

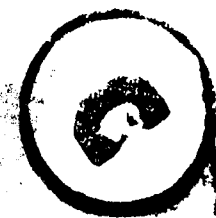
354

INDIAN JOURNAL OF
OTOLARYNGOLOGY

VOL. XII

NO. 4

DEC - 1960



JL
-183:4m2, N4905.
N60.12.4
1410 260.

61.

Vol. XII, No. 4

DECEMBER 1960

259

INDIAN JOURNAL
OF
OTOLARYNGOLOGY



PUBLISHED BY

The Association of Otolaryngologists of India

ADVERTISEMENT TARIFF

		<i>Full Page</i>	<i>Half Page</i>
		Rs.	Rs.
BACK COVER PAGE	...	200/-	Not available
INSIDE COVER PAGE	...	125/-	75/-
FULL ORDINARY PAGE	...	100/-	65/-

★

**10% Discount if paid in
Advance for 4 insertions**

★

Address all correspondence to:

THE EDITORIAL SECRETARY

Indian Journal of Otolaryngology

1-A, Marshall's Road, Egmore, Madras-8.

INDIAN JOURNAL OF OTOLARYNGOLOGY

Vol. XII, No. 4

DEC. 1960

Official Scientific Journal of the Association of
Otolaryngologists of India

Editorial Board

<i>Chairman</i>	...	Major N. DUTT
<i>Editor</i>	...	Dr. V. S. SUBRAMANIAN
<i>Treasurer</i>	...	Dr. C. M. LEELAVATHY
<i>Editorial Secretary</i>	...	Dr. U. ANANDA RAO

INDIAN JOURNAL OF OTOLARYNGOLOGY

1-A, MARSHALL'S ROAD :: EGMORE, MADRAS-8

CONTENTS

Problems in Tympanoplasty S. R. Rege and K. H. Patel	...	Page 185
Treatment of Allergic Rhinitis with Intratubinal Autohaemo with Hydrocortisone P. P. Karnik.	...	195
pH of the External Ear Dr. G. Lakshminpathi and Dr. C. Sita Devi.	...	200
Evolution of Hindi Test Material for Speech Audiometry Dr. O. P. Gupta, Prof. R. N. Misra and Dr. M. L. Bhatia.	...	211
Palatograms of Hindi Speech Sounds Dr. O. P. Gupta and Prof. R. N. Misra.	...	222
A. case of an Adamantinoma of the upper jaw S. N. Jain.	...	226
Association Notes	...	229

CORRECTION OF IMPAIRED METABOLISM

PALATABLE AND WELL TOLERATED

NEOGADINE

(ELIXIR)

ENDORSED

By over 25 years' clinical experience

CONTAINS

Vitamins A, B₁, C and D
Organic iodine
Vanadium arsenate
Calcium, Phosphorus
and Magnesium.

Bottle of 360 c.c. (12 oz.)

RAPTAKOS, BRETT & CO., PRIVATE LTD., WORLI, BOMBAY

SUITABLE

For a variety of conditions,
arising from impaired
metabolism, including
bronchial affections,
asthenic states, etc.

Particulars from:

F.L. Fischer

FREIBURG I. BR.



BERLIN



MAGNIFICATION

10.5X

14 X

17.5X

FENESTRATION
TYMPANOPLASTY
STAPES MOBILISATION

FOR OPERATIONS
AND EXAMINATIONS

PROF. ZOLLNER'S
BINOCULAR MAGNIFIER

SOLE AGENTS & DISTRIBUTORS:

B. MOHANLAL & CO.

184 PRINCESS STREET BOMBAY 2

Enteromycetin

(CHLORAMPHENICOL U. S. P.)

OTIC SOLUTION

**For topical therapy in external
and middle ear infections**

ENTEROMYCETIN Otic Solution contains 10% chloramphenicol in propylene glycol base providing local bactericidal concentration in each drop to the commonly occurring organism in acute or chronic otorrhoea.

INDICATION

Acute or chronic otorrhoea particularly due to *B. Coll.*, *Strepto.*, *Staphylo.*, *Proteus.*, *Pseudomonas*, etc., following ear operation (mastoid), it can also be used topically in other wound infections, e.g. infected ulcers, pedicle flaps, skin grafting, abscess cavities, etc.

Manufactured by



DEY'S MEDICAL STORES (Mfg.) PRIVATE LTD.
CALCUTTA-19

Under Licence from

ZAMBON S.p.A. VICENZA (Italy)

Exclusive Distributors

DEY'S MEDICAL STORES PRIVATE LTD.

CALCUTTA - BOMBAY - DELHI - MADRAS
PATNA - BAUHATI - CUTTACK



196/DEC/1-60

Indian Journal

OF

OTOLARYNGOLOGY

OFFICIAL SCIENTIFIC JOURNAL OF THE ASSOCIATION OF OTOLARYNGOLOGISTS OF INDIA

Vol. XII, No. 4

DEC. 1960

Problems in Tympanoplasty

BY

S. R. REGE, M.S., D.L.O., F.C.P.S.,

Hon. Asstt. E.N.T. Surgeon, K. E. M. Hospital, Parel, Bombay-12

AND

K. H. PATEL, M.S., D.O.R.L.,

Registrar, E.N.T. Department, K.E.M. Hospital, Parel, Bombay-12.

The main purpose in presenting this paper is to bring to light some of the difficult situations we encountered in performing Tympanoplasties. This research on Tympanoplasty was done in K.E.M. Hospital, Bombay, for a period of one year ending November 1959. It is too early to give out the results of our endeavours but we felt that it was appropriate to acquaint you with the difficulties and learn from the experience of this learned gathering how we should have proceeded.

In our series we performed 22 Endaural, 33 postauricular and 9 permeal operations. Mastoidectomy is the first step in the former two procedures. We feel the success of this operation depends upon how effectively mastoid disease is removed. Compared with foreign literature our cases have a long history of ear suppuration with the result that disease lingers in the remotest of the mastoid air cells. We feel that mastoidectomy should be thoroughly complete and the tip should be explored in every case. We have seen a case where mastoid antrum and epitympanum were properly dealt with leaving the tip alone as it was felt that the tip portion was sclerotic and healthy. The case returned to us within 2½ months with acute mastoiditis

localised to tip and lower mastoid process. On re-operation it was discovered that middle ear with the skin graft had resisted infection whereas the diseased tip required removal.

Once in the mastoid antrum we expose the short process of incus guarding the aditus. When exposing the short process, we discard the use of mastoid scoops for clearing the periantral cells. We have noted so often this manoeuvre can dislocate an intact incus. We recommend the use of dental drill to expose the incus still covered with mucosa. The most important and at the same, time-consuming step is to expose incudostapedial joint and the long process of incus. We reflect the drum remnants as in Rosen's operation and by means of a drill reduce the posterior bony rim so that entire long process is visualised. This technique gives a good exposure of incudostapedial joint, entire foot plate region and the round window. We have always reduced the bridge from this side of the middle ear rather than working from antrum side. If the long process is found destroyed, it means a lot of unnecessary waste of energy and time and we proceed with the removal of the bridge. It is possible with gentle care to remove the bridge without injury to underlying short process of the incus. In Case Nos. 10, 37 and 41 where the bridge got fractured we had to remove the bridge but left the mucosa intact over the incus and a Type II procedure was completed. We have not been able to put short process of incus against head of Stapes as described by Zollner, but we had 2 cases where malleus was put against stapes. In Case No. 64 we were successful in putting the neck of the malleus against the head of the stapes in No. 62 the handle of the malleus was put against the foot plate of stapes. In both of them malleus produced a good tenting effect for the graft and the new drum had a better vibrating surface whereas adhesions to medial wall were unlikely. In Type III, the essential step is lowering of the facial ridge. With experience we have been able to lower the ridge alarmingly low and yet the facial nerve has been safe. As a rule with Types II and III a good result is obtained because the auditory ossicles are in a good condition

before operation. It is merely a matter of performing the operation as smoothly and gently as possible retaining as much undamaged epithelium as can be salvaged and being careful not to create an opportunity for adhesion formations post-operatively. We have observed that in 23 patients who had a pre-operative perforation in posterior superior quadrant with granulations the lenticular process or the head and crura of stapes were destroyed. We have had no case where polythene rod was used in empty niche of oval window as described by Wullstein.

It is essential to have a freely mobile stapes; to this end we had to free it of all adhesions and to cut the stapedial tendon to give it unrestricted mobility. If the crura are destroyed we see that foot plate is not fixed. We have always insisted on getting a good stapedial reflex. The mucosa in the niche of oval window is respected very much for fear of post-operative adhesions. Toilet of the round window has been difficult at times. In 2 cases (Case Nos. 35 and 37) where both windows were fibrosed the result is deplorable. In Case No. 37 extensive fibrosis starting from eustachian opening had invaded the windows. We succeeded in getting a free foot plate after lot of struggle but round window could not be salvaged. We have recommended fenestration operation for this patient. In Case No. 35 round window appeared as a cleft buried under the prominence of promontory and we have to shelve out bony rims from promontory to give a good size for the round window. In Case No. 15 the jugular bulb was so prominent that a trough formation for type IV was impossible. We do not know yet how to get over such a situation! The middle ear opening of Eustachian tube showed great variation; in at least 8 patients the opening was seen in anterior superior quadrant of the middle ear diametrically opposite to round window making a type IV procedure difficult. We are adverse to grafting the foot plate region but leave it open to outside as it might lead to fibrosis and fixation of the foot plate. We have found Rosen's curette a good instrument to excise thickened mucosa, granulations and polypi from

the hypotympanum. During this procedure one has to be very gentle and pay maximum respect for the remnants of the annulus tympanicus. The latter structure is very important for reconstruction of the new drum. It serves as a source of blood supply for the graft and a scaffold for the new drum. A difficult situation arises when the annulus is absent or deficient in the anterior part. In Case No. 38 we created a raw surface on anterior meatal wall, packed hypotympanum and area around eustachian tube with gel foam pieces. We put the graft against this raw area and over the middle ear, but the graft has failed. In Type IV procedure we have put gel foam in hypotympanum and buried round window and eustachian orifice under one graft. We had no occasion to use mucosa or amnion graft over the promontory or medial wall. We have instructed our patients to start Valsalva's autoinflation 3 weeks following operation, to prevent adhesion formations and set a mobile drum.

RESULTS

During 1st December 1958 to 30th November 1959, we had occasion to perform Tympanoplasty operations on 58 cases. Bondy's modified radical operation was performed on 6 cases to serve as control. Included in this are 8 cases with Attic cholesteatoma, 15 chronic otitis media with antral cholesteatoma, 20 chronic otitis media without cholesteatoma, and 21 chronic otitis media with central perforation and chronic mastoiditis. This series also includes 6 cases previously mastoidectomised.

