the ears with sharp objects.

16. My grand-dad was okay 2 months ago. Now he askes us all to speak louder when we talk to him. My grand-ma also had the same problem. Why is that older people go deaf?

As we grow older, our bodies slow down. The aging process affects the functioning of every organ in our body and our hearing, just like our sight may become impaired.

Prevention and Ear care.



PREVENTION AND EARCARE

1. What does prevention mean?

   Prevention means "a coming before" or anticipatory action which prohibits a sequence of events from taking place.

2. Can hearing loss be prevented?

   In most Cases hearing loss can be prevented. However, some types of hearing loss such as that which occurs due to old age are difficult to avoid.

3. I know of a newly Married couple who are first cousins. The girl has been deaf since childhood. Are there chances of their child being born deaf?

   Yes, there is a high chance of the child being born deaf. Hence, if there is a history of hearing loss is the family, it is better not to get married to close relations,

4. What precautions should a mother take during pregnancy?

   During pregnancy, drug intake, poor nutrition, exposure to radiation, smoking and alcohol consumption should be avoided. The pregnant woman should also be careful to avoid falls and/or other injuries.

5. My son has runny ears. I am worried that my younger son may also get ear discharge. Is there any way to prevent it?

   As far as possible they should avoid poking their ears with sharp objects. Also, while feeding thiar children, mothers should take care to position their child properly so that the milk does not enter the nose and pass into the ear and cause infection.

6. My neighbour works in a factory and is exposed to very loud noise. Of late he has been complaining that he cannot hear too well. What can be done now?

   The damage has been done, but he can still prevent further damage to his ears. Such employees who are constantly exposed to loud noise should wear ear plugs or ear muffs to protect their ears. Helmets also serve this purpose well.

7. Can the management take any precautions to prevent their employees from acquiring hearing loss?

   Yes, if the working environment is very noisy, the management should provide their employees with ear protective devices like earplugs, ear muffs or helmets. The workers

should be put on shifts so that one person is not exposed to the noise all the time. It is also possible to reduce the noise at the source and along the pathway of transmission. .

3. How do you reduce the noise at the source?

Control at source can be done by checking the instrument for worn out parts, replacing them for new instruments or by changing the way in which it needs to be operated. We can also reduce the vibration, by isolating the machine from the floor.

9. Is there anything else that can be done to control the noise in the factory?

By isolating the instrument from the mains set-up, by having a discontinuous pathway ie. stairway (both of which are possible only with a good building plan), by seating the operater away from the machine, by using barrier around the source or by saving acousticated rooms to absorb sound, it is possible to control the noise even along its path of transmission.

10. How can swimmers protect their ears?

Swimmers can prevent water from entering their ears and causing ear infection by wearing swimmers earmolds.

11. What are the professions for which ear protective devices are required?

Factory workers, divers* pilots - as they are exposed to aircraft noise and traffic policemen all need to wear ear protective devices.

12. You say noise is harmful. My grandchild listens to very loud music. Will it affect his ears?

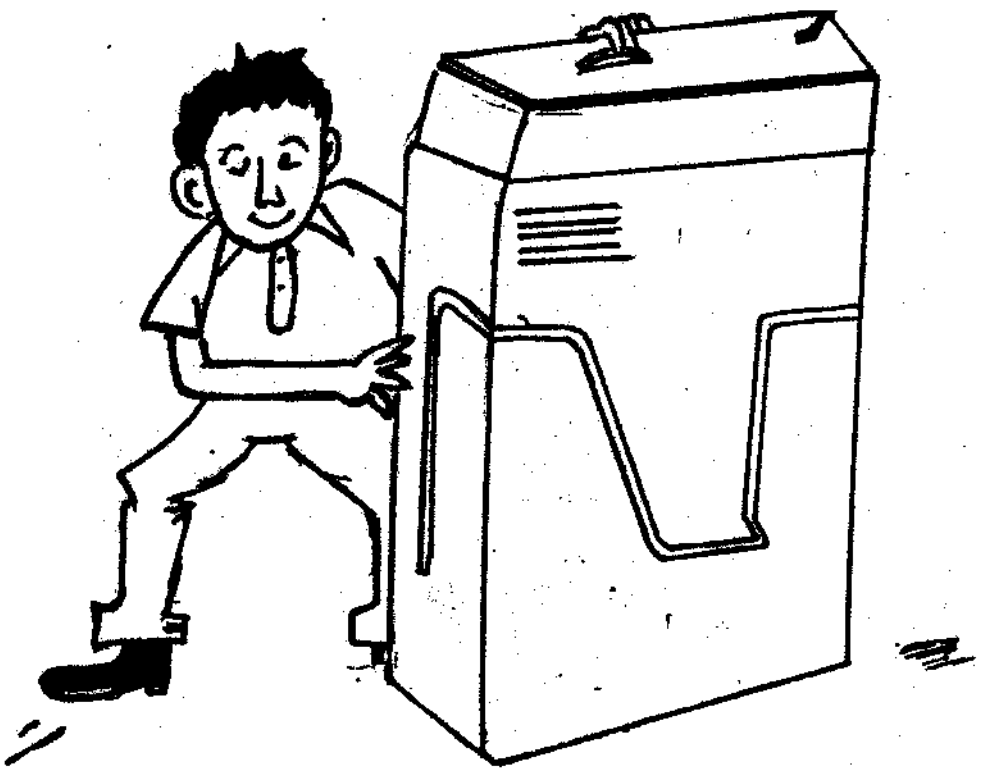
Teenagers especially those in the habit of listening to the Walkman and load blasting music for many hours a day are at a risk of getting noise induced hearing loss. Hence it is advisable to listen to music at a lower volume.

13. If foreign bodies enter the ear, what is to be done?

It is better to see a doctor immediately as he will flush out the foreign body from the ear. However if a doctor's services are not available, the foreign body could be removed or drawn out by an object with a blunt end.

EAR CARE

1. **Stay away from loud noise.**
2. **Avoid putting things into the ear.**
3. **Get prompt medical care for any ear infection.**
4. **Avoid ototoxic drugs unless absolutely necessary.**
5. Have **your ear and hearing cheeked up once a year.**
6. **Do not get advice on treatment from anyone but a qualified ENT specialist and audiologist.**



THE HEARING CLINIC

1. How can hearing loss be detected?

   When an individual/child is not able to hear sounds which most people hear such as ear horn, sound of crackers and softer sounds such as doorbell telephone ring, cooker whistle etc., We can be certain that the person is having hearing loss.

2. H*ow* do you check to see if an infant has hearing loss?

   In most instances the mother will recognize that there is something wrong when within the first five months of lite the child does not respond to her voice. By 6-7 months the normal child will show a startle response when presented with a loud sound. If this behaviour is not observed, it is better to got the child's hearing checked.

3. What are the alerting signs for parents of the hard of hearing child?

   The delay in speech and language acquisition are very often the first alerting signs to parents of the hard of hearing child.

4. What is the first step to be taken when we know our child has hearing loss?

   If you suspect that your child has hearing loss rush to a doctor who will do a preliminary examination and then refer you to a speech and hearing clinic.

5. Who is the person who checks our hearing in the speech and hearing clinic?

   The person who checks your hearing in the clinic is an Audiologist.