Following operations were done on 58 cases:

Type of operation	No. of cases
1. Myringoplasty	9
2. Type II	11
3. Type III	15
Malleolar-stapedialpexy	2
4. Type IV	21
5. Type V	Nil

Results of Myringoplasty

Total cases	...	...	9
Improved hearing	...	...	5
New drum intact	...	...	6
Grafts totally lost	...	...	2
Post-operative perforation	...	...	1

Audiometric improvement is shown in Charts I-VI

Results in Type II

Total cases	...	...	11
Improved hearing	...	...	8
New drum intact	...	...	9
Post-operative perforation	...	...	2
Wet mastoid	...	...	1

Audiometric improvement is shown in Chart II.

Results in Type III

Total cases	...	...	17
Improved hearing	...	...	9
New drum intact	...	...	5
Wet mastoid	...	...	5
Complete failure	...	...	2
Post-operative perforation	...	...	4

Results in Type IV

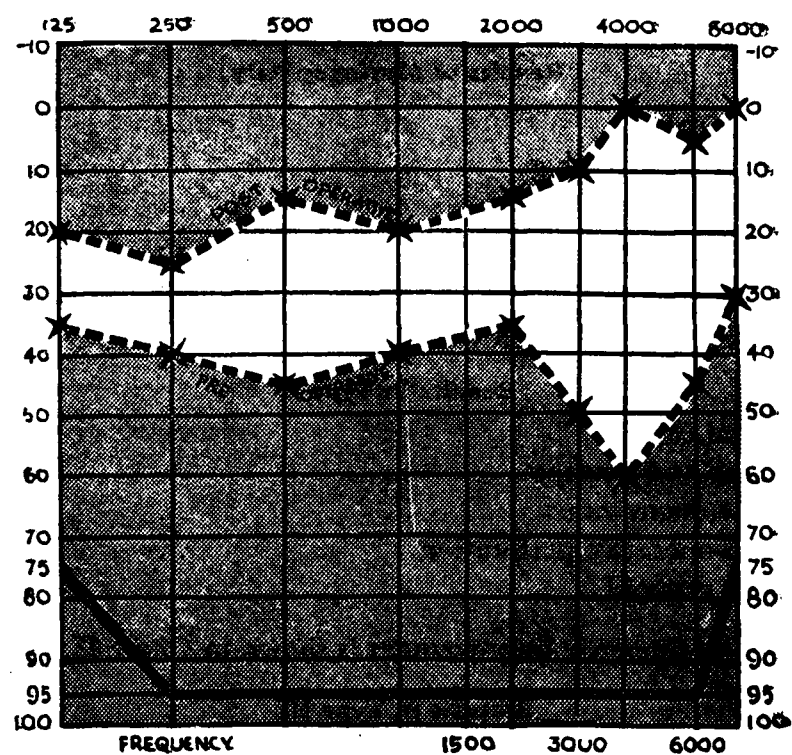
Total cases	...	...	21
Improved hearing	...	...	11
New drum intact	...	...	17
Wet mastoid	...	...	2
Complete failure	...	...	4

The following pathology was encountered in 58 cases.

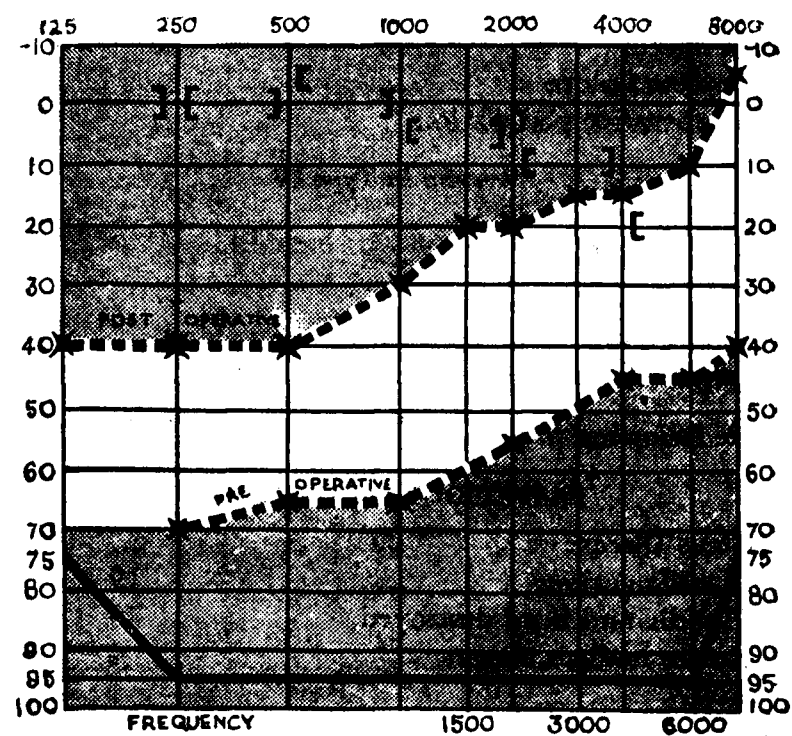
PATHOLOGY OF OSSICLES

Malleus Disease	...	...	27 cases
Handle carious	...	19	
Handle and head destroyed	...	4	
Entire malleus absent	...	4	

Case No. 63

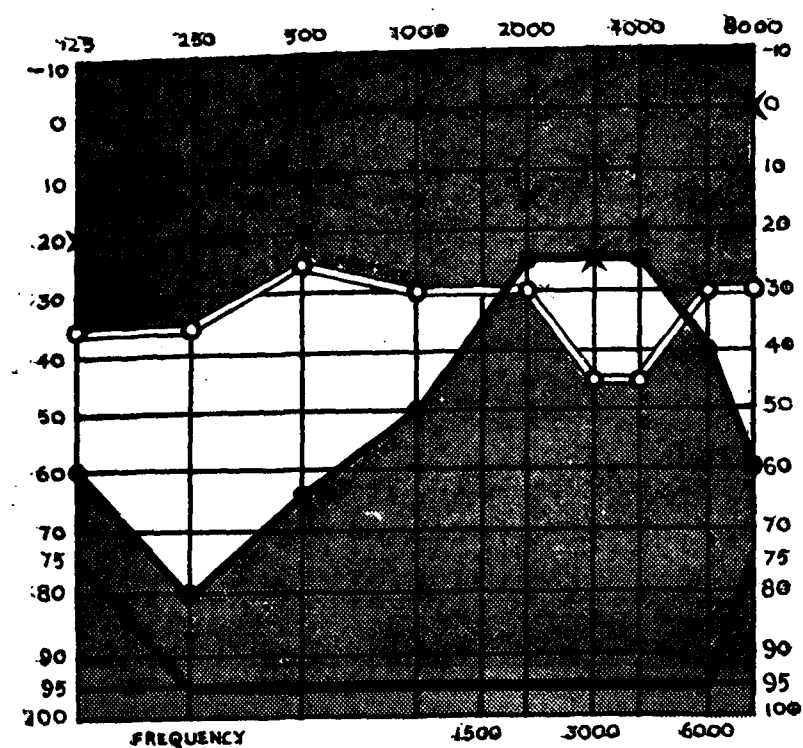


Type IV Left.

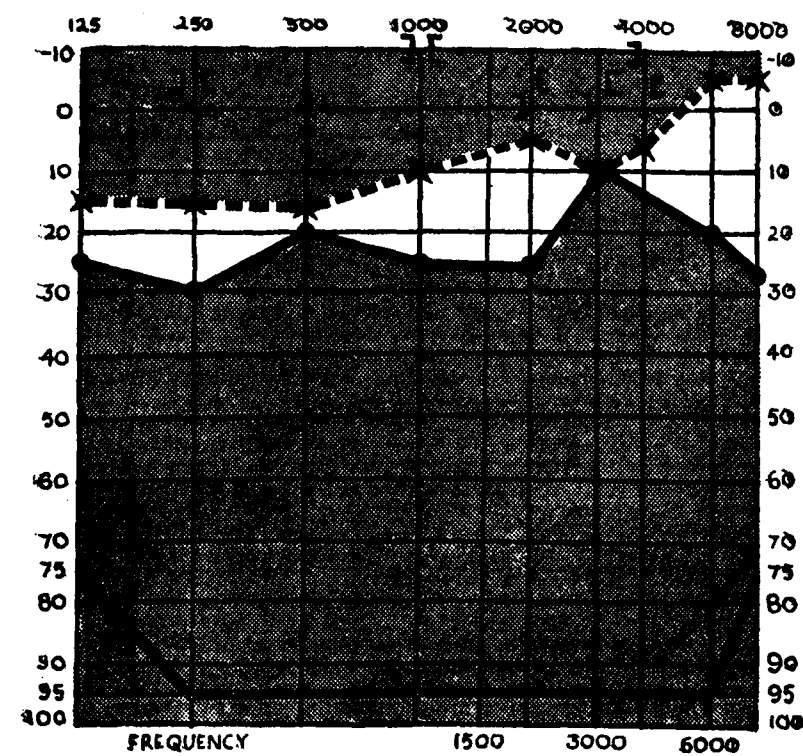


Type IV Left.