6. My friend claims that he caa detect hearing loss using his watch. Is it wise to go to such people?

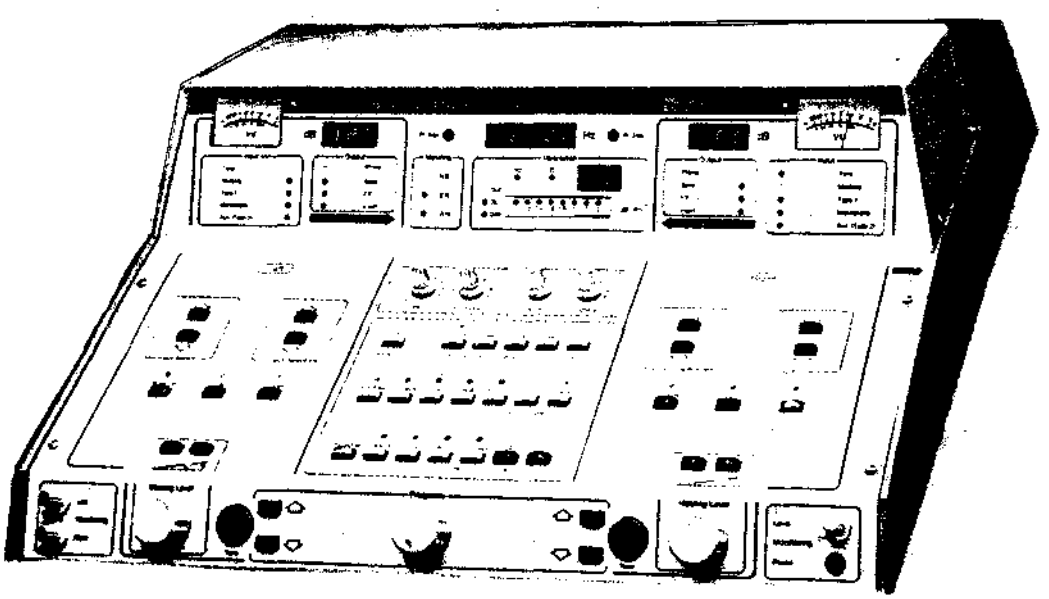
   There are many people who claim to have such abilities. These people are quacks or unqualified people and will not be able to specify the amount or type of hearing loss you have . For reliable results it is best to approach an audiologist who is a specialist in hearing sciences.

7. Who is a speech and language therapist/pathologist?

   He/she is one who checks for speech and language disorders in an individual and gives the necessary assistance to restore it to normal level.

8. How is hearing tested?

In the hearing clinic, an instrument called the audiometer is to measure hearing.



9. How does it work?

Hearing is measured with an audiometer by presenting tones through headphones which are placed on the patient's ear. The tone is presented in varying degrees of intensity and at various frequencies. The amount of hearing loss is thus established.

19. How do we know at what level a person hears?

In an audiometer we generally start by presenting a louder tone and then gradually decreasing the loudness.

till it reaches a level when the patient is just able to make out the presence of the sound. This is the level or the threshold at which he hears.

11. What is normal hearing?

If on a hearing test an individual's hearing threshold is within 25 dB,his hearing is said to be within normal limits.

12. At what level does sound cause discomfort to the ear?

Sounds at a level of 120-130 dB cause discomfort to the listener and this level is called the threshold of discomfort.

13. Sometimes when we hear a loud sound We can feel pain in the ear. How loud does a sound have to be to cause pain?

Sounds at a level of 140 dB cause pain the ear of the listener and this level is called the threshold of pain.

14. Are all the frequencies checked in an audiometer?

We generally check frequencies from 250 Hz to 8000 Hz as the sounds We generally encounter in our daily life fall well within this range.

15. Across what frequencies is speech heard?

Speech is generally heard around the frequency range of 300 Hz - 4000 HZ.

16. What is the work of the audiologist in the hearing clinic?

The audiologist conducts various tests to evaluate hearing. He checks for the type and degree of hearing loss advises you on what is to be done recommends surgery when useful and fits hearing aids for those who may benefit by it.

17. What tests does one undergo when one visits a hearing clinie?

The routine tests done in a hearing clinic are puretone audiometry, impedance audiometry and speech audiometry.

18. What is puretone audiometry (PTA)?

PTA represents the principle basis of a hearing evaluation. It is a measurement technique which consists of determining hearing thresholds for puretones at different test frequencies. This is a test which requires active participation of the subject.