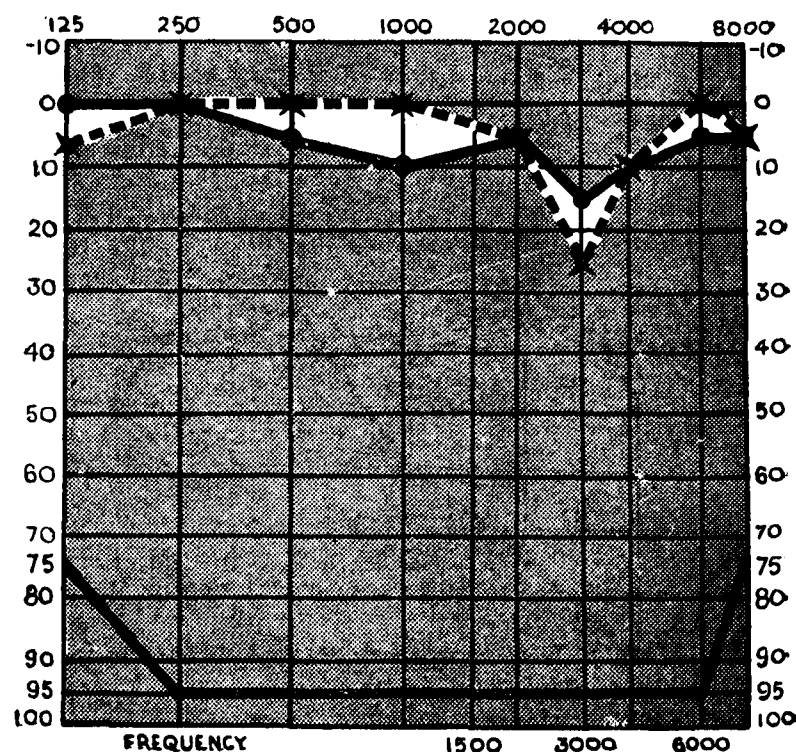
Case No. 64



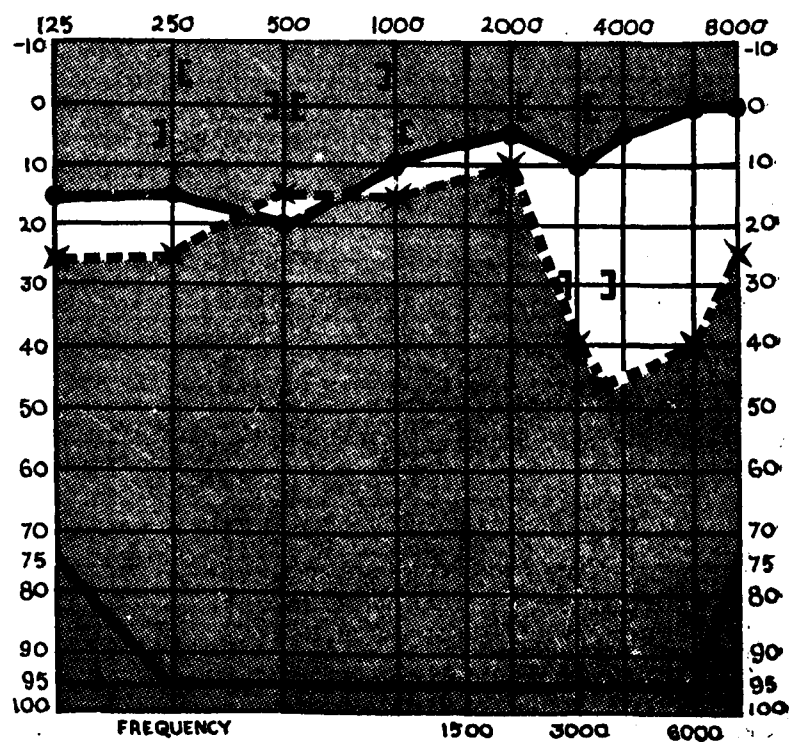
Type II Right.



Type III Right.



Type IV Left.



Type III Left.

II. Incus disease	...	...	34 cases
Long process destroyed	...	20	
"Aseptic necrosis" Long process	...	10	
Entire Incus destroyed	...	4	
III. Stapes disease	...	...	21 cases
Crura destroyed	...	4	
Foot plate in granulation	...	16	
Ankylosis	...	Nil	
Foot plate destroyed	...	1	

One of us (K.H.P.) has been doing a modified acoustic probe test using a probe and Tuning Fork. The results of this test verified at operation showed results correct in 9 out of 10 cases.

We are in agreement with Nils G. Richtner that Type IV affords good hearing improvement even in cases of extremely grave auditory impairment. Majority have undergone this procedure. The audiogram of Case No. 63 is very interesting and shows a considerable rise in post-operative hearing. Here we may remind you of F. Zollner who has said that a greater gain in hearing is obtained by acoustic separation of the two windows than by Fenestration operation for otosclerosis *viz.* gain even above 24 db. optimal hearing according to Carhart. Probably the entrance of sound in the natural way through oval window is more effective than the one through "fenestra nov-ovalis". In 4 cases 25 db. level was reached. This group of patients undergoing Type IV have shown the greatest amount of gain in hearing, because their initial threshold lay between 50/60 db. as both windows were open to outside.

HEALING OF MASTOID SEGMENT

The average period for total healing was $2\frac{1}{2}$ to 3 months. Although some patients in Type IV required dressings upto 4 months or longer ultimately they also healed. Only 7 patients are carrying on with mastoids covered with granulations. Five cases have intermittent discharge from mastoids but come under control with treatment. It is our observation that middle ear and mastoids with cholesteatoma pathology healed better and

faster than those with exuberant granulations and polypi formation. We have not used skin graft for mastoid wound in any case and are not sorry for it.

We have used a full thickness skin graft from mastoid tip region. In 8 cases the grafts have totally disappeared, whereas in 9 cases there is a perforation in the graft in post-operative period. In 2 of these the perforation seems to be due to shifting of the graft rather than due to necrosis.

TYMPANOPLASTY IN CHILDREN

The results are very unsatisfactory. The healing is delayed indefinitely due to exuberant granulations. It may be due to lack of cooperation during dressings, lack of hygiene coupled with unpunctuality.

Tympanoplasty in previously radical mastoidectomised is a very difficult procedure and is a challenge to surgeon's resources.

COMPLICATIONS

1. *Facial paralysis*.—This occurred in 3 patients—two have since recovered and third is not to be traced. Two of them were previously operated.

2. Labyrinthitis occurred in one patient resulting in total deafness in operated ear.

CONCLUSIONS

Tympanoplasty is a difficult procedure. Each case presents its own problem and a decision has to be made on the operation table as regards possible surgery. Improvement in hearing and a dry ear are ideals to be gained in Tympanoplasty.

ACKNOWLEDGEMENTS

Our thanks are due to Dr. S. V. Joglekar, Dean, K. E. M. Hospital for allowing the use of hospital case records, Dr. J. V. DeSa and Dr. P. P. Karnik for their valuable suggestions and advise; Dr. K. L. Shah and Dr. D. K. Dastur for completing the investigations of our cases.

Treatment of Allergic Rhinitis with Intratubinal Autohaemo with Hydrocortisone

BY

P. P. KARNIK, M.S. (BOM.),

Hon. Asstt. E. N. T. Surgeon, K. E. M. Hospital, Bombay and

Hon. E. N. T. Surgeon, Dr. Nanavati Hospital, Bombay.

There is no authoritative survey done about the exact incidence of allergic rhinitis. It seems that it differs from country to country and even in the same country from regions to regions. The reason behind this may be the variations in the intensity of concentration of allergens and the variation of environmental factors. Foreign workers such as Vaughan (1933) and Bray (1957) have stated that roughly 10% of general population is frankly allergic and 50% give the history of transient episodes. It has been an accepted fact that it is more common in intelligent class of people, which has been substantiated by the work of James and Leavitt who found no incidence of allergy in about 6000 mentally defective people. It has been roughly established that about 65% of cases of allergy attending the E. N. T. out-patients are cases of allergic rhinitis. Out of which 40% are purely affecting the nose, 15% along with bronchial asthma and rest with other allergic manifestations. It is not the purpose to go into details of various allergens and predisposing factors but it is found that given a receptive soil as provided by strong hereditary predisposition, the initiation of allergy is likely to follow to exposure to allergens at a time when tissue resistance is lowered by chill, fatigue or emotional disturbances. Allergy once established may get augmented and may even spread from one shock organ to other. And thus it is imperative that one must try to treat and cure these patients from this disease which has got more a nuisance value.

TREATMENT

In deciding treatment of these cases one does not follow hard and fast rule. This is because there is no one type of treatment which is found to be beneficial in all the cases, and thus one always tries to evolve a particular course of treatment which one finds to be useful in his own cases. It is by no means uncommon for minor allergy to subside spontaneously, but there is always a chance that if it is allowed to continue it might get severe. Ideally one always tries to strike the exact allergen by taking a detailed history. But it is too difficult to get clear-cut evidence of the same. Even foreign workers have doubted the usefulness of specialized tests to detect various allergens. And thus measures to avoid possible contact or even hyposensitization is not always possible in all cases. Symptomatic and palliative measures such as antihistaminics, calcium, vitamin C and sympathetic stimulating drugs, parasympathetic depressant drugs are always found to be useful in tiding over the acute crisis, but are found to have no lasting effect. This leads us to try other alternative treatments such as cautery, zinc iodisation, etc. But one always experiences that a particular treatment may not give beneficial effects in all the cases. These above facts amply prove that the essential nature of allergy evades us and leaves us to try "*Reductio ad absurdum*" method for the treatment of the allergic rhinitis.

Recently cortisone group of drugs have come into use for the control of allergic condition, although precise method of their action are open to debate. Awny and Soliman gave the possible explanations as:

- (1) It potentiates the formation of hormonal antibodies and therefore counteracts the effect of antigen, and consequently prevents the sensitization shock.
- (2) It potentiates the action of histaminase.
- (3) It is having antihyaluronidase action.
- (4) Effect over the permeability of blood vessels.

I have tried to use this drug in combination with autohaemo intratubrinally. My colleague, Dr. S. R. Rege and Dr. K. L. Shah have already published a paper on autohaemo given intratubinal in the Indian Journal of Otolaryngology (June 1958). They have discussed the merits and demerits and claimed about 75% of cure. There is nothing much to add to that and technique is the same. I have only mixed 25 mgms. of Hydrocortisone acetate with citrated blood and given half of it each side.

In the present series of cases, I have included only cases with chronic nasal allergy which has been characterised by recurrent attack of rhinorrhoea, sneezing and nasal obstruction. Acute episodes are always treated with symptomatic measures and they were subjected to autohaemo with cortisone later on.

In analysing the present series of cases, I would like to state:

Total number is eighteen.

1. Two cases were already given autohaemo intratubinal with no relief.
2. Two cases were subjected to cauterization of inferior turbinates with no relief.
3. Five cases were given Halsidine + Delergin courses with no relief.
4. Nine cases were fresh.

Out of these 18 cases, three cases were having bronchial asthma for which they were treated by various other methods.

And thus one will note that 50% of cases were already subjected to other types of treatment with no beneficial effect.

The period of observation after treatment varies from 8 months to about 2 years.

Six of them are more than one year and I find :

4 showed markedly improved

1 – slight improvement

1 – no improvement at all.

The other 12 cases had a follow-up less than 12 months, and I find about 8 cases free from symptoms.

2 cases – much improved.

2 cases – no improvement at all.

There were no side effects of Cortisone noted in these cases as the dosage employed is small. But about 7 cases did suffer from severe head cold after the injection. Three cases had a severe rebound phenomena but that subsided with other palliative measures.

Out of 3 cases of bronchial asthma, all the cases had a very marked improvement and they were very much happy after the treatment.

Two cases have shown slight deterioration after an initial improvement lasting for about eight months. But severity of recurrence is much less.

It is evident that the series which I am reporting is too small as well as the period of observation is also not sufficient to assess the final results. But finding that the treatment mentioned above has given fairly good hopes of improvement in most of the cases, I have ventured to report this series. I was very happy about the spectacular relief in the cases of all rhinitis with bronchial asthma. From clinical trials which I have done I feel that with the use of such small doses of hydrocortisone in suitable cases one may be able to achieve better results and cases which have failed to respond with other types of treatment should be given a trial with this therapy.

BIBLIOGRAPHY

1. Ashley : Modern trends in Otolaryngology with special emphasis on allergy, Am. Otol. Rhinol. and Laryng., 60 : 526-531, 1951.
2. Dill Lewis et al : Observations on the local use of Cortisone in the nose in allergic rhinitis, Laryngoscope, 61 : 415, 1952.
3. Rege et al : Treatment of autohaemo in allergic rhinitis, Ind. J. Oto., June 1958.
4. Smith et al : Local use of hydrocortisone acetate in the nose. A. M. A. Arch. Otolaryng., 60 : 24, 1954.
5. Stewart : Further observations on the effect of cortisone and ACTH in the treatment of allergic rhinitis, Jour. Laryng. Otol., 68 : 193, 1954.

pH of the External Ear

BY

Dr. G. LAKSHMIPATHI, M.S., D.L.O.,

*Lecturer in E. N. T. Diseases, Kurnool Medical College, and
E. N. T. Surgeon, General Hospital, Kurnool*

AND

Dr. C. SITA DEVI, M.B.B.S., M.SC.,

Lecturer in Biochemistry, Kurnool Medical College, Kurnool.

Diseases of the external ear form a fairly large proportion of all cases encountered in otologic practice. Fabricant (1949) and Gill (1942) have recorded that 5 to 40% of all patients attending an otologic clinic suffer from external otitis^{3, 4}. The incidence is said to be much more in the humid tropical countries. We have recorded in the E.N.T. department of the Kurnool General Hospital that external otitis accounts for 1025 cases among the 4059 patients with ear diseases in the year 1958, (Lakshmipathi and Ramanarayanamurti - 1960)⁶ and for 1211 cases among the 4152 patients with ear diseases in the year 1959 giving an average of 27.2%.

The external auditory canal is about one inch in length and is of a S-shaped curve with a slight downward slant near the tympanic membrane. Its inner two-thirds is bony and the outer one-third cartilaginous. It is lined entirely by skin. Cerumen is secreted from the ceruminous glands which are situated in the outer membrano-cartilaginous part of the canal. These are apocrine glands with a tubo-alveolar structure and often extend to the perichondrium. (Scott Stevenson-1954)⁸. The fresh cerumen which is thin is acidic in reaction and is attributed to have a bactericidal action. But the old cerumen is a good culture medium for micro-organisms.

The problem of management of bacterial infections of the skin cannot be well appreciated by the usual study of the diseases, their symptomatology, the bacteria concerned and the drugs supposed to destroy the bacteria unless we concurrently study the factors which influence the resistance the skin offers to these invading organisms or make the skin harbour them and permit or even facilitate their growth on it. There are many factors which thus influence the protective functions of the skin. Marchionini and others (1938)⁷ have drawn attention to the "acid mantle" that is present on the skin which plays a large part in protecting it from these invading bacteria. This normal acid coat is dependant on the cornified horny cells, sweat, secretion from the sebaceous glands and the apocrine glands. The lactic acid excreted in the sweat is largely responsible for this and the pH of the skin at some spots on the body is as low as 5 or even 3. Colebrook (1930)² has found that bacteria rapidly disappear after application on an intact skin. Susceptability of skin to infection is due to removal of this acid cloak and its replacement by alkaline cloak. The damaged and swollen horny material favours the growth of the bacterial population. Fabricant (1949) has drawn attention to "moisture, maceration, dead horny tissue and relative alkalinity" as the four favourite conditions for the multiplication of organisms on the skin.³

The ear canal being lined by skin is prone to all the diseases affecting the skin elsewhere on the body. However the ears are protected from the air borne bacteria by the normal anatomy of the external ear canal. Majority of the organisms are stopped at the bottom of the concha and the entrance of the ear canal by the hairs. The few that escape and pass beyond are trapped in the membranous canal by the cerumen and are then brought out by the movements of the lower jaw. In addition the external ear canal also has the acid mantle of Marchionini present on it protecting it from infections. But

when there is a damage the warm and moist environment containing cellular debris and cerumen serves as a good culture medium for organisms. Associated with this the change in the reaction of the ear canal is an important predisposing or favouring factor in the production of external ear infections. Few references on the pH of the ear canal are available in the literature and in our country practically no work has been done in this field. Ear canal being a favourite site for many infections bacterial and fungal, a knowledge of the reaction of the normal ear canal is essential to understand the course and plan the treatment of external ear infections. A study of the pH of the normal healthy external ear canal is taken up here with a view to observe the conditions in our Indian patients and set up our normal standards.

MATERIAL AND METHOD OF STUDY

This work was undertaken in the E.N.T. and the Biochemistry departments of the Kurnool Medical College and the Kurnool General Hospital during a period of four months from November '59 to February '60. Material is collected from the ears of the patients attending the General Hospital E.N.T. out patient. Ears of those patients who attended the hospital for complaints other than that of the ear were examined and material is collected from those ears which are normal and which have cerumen absent or in minimal amounts.

First the pinna is well swabbed with sterile, neutral, triple distilled water of 7.0 pH. Next the external canal is slowly and completely filled with the same triple distilled water up to the brim with no overflow. The water is allowed to stay

in the ear for two minutes and during this period close contact between the ear canal and the solution is facilitated by movements of the pinna and the patient moving his mandible up and down and side to side. The fluid is then carefully withdrawn into a sterile test tube previously rinsed well with the same triple distilled water of 7.0 pH. The material is examined in the Biochemistry department of the Kurnool Medical College.

METHOD OF ANALYSIS

pH of the fluid collected from external ears is determined by colorimetric method (White and Delory, 1952).¹⁰ The set of buffer mixtures used are that of Kolthoff (1925).⁵ The same triple distilled water (pH 7.0—checked with Beckman's pH metre) was used for the preparation of buffer mixtures as well as indicators. Direct determination of pH by pH metre could not be undertaken for want of micro-electrodes.

Some of the ears were examined twice and thrice at intervals of three to seven days and the material collected and examined to know the constancy of readings. All the patients thus examined were instructed not to handle their ears in any way particularly by avoiding putting oil or water or cleaning with kutchies etc., during the period of observation.

RESULTS

230 ears in all were examined from 128 patients. Of these 114 were right ears and 116 left ears. 70 were males, 37 females and 21 were children. 40 of these ears were examined more than once. 25 were examined twice, 13 thrice and 2 four times. Total examinations were on 287 specimens.

Results of 166 examinations on 127 ears from 70 adult males.

Sr. No.	Sex	Age	Side	pH	Sr. No.	Sex	Age	Side	pH	Sr. No.	Sex	Age	Side	pH
1	m	14	L	5.9	25	m	18	R	5.7	52	m	14	R	6.8
			R	6.1				L	5.9	53	m	20	R	6.1
2	m	22	L	5.7	26	m	20	R	6.0				L	6.3
			R	5.7				L	5.8	54	m	45	R	5.7
3	m	40	L	5.9	27	m	17	R	6.5	55	m	24	L	5.9
			R	6.6				L	6.5	56	m	44	R	5.5
4	m	35	L	6.4	28	m	20	R	5.9				L	5.3
			R	5.9	29	m	22	R	5.2	57	m	22	R	5.5
5	m	60	L	5.9				L	5.6				L	5.5
			R	5.9				L	5.7	58	m	15	R	6.8
6	m	50	L	5.9				L	5.7				L	6.8
			R	5.7				L		59	m	45	R	5.3
7	m	17	L	6.3	30	m	25	R	5.5	60	m	52	R	5.4
			R	6.5				L	6.1				L	5.3
8	m	20	L	5.7	31	m	45	R	5.3	61	m	25	R	5.9
			R	6.0				L	5.3				L	5.9
			R	6.1	32	m	50	R	5.7				L	6.8
			R	5.9				L	6.2	62	m	40	R	6.3
9	m	21	L	5.5	33	m	20	R	5.6				L	6.3
			R	5.7				L	5.3				L	6.3
10	m	52	L	5.5	34	m	26	R	5.9				L	6.5
			R	5.3				L	5.9				L	6.3
			R	5.3	35	m	22	R	6.5				L	6.7
			R	5.5				L	5.9				L	
11	m	24	L	5.5	36	m	15	R	5.7	63	m	40	R	6.3
			R	5.9				L	6.3				L	5.8
12	m	21	L	5.9	37	m	20	R	5.3				L	6.4
			R	5.9				L	6.3				L	5.6
13	m	50	L	5.9	38	m	40	R	6.1				L	5.9
			R	5.9	39	m	25	R	5.8				L	5.9
14	m	17	L	5.9	40	m	80	R	6.1				L	6.0
			R	5.9				L	5.9				L	5.6
15	m	20	L	5.5	41	m	35	R	6.1	64	m	30	R	5.7
			R	5.7	42	m	32	R	6.8				L	5.7
16	m	40	L	6.1				L	6.1				L	6.0
17	m	45	L	5.8	43	m	30	R	6.1				L	5.9
18	m	60	L	5.7				L	6.1				L	5.9
			R	5.7	44	m	20	R	5.7				L	5.9
19	m	25	L	6.1	45	m	22	R	5.8	65	m	18	R	5.9
			R	6.6				L	5.9				L	5.9
20	m	24	L	7.0				L	5.9				L	5.8
			R	5.9				L	5.9				L	5.9
21	m	12	L	6.8				L	5.9				L	6.0
			R	6.2				L	5.9				L	5.8
			R	6.8	46	m	50	R	5.5	66	m	70	R	5.3
22	m	22	L	5.9				L	5.1				L	5.3
			R	5.9	47	m	18	R	6.1				L	5.1
23	m	30	L	5.9				L	6.1				L	5.3
			R	6.4	48	m	21	R	5.9				L	
			R	6.4				L	6.9	67	m	40	R	5.9
24	m	50	L	5.7	49	m	12	R	5.8				L	5.5
			R	5.6				L	6.1	68	m	25	R	5.8
			R	5.6	50	m	34	R	5.3	69	m	17	R	6.4
			L	5.4				L	5.3				L	6.3
			L	5.5	51	m	13	R	6.5	70	m	19	R	6.2
			L	5.5				L	6.5				L	5.9

Of the above 127 ears 65 were right ears and 62 left ears. The highest pH recorded was 7.0 and was found in one ear. The lowest was 5.1 and was found in 2 ears. The average pH was 5.91. The pH ranged between 5 and 6 in 108 examinations and in 58 it ranged between 6 and 7. Thus 65% of ears showed the pH in the 5 to 6 range and 35% had the pH in the 6 to 7 range.

Results of 82 examinations on 68 ears from 37 adult females.