19 .What is impedance audiometry?

Impedance audiometry is a procedure which checks the efficiency or the functioning of the middle ear. Through this test we can detect problems associated with the ME. This test does not require the active involvement of the patient.

20. Why is speech audiometry done?

Speech audiometry is part of the procedure of hearing evaluation dose using speech materials. Since finding speech thresholds is more meaningful for every day life situations this test is included in the measurement of auditory function. It also serves as cross-check for the PTA findings.

21. How dees one test infants in the clinic?

Since we cannot expect active participation in tests from little babies, we can check for hearing loss by doing informal screening. There are also ether objective and more sophisticated methods like the BSERA - Brainstem evoked response andiometry.

22 . How is informal screening done?

Screening means checking for the presence/absence of a

disorder. We can do this by presenting various sounds either in a audiometer or using toys and checking for the startle response - slight shudder of the body, eye widening in response to sound, slight head torn toward sound source etc,

23. How is BSERA conducted?

In this test, electrodes are fixed on the patient's head and the auditory potentials (electric messages generated by the nerves in response to sound) are recorded by the computer Which gives information regarding the child's hearing, or the type and degree of hearing loss.

24. How is clinical testing of a child aged 2 to 5 years done?

By making use of play conditioning techniques we can get the child to participate in the test. Here we create a play activity and the child is taught to respond to the sound and the entire testing continues with the active participation of the child, although it may just seem like a game.

25. Are there any standard play conditioning techniques?

The VRA-visual reinforcement audiometry and the TROCA-Tangible reinforcement operant conditioning audiometry are the most widely used procedures.

26. How is VRA done?

Here the child is shown pictures or lighted toys (as reinforcement) each time he responds to the sound and thus the occurrence of such responses is increased,

27. How is TROCA conducted?

This procedure uses either candy or cereal as reward for correct responses and thus the child's hearing is evaluated.

28. who are the children most difficult to test?

The mentally retarded child, the autistic child who does not interact with the clinician, children with multiple problems such as the brain damaged or the deaf-blind children are some examples of cases difficult for the audiologist to test.

Aural Rehabilitation

Intervention

AURAL REHABILITATION

INTERVENTION

1. I passed a speech and hearing clinic yesterday. On the door was a big sign n like this. What does it stand for?

It is the symbol of the World Federation of the deaf. It says wherever you see this sign, help is rendered to the hearing handicapped.

2. I do not fully understand the implications of the term hearing/auditory handicapped. Could you please explain.

If refers to the interference that the hearing impairment produces in day to day activities. In other words the influence of hearing impairment is What is termed hearing handicap.

3. My neighbour attends a deaf school. Her parents are constantly talking about 'aural rehabilltation'. What does that term mean?

'Aural' means pertaining to the ear. Aural rehabilitation is a treatment process that has, as its main aim the reduction of handicaps associated with the hearing loss.

4. Can hearing loss be cured by medicines/operations?

   Most often hearing loss due to external ear or ME deformities can be improved by surgery and hearing is restored to near normal limits. Hearing loss due to problems such as excessive ear wax, fungus in the ear can be solved by taking the necessary medicines prescribed by the doctor.

5. If surgery cannot restore hearing what is to be done?

   The initial management in such cases is to provide them with a hearing aid.

6. What is the function of the hearing aid?

   The hearing aid (HA) makes the sound reaching the ear loader ie. it serves the purpose of amplification.

7. Which is the most appropriate HA for a person?

   The patient will have to undergo a hearing aid trial in which the audiologist will try out various HAs and then prescribe the one which seems to benefit him the most.