Sr. No.	Sex	Age	Side	pH	Sr. No.	Sex	Age	Side	pH	Sr. No.	Sex	Age	Side	pH
1	f	30	L	5.9	9	f	20	L	6.1	23	f	28	R	6.8
			R	6.3				R	6.9				L	6.5
			R	5.9	10	f	25	L	5.6	24	f	30	R	6.9
			R	5.9				R	5.5				L	6.7
2	f	15	L	6.3	11	f	25	L	6.1	25	f	45	R	6.6
			R	6.1				R	5.9				L	6.8
3	f	35	L	6.3	12	f	25	R	6.1	26	f	20	R	6.3
			R	6.3				L	6.0				L	6.3
4	f	50	L	5.3	13	f	20	L	5.9	27	f	30	L	6.5
			L	5.3	14	f	40	R	5.9	28	f	18	R	7.0
			L	5.3				L	5.7				L	6.4
			R	5.0	15	f	70	L	6.0	29	f	50	R	6.3
			R	5.3				L	6.0				L	6.1
			R	5.3				L	6.0	30	f	30	R	6.1
5	f	20	L	6.0	16	f	40	R	5.4	31	f	20	R	7.0
			R	6.1				L	5.7				L	5.7
			R	6.3	17	f	22	L	5.9	32	f	25	R	6.3
			R	6.9	18	f	33	R	5.9				L	5.9
			R					L	5.9	33	f	30	R	6.1
6	f	22	L	6.1	19	f	30	R	5.7	34	f	30	R	6.1
			R	6.1				L	5.9				L	6.7
			R	6.5	20	f	12	R	5.3	35	f	25	R	6.8
			R	6.5				L	5.5				L	6.4
			R		21	f	25	L	6.3	36	f	50	R	5.5
7	f	60	L	5.9	22	f	50	R	6.3				L	7.0
			R	5.9				L	6.6				L	6.9
			R	5.9				L	6.1	37	f	20	R	5.5
8	f	50	L	6.7				L	6.3				L	5.6

Of the 68 ears above examined 31 were right ears and 37 left ears. The highest pH recorded was 7.0 and was found in 30 ears. The lowest was 5.0 and was recorded in one ear. The average pH was 6.10. The pH ranges between 5 and 6 in 32 specimens and between 6 and 7 in 50 examinations. Thus 39% of the ears were in the 5 to 6 range whereas 61% showed the

pH in the 6 to 7 range almost a reversal of that obtained with males.

Results of 39 examinations on 35 ears from 21 children.

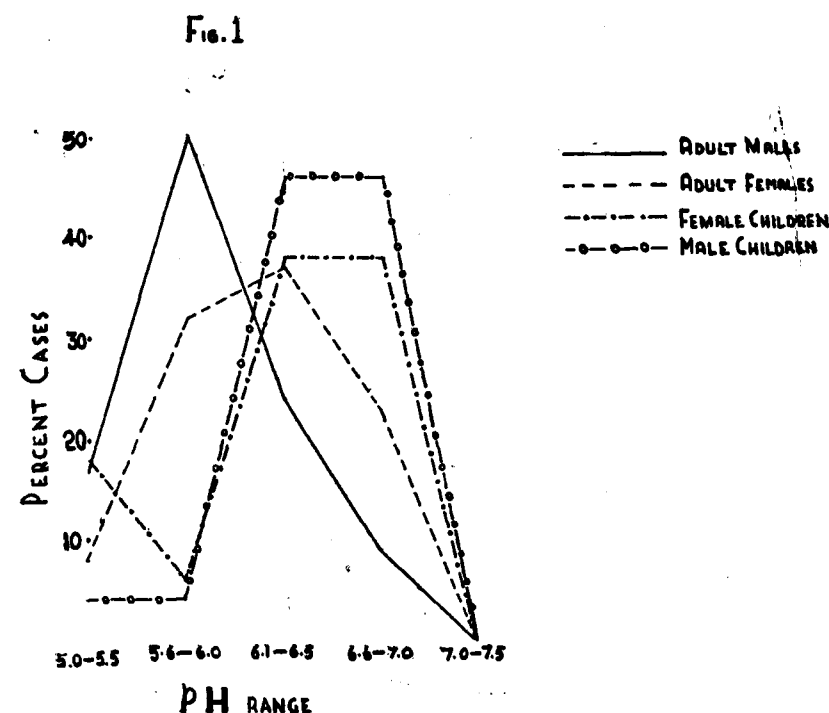
Sr. No.	Sex	Age	Side	pH	Sr. No.	Sex	Age	Side	pH	Sr. No.	Sex	Age	Side	pH
1	fe	10	L	6.4	7	me	6	L	6.8	15	me	8	R	7.0
				6.9	8	fe	11	R	6.6	16	fe	10	R	7.0
			R	6.2	9	fe	11	R	6.3	17	fe	5	R	6.8
				5.9	10	me	6	L	6.3	18	me	7	R	6.5
					11	me	11	R	6.6	19	me	9	R	6.6
2	me	1	R	6.1	12	me	10	R	6.4	20	me	3	R	6.3
3	fe	5	R	5.9	13	fe	9	R	6.1	21	me	11	L	6.5
4	me	11	L	6.3	14	fe	3	R	6.7					6.8
5	me	8	R	6.8										5.9
6	me	8	R	6.1										6.2
			L	7.0										
				6.3										
				6.6										

Of the 35 ears above examined 18 were right ears and 17 left ears. 8 were female children and 13 male children. The highest pH recorded was 7.0 and was found in 3 ears. The lowest was 5.9 and was found in 3 ears. The average pH recorded was 6.48. The pH ranged between 5 and 6 in 3 specimens and between 6 and 7 in 36 specimens. Thus in 8% of the ears the pH ranged between 5 and 6 and in 92% it was between 6 and 7. The average pH in the 13 male children was 6.47 and in the 8 female children it was 6.5.

AGE DIFFERENCE AND pH

Age Group	No. of specimens	Average pH
0—5 years	8	6.43
5—10 years	24	6.55
10—20 years	77	6.11
20—30 years	82	6.02
30—40 years	37	6.03
40—50 years	39	5.80
50—60 years	12	5.61
Above 60 years	9	5.67

The highest pH recorded among all ages was 7.0, the lowest 5.0 and the average normal was 6.0. The pH range against the percentage of cases in males and females in the two age groups is shown in Fig. 1 (see Graph). There is a slight shift of pH to the right in adult females and much more in children when compared to male adults.



HABITS AND pH

100 specimens were from patients who confessed to a habit of periodical cleaning of their ears or washing them with water and putting oil. 187 were from those who denied such a habit.

Habits	No. of specimens	Average pH
+ ve	100	6.046
- ve	187	6.046

Out of the 40 ears which were repeatedly examined exact readings were obtained in 19 ears. A difference of 0.2 and less was obtained in 11 ears. The maximum difference was 0.9 and was recorded in 2 ears.

The normal average pH of the external ear canal from our study is found to be 6.0. There is a slight difference with age and sex, it being more alkaline in females and children. The ears of men were found to be more on the acid side and that of the females nearer neutral and towards the alkaline side. It is significant that 65% of the males had the pH in the 5 to 6 range and only 35% in the 6 to 7 range, whereas only 39% of the females had their pH in the 5 to 6 range and 61% in the 6 to 7 range. And in children only 8% were in the 5 to 6 range whereas 92% were in the 6 to 7 range. With advancing age the pH is found to decrease, *i.e.*, the ear reaction is becoming more acid. The lowest pH was 5.0 and was found in one ear and the highest pH of 7.0 was found in 7 ears. The average normal of 6.0 pH was found in 9 ears. The pH ranged between 5 and 6 in 142 ears and between 6 and 7 in 145 ears. The average for adult males was 5.91 and for adult females 6.10 which is 0.19 higher than for men. The pH for children was 6.48 which is 0.57 more than for men and 0.38 more than for women. The average pH in male children was 6.47 and in female children it was 6.5, slightly higher than in the male children. In no case did we get the pH beyond 7.0; *i.e.*, all the ears showed only an acid pH or neutral pH out not an alkaline pH. The habits of the patient (with regard to his ears) do not appear to influence the reaction of the ear canal as found from our recordings. 26 patients who had disease in one ear, either external or middle ear infections, or post-operative mastoidectomies were included in this study and the pH of their normal ear was studied. 12 of them had the pH between 5 and 6 and 13 had it between 6 and 7. One had it exactly at 6.0. Disease in one ear does not influence the reaction of the other ear which is normal.

Fabricant (1949)³ measured the pH of the ears in 131 subjects, 27 infants, 44 children and 60 adults all with normal

external ears with no or minimal amount of cerumen. He recorded the results thrice at half minute intervals directly with a specially adapted silver-silver chloride glass electrode with the Coleman electrometre. In his results from adult males the pH ranged from 5.0 to 7.8; in adult females it ranged from 5.0 to 7.6; in male children it ranged from 6.0 to 7.9, and in female children it ranged from 5.7 to 7.9; in male infants it was between 5.6 to 7.6 and in female infants from 5.2 to 7.5. Thus the readings were almost the same in all age groups though they were about 0.2 to 0.3 higher in female adults, children or infants alike than in the corresponding males. In all age groups he found some of the ears in the alkaline range also (beyond 7.0) though the majority were in the acid range.

Blank (1939)¹ measured the pH on the skin surface (not in ears) of 100 male medical students and 100 women nurses and found the pH to vary from 4.0 to 7.0. Average pH of females was 0.5 higher than in males.

The importance of the acid mantle on the skin has long been recognised as a natural protective phenomenon. The ear canal being lined by skin, the acid mantle exists here also and protects the ear canal from the entering micro-organisms. It is a significant fact that disease in one ear does not materially alter the reaction in the other ear; and it is also significant that the popular habit of periodical self cleaning of the ears and occasional putting of oil in the ears which our patients always indulge in, does not alter the reaction of the canal unless it is traumatising. The trauma leads to an exudation of the alkaline tissue fluid which favours the growth of organisms leading to irritation of the skin inducing further scratching and trauma and further alkalinity. Thus in the words of Fabricant (1949) "moisture, maceration, dead horny tissue and relative alkalinity" the four favourite conditions for the propagation of organisms are introduced and the vicious circle continues preventing the healing of the inflammation. An appreciation of this has a vital bearing on the planning of treatment of external ear infections. As Wise and Sulzberger (1938)⁹ suggest the

logical conclusion in the management of these diseases is therefore not to alkalinise but to acidify the skin surface. Thorough cleaning of the ear canal to remove the irritating material and prevent stasis which leads to further alkalinity and instillation of ear drops with an acid medium should be the frame work into which the details are fitted in, depending on the nature of the infecting organism and the lesion produced.