8. What other factors doesthe audiologist bear in mind while prescribing the HA?

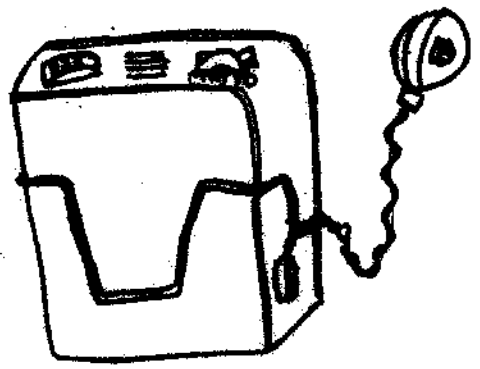
   She audiologist also bears in mind the patient's

preference for the HA, availability of different types of HAs and the cost factor.

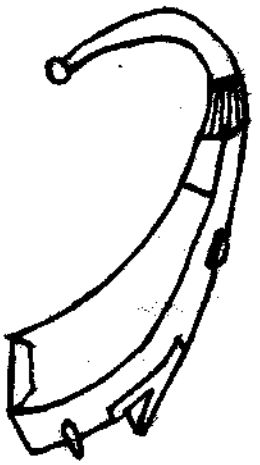
9. What types of HAs are available?

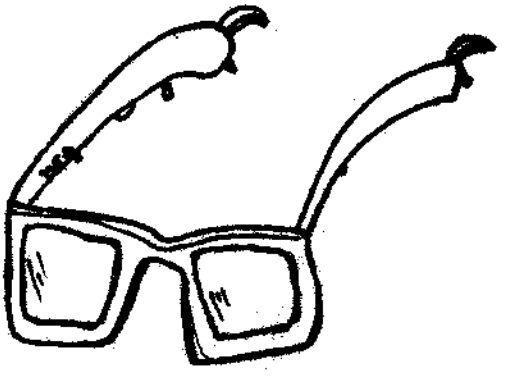
Hearing aids come in a variety of Shapes ana sizes, some to be worn on the body, some behind the ear and others within the bowl of the ear, or even within the ear canal itself. Hearing aids can also be built into or attached to spectacle frames.

BODY LEVEL/POCKET HA

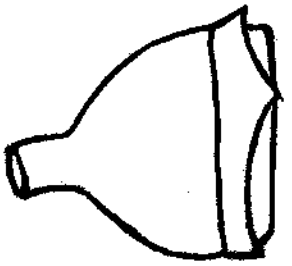


BEHIND-THE-EAR-AID





SPECTACLE HEARING AID



IN-THE-EAR-AID

10. Do these hearing aids vary ia cost?

Yes, The body worn HAs is less expensive than the behind the ear type (BTE), spectacle HA or canal aid.

11. Are there any HAs available for group set-ups?

Yea. Group hearing aids or classroom amplification devices are also available.

12. If a person has hearing loss in both ears does he have to wear two HAs?

Yes. It would be ideal. But if he cannot afford or manage two hearing aids, amplification to both ears can be provided with a single HA but with a suitable cord and 2 receivers for the 2 ears.

13. What is the small plastic piece Which is attached to the HA?

It is called the earmold. The impression of the ear is taken and an eramold is made. The earmold is fixed to the HA receiver and thus it fits well in the ear.

14. Is this all than an earmold does, keeping the receiver snugly in the ear?

No, The earmold plays a very important part in reaching the sound into the ear.

15. If a person has a constantly discharging ear but needs amplification, what can be done?

la case of runny ears, earmolds should not be put into the ear. For sueh ears, HAs with bone conduction receivers which are placed on the skull (behind-the-ear) can be provided.

16. My nephew complains of a blocking sensation in his ear when he wears a earmold. What can be done for this?

For people who report fullness or blocking sensation while wearing earmolds, a ventilation hole can be drilled into the earmold.

17. A boy in my college wears a hearing aid, bat it always gives out a whistling sound. How does that happen?

If the earmold is not of a good fit, it may cause the aid to whistle. This is known as "feedback?. This is often not heard by the wearer, but it can be very annoying to the listener and may limit the effectiveness of the HA.

18. What can be done about it?

Always make sure that the earmold fits the ear well and fixes properly to the receiver of the hearing aid.

19. Can little children be given behind the ear (BTE) hearing aids?

    It is advisable not to give little children BTEs as the weight of the HA may bend their pinna. Also BTEs are fragile and need te be adjusted and maintained with care.

20. If a person feels shy te wear the body level HA what type of HA is recommended?

    He can wear a behind the ear type or a canal aid which dosnot make his handicap so very obvious. If he wears spectacles, he can be prescribed a spectacle hearing aid.

21. The H^A centrol has 3 settings, O, T, and M or N.what do they stand for?

    O - stands for 'off', 'T' for use with either a 'Television or telephone', M or N for 'microphone on'.

22. What is the power source of the HA?

    The power source of the HA is a pentorch cell of voltage 1.5 v. For BTE and canal-aids, button cells of 1.5v are used.

23. Haw long does the cell in a body level HA last?

    If a HA user uses his aid for a duration of 8 hours a day, the cell will last no longer than 15-18 days.

24. How long does the button cell in a BTE last?

It generally lasts for about 12-15 days if the HA is used regularly.

25. If a telephone operator suffers from hearing loss, what devices can be given to help him?

He may he provided with a telephone instrument which provides voice amplification. The headset of the telephone is equipped with a volume control.

26. What other home devices can be given for the hearing impaired person?

There are other assistive listening devices like doorbell and telephone signaller -a light flashes each time the bell rings, and the baby cry light indicator in which the vibrator placed under the pillow informs the mother that the child is crying.

27. Is management of the hearing-impaired complete once the HA is given?

No. There is much more to management than just using a HA. The next step is training the child to listen....

Auditory training

training to hear.....

AUDITORY TRAINING WITH CHILDREN

"Training to hear . . . . . .

training to listen and understand....."

1. My nephew has hearing loss. We have bought him a hearing aid but he still does not speak. What else can we do to help him?

   It is not enough if you just provide a child with a HA. You should teach him to learn to make meaning of the sounds he hears which is what auditory training is all about.

2. Could you tell me something more about auditory training.

   It is a programme wherein you train the child to make maximum use of the little hearing that he has for awareness and understanding of environmental sounds and speech sounds.

3. If a hearing impaired child has not had auditory training what may happen?

   By training the child to perceive a wide variety of environmental sounds, he will learn to be alert to unexpected changes in his surroundings. Auditory training thus serves to ensure his safety and well being.

4. What does this auditory training programme consist of?

   It consists of the following steps:
   (1) awareness (2) discrimination (a) gross sounds (b) fine sounds (3) identification and (4) comprehension.

5. How do you develop awareness of sound?

   The goal in this step is that the child should recognise when sound is present and attead to it. So sounds that are related te daily activities should be presented the minute the child puts on his HA, so that he begins to realize the presence of 'sound'.

6. My maid's child who is deaf can make out the presence of sound but he does not respond appropriately as he is unable to differentiate between sounds. What do we do them?

   Start discrimination training . First the child is trained to distinguishh between gross sounds (ie sounds which are highly dissimilar) both non-verbal (eg: bell and drum) and verbal sounds (eg: doll, papa). Activities are created and the child ie tought to respond appropriately to the different sounds. Eg. put down blue block for drum and red block for bell.

7. Once he ia able to do this, how do you proceed?

   Next develop discrimination for finer sounds. Here the child has to differentiate between sounds which are not totally dissimilar as in the above ease.

Eg. Nonverbal - drum and dumroo, verbal - dog-doll, baby-mummy

8. What does identification mean?

   Step 3 or identification requires the child to recognize the speech sound and identify by pointing a picture or repeating.

9. I saw a lady call out to her hearing-impaired child from behind. How can you make out whether the child has actually heard her or not?

   If the child has been trained well auditorily, he can locate the source of sound. In this case he would have looked back and responded.

10. What is this ability to locate a sound souree called?

    It is called localization. It means judging the direction, distance and angle from which the sound came.