We express our thanks to the Superintendent of the General Hospital, Kurnool, Dr. D. Raghavendrarao, M.S. and the Principal, Kurnool Medical College, Dr. K. Ramesh Pai, M.S., F.R.C.S., for permitting us to use the hospital and college records. We also record our appreciation of the help rendered by the staff of the E.N.T. and the Biochemistry, Departments of the Kurnool General Hospital and the Kurnool Medical College.

REFERENCES

1. Blank, I. H.: Measurement of pH of the skin surface, *J. Invest. Dermat.*, **2**: pp. 67 and 231, 1939.
2. Colebrook, L.: Min. Hlth. Inter. Rep. Dep. Comm. Matern. Mortal. Morb. Appendix D-1930 - quoted in Topley and Wilson's Principles of Bacteriology and Immunity, Ed. by Wilson G. S. and Miles, A. A., Edward Arnold Ltd., London - IV Ed., Vol. II, 1955, p. 1161.
3. Fabricant, D. Noah and Perlstein, M. D.: *Archives of Otolaryn.*: **49**: 201, 1949.
4. Gill, W. D.: *Anall Oto. Rhin. Laryn.*: **51**: 370, 1942.
5. Kolthoff: *J. Biol. Chem.*, **63**: 135, 1925.
6. Lakshmipathi, G. and Ramanarayanamurti, B.: *Jour. Ind. Med. Ass.*, **34**: 439, 1960.
7. Marchionini, A., Schmidt, R. and Kiefer, J.: *Klin Wschr.* **17**: 736, 1938, quoted in Topley and Wilson's Principles of Bacteriology and Immunity, Ed. by Wilson G. S. and Miles A. A., IV Ed., Vol. II, p. 1162, 1955.
8. Scott Stevenson, R.: *Otitis Externa in Maxwell Ellis - Modern Trends in Diseases of Ear, Nose and Throat*, Butterworths, London, Ed. I., p. 140, 1954.
9. Wise, F. and Sulzberger, M. B.: *Year Book of Dermatology and Syphilology*, Year Book Publishers, Chicago, p. 553, 1938.
10. White, F. D. and Delory, G. E.: *A course in Practical Biochemistry*, Churchill London, Ed. VI, p. 8, 1952.

Evolution of Hindi Test Material for Speech Audiometry

BY

Dr. O. P. GUPTA, M.S. (E.N.T.), D.O.,
Prof. R. N. MISRA, M.S., D.L.O. (Lond.),

AND

Dr. M. L. BHATIA, M.S., D.L.O.,
Department of Otolaryngology, K. G. Medical College, Lucknow.

INTRODUCTION

The ability to hear and understand speech is the most important quality to be determined when testing the hearing. The work about to be described had been undertaken under I. C. M. R. in the search for a standardised test material in Hindi which will measure this ability in Indian patients. The English test material as prepared by the Psycho-Acoustic Laboratory, Harvard University, Cambridge, Mass, U.S.A. can only be used in patients who know English. In our experience there is a wide disparity between the discrimination scores as obtained by English Spondee records and Hindi spondee records even in normal subjects who know both the English and the Hindi languages. This is apparent from the following table.

Table No. 1

(English spondee word list 5-A and 5-B - Harvard University).

Discrimination Score	Discrimination Loss	No. of Cases	Mean Intensity in decibels
100%	0%	14	54 db. approx.
90-99%	0-9%	24	56 db. „
80-89%	11-20%	26	56 db. „
Less than 80%	More than 20%	36	55 db. „
	Total ...	100	

The discrimination score of 100% was obtained in all the above 100 normal subjects at an average intensity of 45 db. approx. when using our Hindi spondee word list. This shows that not only it is difficult to get maximum discrimination score with foreign test material but also there is a shift to the right of the normal speech curve.

Why do we require an indigenous test material.—Every language is a system of units of differing size which combine together in a manner regulated by the structure of the system. The smallest unit in any language is called *phoneme*, the equivalent in speech of a single *letter* in writing, and in all language systems these phonemes belong to one or the other of the two main classes, *viz.*, vowel and the consonant phonemes. Phonemes combine to form 'words'. These phonemes are capable of distinguishing one word of a language from the other words of the same language. The Hindi word राम (ra : m) is made up of three of these phonemic unit *i.e.* र + आ + म, the word काम (ka : m) is again made up of three, of which two also occur in राम namely आ and म. The substitution of phoneme क for र has produced two words quite different from each other.

The total number of English phonemes is just over 40, the exact number depending on particular speaker. These 40 sounds can be combined to produce large number of words. The number of phonemes can be determined by making a series of substitutions in English words, like the change made to convert hit into hid. For instance in the series of words "hid, heed, had, head,—" the first and the last phonemes are the same in each word, whereas the middle phoneme is different in each word. These middle phonemes are the vowel phonemes. Not all English vowels can occur between h and d, but by taking other series into account the total number of English vowels has been found to be about 20. The number of vowels is dependent upon pronunciation of the speaker, *e.g.* an English man who thinks of two different vowel phonemes in the words 'gas' and 'mask' will have one more vowel sound in his total than the one who pronounces the word with the same vowel phoneme. In Hindi

there are just over 56 sounds which can be combined to form different words, and of these 17 are vowel phonemes (11 pure vowels and 4 diphthongs) and the rest consonant phonemes. The consonant phonemes can be determined by similar substitutions in the initial and final positions in the words of the type, "bit, kit, sit—; राम, काम, दाम, नाम—and so on.

The knowledge of these units, (*i.e.* vowel and consonant phonemes) the way in which they combine, and the statistics of their combination is stored in the memory of every speaker and listener and is the result of auditory experience. When we realise that we do not have to hear all of what is said, much of it is guess work, the need of a test material for speech audiometry in the mother tongue of the listener at once becomes apparent, because auditory experience in one's mother tongue always exceeds that of any other language acquired later in life.

Test materials used in Speech Audiometry are :—

- (i) Word articulation tests.
- (ii) Sentence articulation tests.
- (iii) Sound articulation tests.

(1) *Word articulation tests.*—The words chosen for articulation tests must be very common ones and ought, strictly to be selected on the basis of a count of the words which occur in current speech. Since the otologists have to deal with patients of very different ages of varying degrees of intelligence, the vocabulary should be restricted to words in every day use, and should be within the intellectual range of the patients. There should be proportional representation in each test list of fundamental speech sounds. The words used in articulation tests may be :—

- (a) Spondees or Disyllables.
- (b) Phonetically balanced words.

(a) *Spondee word list.*—‘Spondee’ is a two syllable word having two syllables equally accented. ‘Spondees’ constitute an ‘easy’ speech material on account of the contextual clues they afford. Hence they are not reliable in cases of perceptive or mixed deafness where there remains some practical hearing at 500, 1,000 and 2,000 c.p.s. on A.C. Pure-Tone Audiograms, because, given sufficient amplification, they can be easily repeated. They are good for determining the threshold of speech intelligibility.

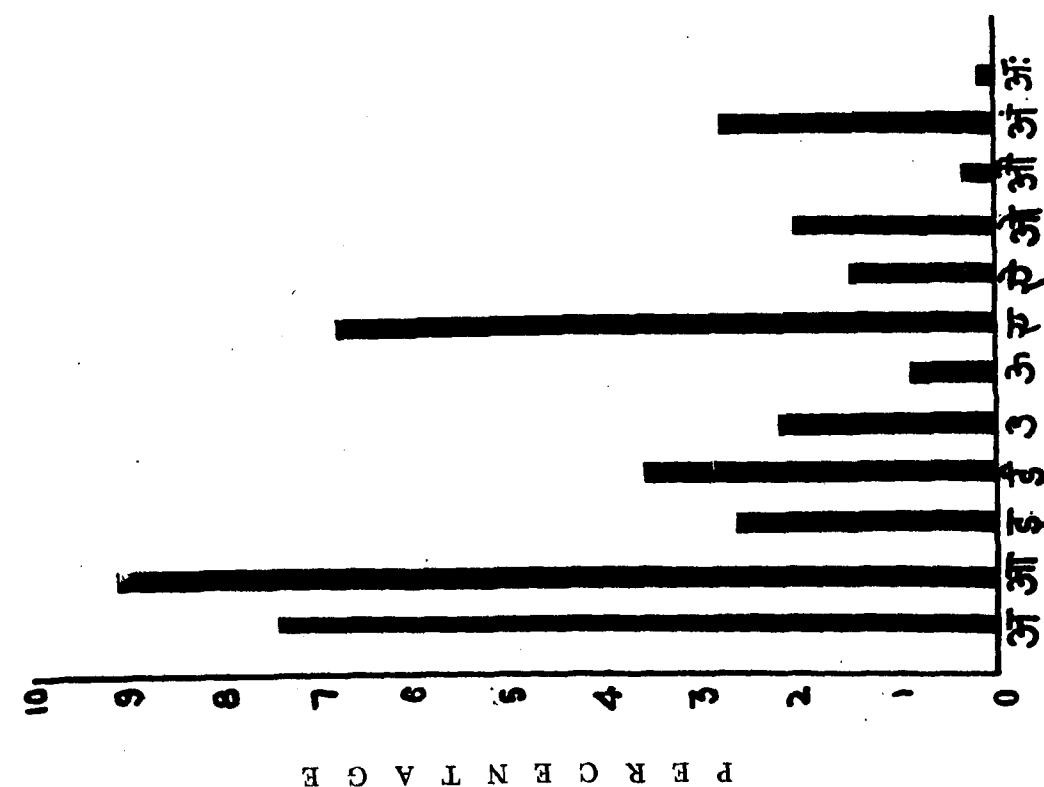
(b) *Phonetically balanced words list.*—Phonetically balanced words are the words which ‘spot check’ the speech in any language system by being phonetically balanced, i.e. each list contains in miniature not only the common sounds of every day speech, but also the proportional representation of such sounds in terms of commonness of their use. They have a more difficult intelligibility because they consist of relatively intense lower frequency vowel sounds and much weaker higher frequency consonants. The short carefully selected phonetic content limits the listener’s cues in such a manner that discrimination is largely dependent upon the ability to hear weaker consonant sounds. Consequently, they are very reliable test material in perceptive deafness where their discrimination is markedly depressed.

(2) *Sentence articulation test.*—Here a patient is made to hear a series of simple isolated sentences of the type “the King ruled the country”. Unfortunately even with 25 sentence list, it takes a long time to perform the test, moreover it has been shown by Fry that there is a close co-relation of ‘word’ and ‘sound articulation’ with ‘sentence articulation’ test. The test therefore is discarded in favour of ‘word’ and ‘sound articulation tests’—its use is only restricted in very deaf patients who may not score when listening to isolated words.