11. How is step 4 ie comprehension achieved?

    Comprehension involves understanding a message and responding appropriately to it. To achieve this, the mother/teacher should make each sound presented meaningful to the child and teach him to respond correctly to it. Eg. Sound - door knock? Response - open the door.

12. Who is the best person to approach for guidance on speech and language training?

    The speech and language therapist/pathologist is the best person to approach. She will guide you in the right direction and will also show you activities on how to stimulate/teach the child at home.

13. Can we admit our hearing impaired child to a normal school?

    Yes. If you have worked hard with your child so that his speech and language level is near normal, admission into a normal school should not be difficult.

14. What are those schools were handicapped children and normal children study together?

    Such schools where both the handicapped children and normal children study together in the same classroom are called 'Integrated schools'.

15. Will the deaf child lag behind the normal children?

    Oh no. It is a very wrong idea that people have about deaf children lagging behind the normal children. There are many deaf people who are great achievers and have earned a name for themselves in various fields. To name

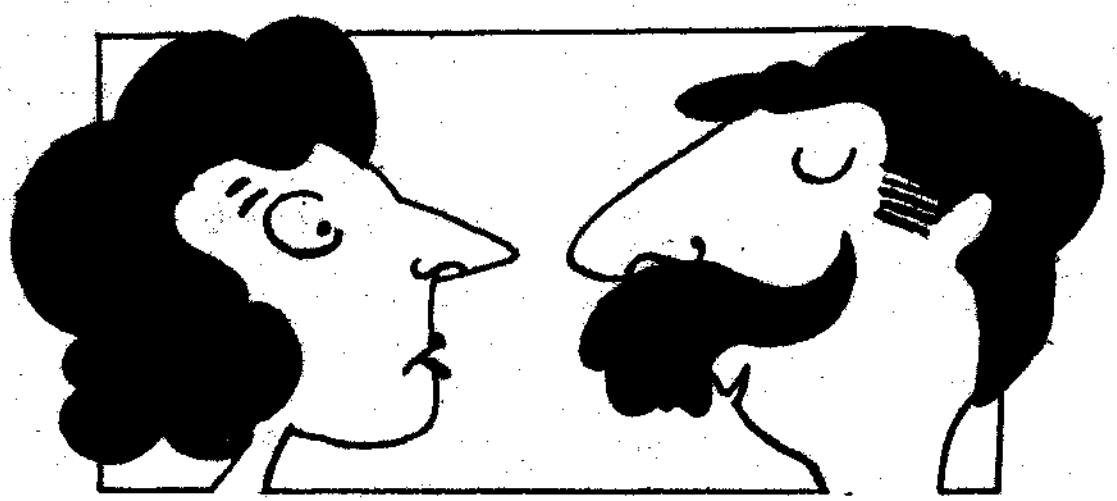
a few Rajeev Bagga - the Commonwealth Champion in Badminton; Anjan Bhattacharya - the Captain of the Indian deaf cricket team to play against Australia was the first person to have received the Arjuna Award among the deaf.

16. My God ! Is that so? Does that mean that the deaf person can do well in any field?

Yes. With adequate training and motivation, the deaf person can definitely shine. I know of quite a few deaf people who have entered various professional fields like engineering, fine arts, computer science etc. and have done wonderfully for themselves.

Aural Rehabilitation

For



The hearing impaired adult.

1. You have spoken of hearing loss occuring due to old age. What is the technical name for it?

   Hearing loss due to old age is called as ' presbyacusis'. It comes from the latin word "Presbys" which means 'old man' and "acusis" Which refers to hearing.

2. Since an adult who has acquired hearing loss already has speech, why does he require rehabilitation?

   The main purpose of rehabilitation in the case of adults is to conserve the speech he possesses and not to let it deteriorate due to the effects of hearing loss.

3. The other day I saw an advertisement in the paper which said 'auditory training and speech reading classes for the hearing-impaired'. What does speech reading mean?