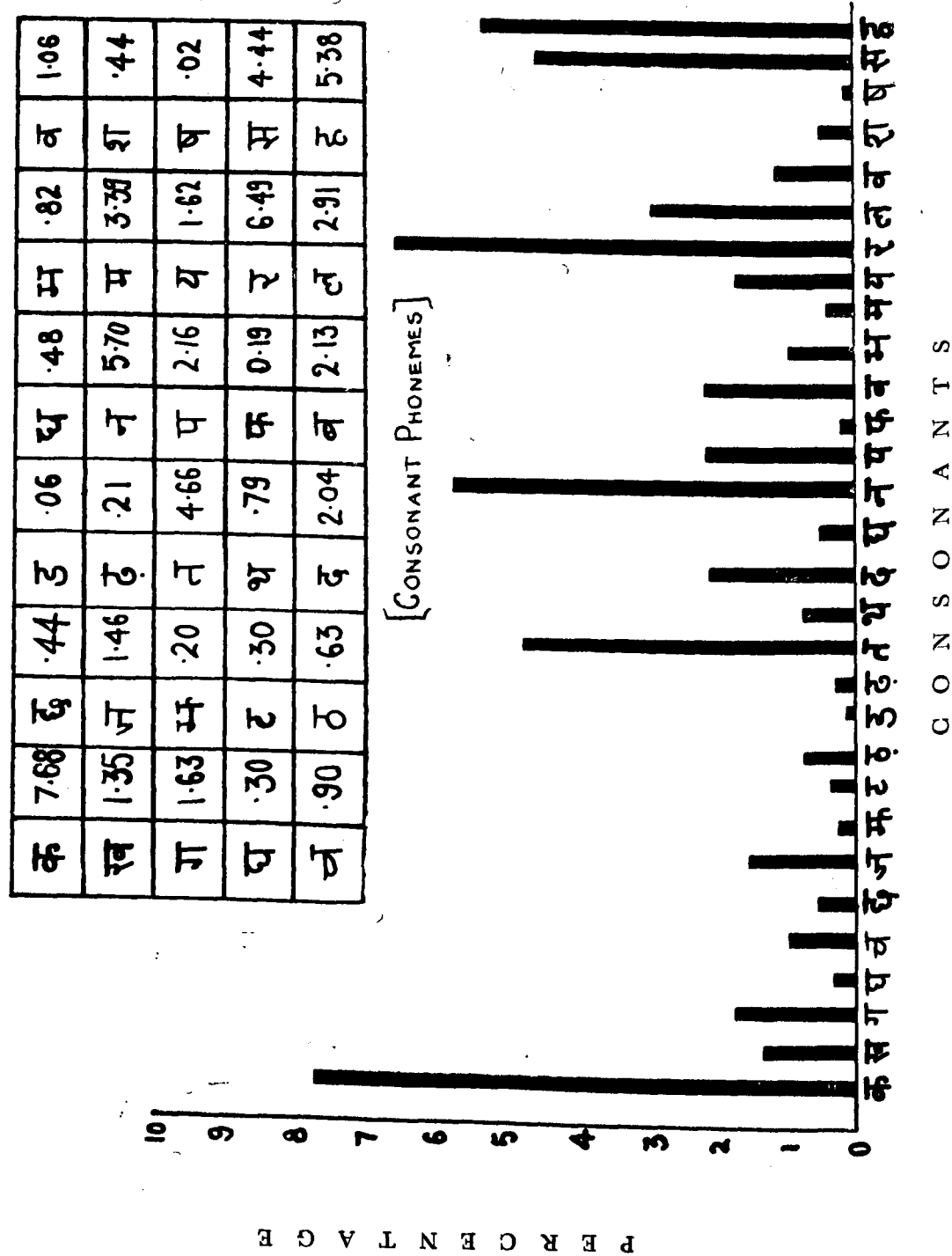
GRAPH 1

अ	आ	इ	ई	उ	ऊ
7.50	9.20	2.76	3.68	2.30	.82
र	रे	ओ	औ	अं	अः
6.80	1.51	2.01	.35	2.85	.15

PHONETIC FREQUENCY DISTRIBUTION COUNT OF HINDI SPEECH SOUNDS
[VOWEL PHONEMES]



GRAPH 2



(3) *Sound articulation tests.*—The word list is similar to P.B. word list, but method of scoring is different. In word test each word is marked right or wrong and scores one point. In sound test, every sound in the word scores one point. Thus in the word काम one mark each is for the two consonant sounds क and म and one for the vowel sounds अ. In addition one mark is given if the patient hears the word at all *i.e.* a total of 4 marks to a word. Thus if the patient says कान for काम - he scores 3 points, दान - 2 points, बोल - 1 point. Advantage of the test is that 100 test items namely speech sounds can be administered to a patient in a short list of 25 words thereby affecting the saving of time and the direct reading of percentage score. Another advantage of this test is that it provides direct information from the patient's responses on his ability to hear high, medium, or low frequency components, which in turn is useful in deciding the type of hearing aid best suitable for him.

Choice of test material.—The Hindi words chosen for articulation tests in the present work are 'spondees', and have been selected strictly on the basis of commonness of their occurrence in current speech. Their vocabulary has been restricted to words in every day use and to suit patients of varying ages and intelligence. There is a proportional representation of fundamental speech sounds (*i.e.* vowel and consonant phonemes). We have prepared the following phonetic frequency distribution count of Hindi speech sounds in ordinary simple Hindi speech (Graph 1 and 2). In these graphs the average number of occurrences of every speech sound is expressed as percentage of total number of 1,000,000 sounds occurring in the simple sentences selected from the Hindi Primers. The count is based on similar data in English language given by Voelkar (1935) from a total of 666,594, sounds in American speech. The phonetic content of our word list is based on the above frequency distribution count of Hindi vowel and consonant phonemes as they occur in the simple Hindi speech.

Standardisation of the test material.—Standardisation was done by testing 100 subjects whose hearing was normal. The normal subjects were selected from amongst medical students who had following points in common :—

- (1) Family history of deafness, Past history of any discharge from the ear, any prolonged fever, or drug administration such as Quinine, Streptomycin etc. were negative in all of them.
- (2) Otoscopic examination was negative for any wax in the ext. aud. meatus, any abnormality of the tympanic membrane etc.
- (3) Eustachian tubes were patent.
- (4) Whisper and Conversation tests were not less than 15 ft.
- (5) Rinne' test was positive.
- (6) Air conduction, as tested by the tuning forks of 256, 512 and 1024 c.p.s. was nearly equal in duration to that of the tester.
- (7) Absolute bone conduction was not noticeably shortened or prolonged for any of the three tuning forks.
- (8) Average loss for pure tones was not more than 20 decibels.
- (9) Masking noise of 10 decibels was used at all levels in the opposite ear.
- (10) All had good command over English language and were accustomed to see the English pictures and therefore conversant with English accent.

The subjects were divided into groups of 10, each group hearing the test words at fixed intensity. Estimates were made in 5 decibel steps from 15 db. above 0 decibel. Articulation

score was plotted against intensity. Each person listened to only one list of words. About 90 words (disyllables) were initially selected. They were administered to the 100 normal ears through the microphone of our Amplivox audiometer incorporating voice level meter, so that the live voice intensity could be monitored by the speaker and maintained at a constant level. A consistent method of pronunciation and intonation was adopted in all these utterances. The tests were made in a sound treated room which housed the subject tester and the apparatus. After discarding the words of consistently difficult intelligibility and consistently easy intelligibility, following list of 40 words was obtained which is of uniform intelligibility and homogeneity with respect to basic audibility. It has been scrambled into different lists of equal difficulty.

Table No. 2

Hindi Spondee word list No. 1 (A).

1. Mat-Dar.	21. Khar-Cha.
2. Khat-Pat.	22. Jhat-Ka.
3. Jhat-Ka.	23. Mut-Ka.
4. Hal-Chal.	24. Mut-Lub.
5. Tus-Mus.	25. Dal-Chawal.
6. Mut-Phir.	26. Kut-Ta.
7. Kur-Ta.	27. Shak-Kar.
8. Sar-Son.	28. Khat-Mul.
9. Har-Kat.	29. Bat-Ti.
10. Lar-Ka.	30. Bar-Gad.
11. Cham-Cha.	31. Par-So.
12. Pee-Pal.	32. Char-Cha.
13. Bis-Cuit.	33. Nat-Khat.
14. Char-Kha.	34. Tin-Ka.
15. Aj-Gar.	35. Ham-Sub.
16. Mir-Cha.	36. Sur-Put.
17. Lar-Ki.	37. Tum-Tum.
18. Gar-Bar.	38. Luck-Now.
19. Kan-Pur.	39. Kul-Chul.
20. Chan-Chal.	40. Bus-Kar.

The results of standardisation are shown in the following table :—

Table No. 3

No.	Intensity in db.	Average percent articulation score
1	15	4.8
2	20	15
3	25	55.6
4	30	66.7
5	35	80
6	40	96.4
7	45	100
8	50	100
9	55	100
10	60	100

The Technique of recording of test material.—The selected word list was then transferred on a tape at the All-India Radio Studios Lucknow. The tape recording was done at a speed of 15 inches per second. The zero adjustment for each tape recording was determined by calibrating the sound pressure level in terms of 1000 cycle reference tone incorporated in the beginning of each word list. The method of uttering the test words was same as was done in the case of initial standardisation. Male voice was used.* The tape recorded material was finally transferred on the gramophone discs (78 r. p. m.) by M/s. Hindustan Recording Company, Benaras, who were kind enough to give us two records free of cost. The records have low surface noise and conform to C. S. I. R. standards.

SUMMARY

A brief account of evolution of Hindi test material for speech audiometry is presented. The Hindi word list, its method of standardisation on 100 normal ears is described. Phonetic frequency distribution count of Hindi speech sound has been graphically shown.

*Male voice used for recording is of O. P. G.

ACKNOWLEDGEMENTS

The authors are grateful to the following :—

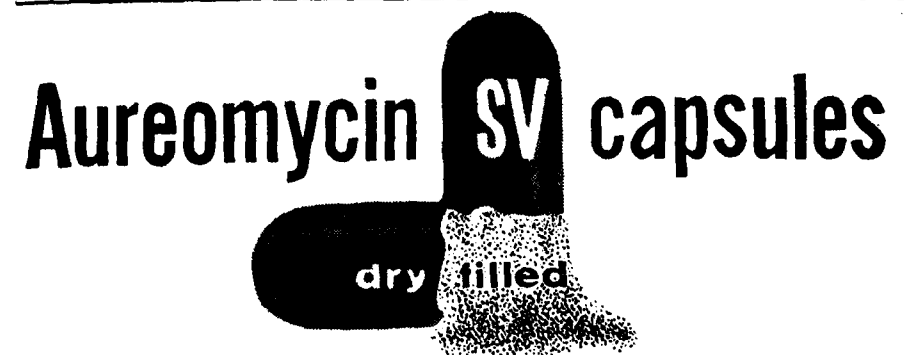
(1) Indian Council of Medical Research—for granting financial assistance to the scheme “Investigations of hearing in the deaf by means of the speech—audiometer with particular view to evolve a set of test words in Hindi”.