   Speech reading and lip reading mean the same. Along with auditory clues the patient is asked to pay atteatiea to the movement of the lips and facial expressions in order to help him understand speech better.

4. My grand-father has hearing loss. We would like to buy him a hearing aid. But how can we be sure that the HA will help him?

There is only one way to discover how much a hearing aid might help and that is by trying one. Unlike spectacles, the benefits may not be immediate and therefore it is important to try an aid over a period of time, while receiving help and guidance in its use.

5. what do you advise the person to do once he gets his HA?

Once he is given a HA, he is advised to start speech-reading/lip reading.

6. Is there any other advantage of attending speech reading classes?

classes can also be very good places to socialize and they allow people to learn from the experiences of others. So always encourage hearing impaired adults to attend speech-reading classes.

7. Is there anything the family members can do, to help an old person in the house speech read better?

Sure. Here are some tips for you to help a person speech read better.

1. Do not hide your face while talking to a deaf parson.

2. Position yourself in such a way that adequate light falls on your face.

3. Don't bend while talking. Let him see your face clearly.

4 . Do not chew gum, paan or tobacco while talking.

5, Be patient and talk slowly. Help him Understand you better.

CONCLUSION

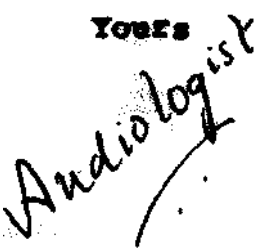
We hope your travels through the car have enlightened you on how complex a structure the ear is and how smell work that tiny organ is capable of doing. Since damage to the hearing organ is rarely visible hearing loss remains an invisible handicap.

Dear readers, we hope that the ideas contained in this book have contributed to the effectiveness of our efforts to enrich the lives of the child or adult with impaired hearing- How that you know, how grave a problem hearing loss is and what serious implications it may have if left ignored, are you., not convinced that every individual with hearing loss should be identified and rehabilitated?

Join with us friends. Let us together work for a common cause the cause of the Hearing Handicapped, Our heroic efforts are bound to bear fruitful results.

So, any more doubts? No? Well then. if they do crop up in your mind, you NOW KNOW WHOM TO CONTACT. So until we meet again - Adios.

Forever at your service



BIBLIOGRAPHY

Berg, F.S., Fletcher S.G. (1970): "The hard of hearing child: Clinical and educational management", Grune and Stratton, New York.

Bess, F.H., McConnell, F.B.(1981): "Auditory education and the hearing-impaired child". The C.V.Mosby Company, St.Louis.

Hartbauer, R.E. (1975): "Aural rehabilitation: A total approach". Charles C Thomas Publisher, Illinois.

HurvitzCarmen (1981): "Special devices for hard of hearing. deaf and deaf-blind persons" Brown, Little, Boston.

Jaffe, B.F. (1977): "Hearing loss in children: A comprehensive text". University Park Press, Baltimore.

Martin, F.N. (1978): "Pediatric Audiology", Prentice Hall Inc. New Jersey.

Martin, F.N. (1981): "Introduction to Audiology" 2nd Edn. Prentice-Hall Inc. New Jersey.

Martin, M. and Grover, B. (1986): "Hearing loss: causes, treatment and advice", Churchill Livingstone, London.

Newby, H.A. (1964): "Audiology: A comprehensive and systematic survey" Meredith Publishing Company, New York.

Northern, J.L., and Downs, M. (1978): "Hearing in children" 2nd Edn. The Williams and Wilkins Company, Maryland.

Oyer, H.J., and Frankman, J.P.(1975): "The aural rehabilitation process: A conceptual framework analysis" Holt, Rinehart and Winston, New York.

Sanders, D.A. (1971): "Aural rehabilitation" Prentice-Hall Inc. New Jersey.

Suma, R. (1984): "Questions and answers to the ear and its functions". An unpublished Independent project submitted as a part fulfilment of Masters Degree (Speech and Hearing) University of Mysore.