(2) Mr. D. D. Sarin, Engineer, Incharge, A. I. R. Lucknow, for the recording facilities in the Studios of the A. I. R. and helpful suggestions on acoustic of speech sounds.

(3) Mr. J. C. Arora, Proprietor, Star Hindustan Record Co., for the excellent gramophone records of the Hindi test material evolved by us.

REFERENCES

1. Fry B. B.: Speech and Language, J. L. O., 1957, 434.
2. Watkyn Thomas: Diseases of the Throat, Nose and Ear, H. K. Lewis & Co., 1953, p. 551.



- ... Each capsule is dry filled with powdered ingredients.
- ... Dry filled capsules are rapidly and completely absorbed.
- ... Contain no oily or pasty filling.
- ... Each capsule completely sealed.

A LEDERLE EXCLUSIVE

AUREOMYCIN* SV provides, in a single dose, potent anti-infective action plus nutritional supplementation to hasten recovery and convalescence.

AUREOMYCIN SV capsules available in bottles of 8's and 50's

*Reg. Trade Mark.

Each capsule contains:

Chlortetracycline Hydrochloride250 mg.
 Ascorbic Acid (C), U.S.P.75 mg.
 Thiamine Mononitrate (B₁), U.S.P.2.5 mg.
 Riboflavin (B₂), U.S.P.2.5 mg.
 Niacinamide, U.S.P.25 mg.
 Folic Acid, U.S.P.0.375 mg.
 Pyridoxine HCl (B₆)0.5 mg.
 Calcium Pantothenate5.0 mg.
 Vitamin K (Menadione), U.S.P.0.5 mg.
 Vitamin B₁₂1 mcgm.
 (as present in concentrated extracts from streptomyces fermentation)

LEDERLE LABORATORIES (INDIA) PRIVATE LIMITED, P. O. BOX 1994, BOMBAY 1

Palatograms of Hindi Speech Sounds

BY

Dr. O. P. GUPTA, M.S. (E.N.T.), D.O.

AND

Prof. R. N. MISRA, M.S., D.L.O. (Lond.),

Department of Otolaryngology, K. G. Medical College, Lucknow.

INTRODUCTION

All speech sounds in any language belong to one or other of the two main classes—vowels and consonants. A vowel (स्वर) in normal speech is defined as a voiced sound in the production of which the air issues in a continuous stream through the pharynx and mouth, there being no obstruction and no narrowing such as would cause an audible friction—the air channel above the larynx being always wide open. Consonants (व्यंजन) on the other hand, are the speech sounds in the production of which air channel above the larynx is relatively narrow or momentarily obstructed. This narrowing or momentary obstruction resulting in articulation of these consonants is affected by the movements of tongue, palate and lips (Fig. 1).

Palatograms are drawings showing the parts of the roof of the mouth with which the tongue makes contact in pronouncing these sounds. This was done by means of artificial palate* (Fig. 2). It was used as follows. The underside of the palate was first covered with a little powdered chalk from powder sprayer and inserted into the mouth. A Hindi sound was then pronounced and palate withdrawn. The parts of the palate from which chalk was removed were projected on the outline diagrams of the palate to give palatograms of different Hindi sounds, and some of them are shown in the figures below (Fig. 3).

* O. P. G. got his own artificial palate made at the Dental College & Hospital, K. G. Medical College, Lucknow.

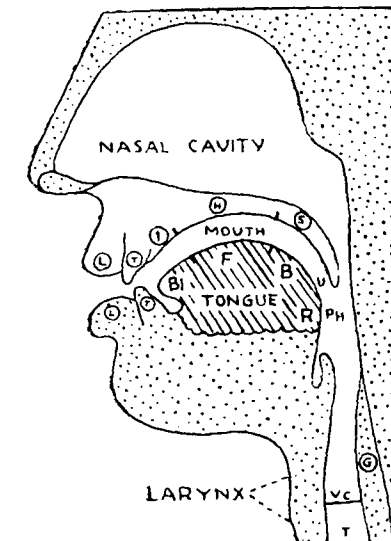


Fig. 1
(Showing places of articulation).

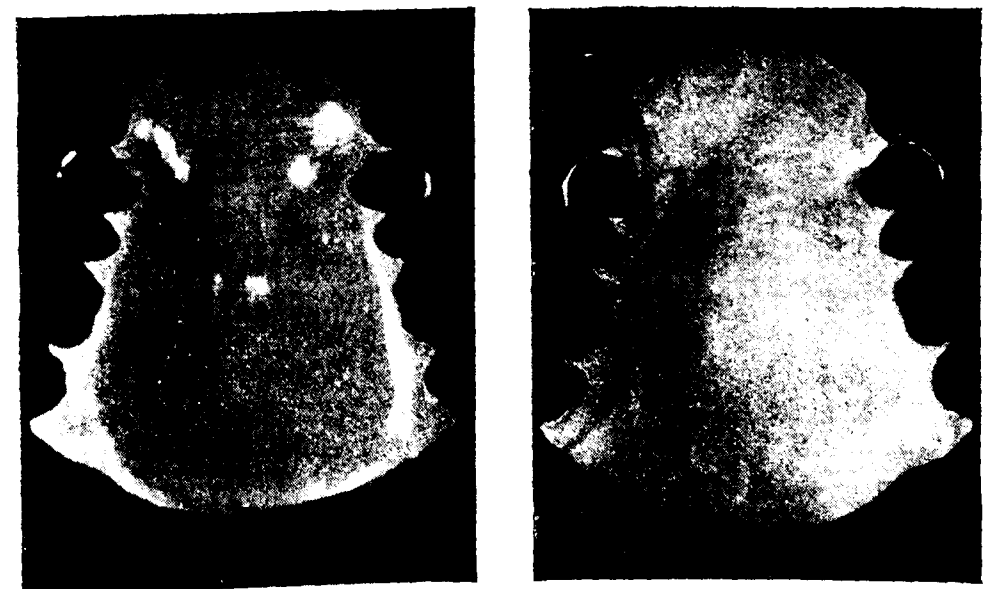


Fig. 2
(Photograph of Artificial Palate).
(a) Under surface. (b) Upper surface.

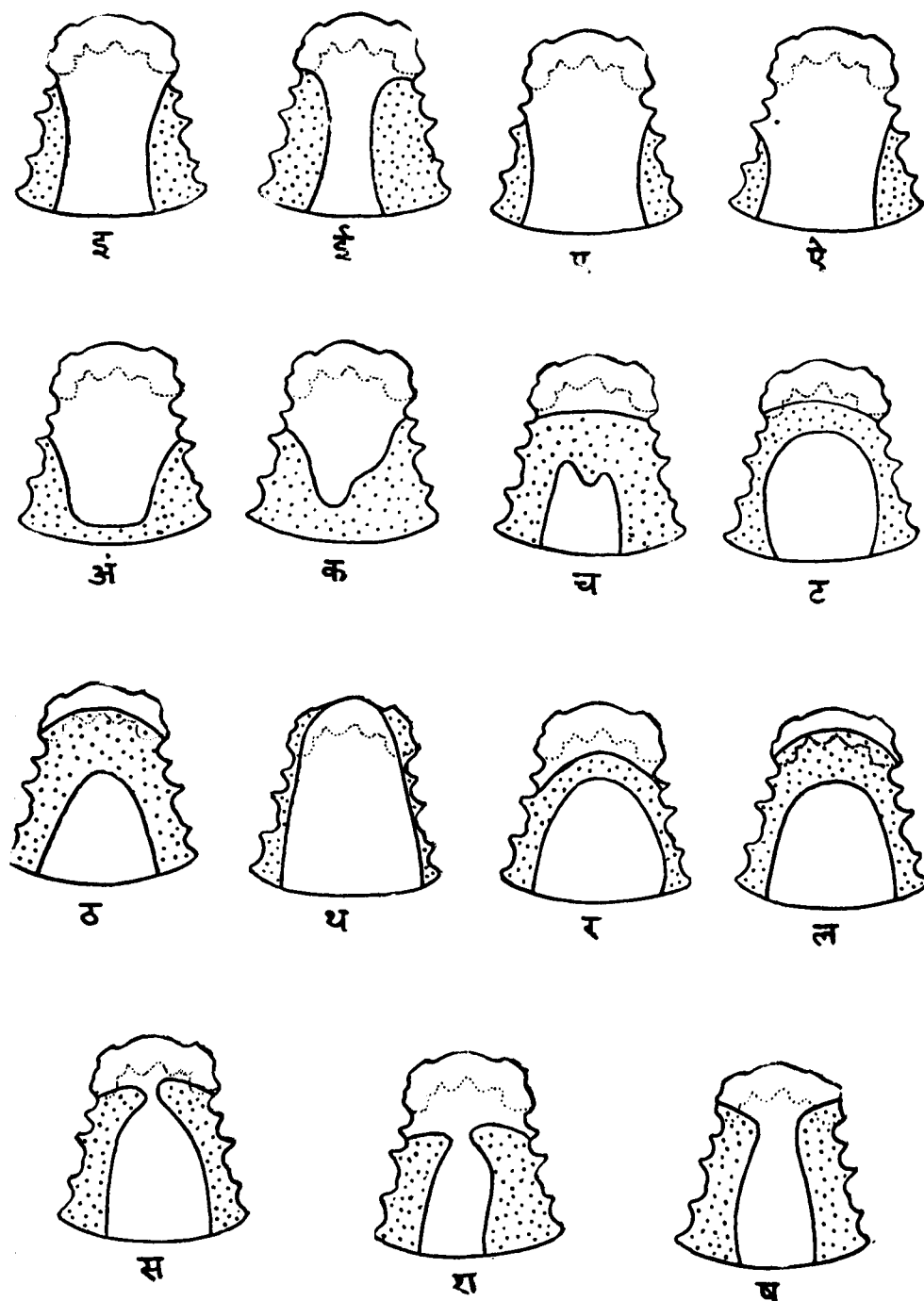


Fig. 3

(Palatograms of Hindi speech sounds).

Utility of these Palatograms.—Is in diagnosis, prognosis, and therapeutics. They should prove of immense value in assessing and analysing the speech defects of cleft palate cases and cases of hypernasality due to congenital or acquired shortening of the soft palate, and likewise will be of great help in knowing the prognosis of the various corrective procedures adopted to treat these cases, viz. Surgery, plastic prosthesis, and blowing and sucking exercises (e.g. playing mouth organ) to improve the tone of palatal muscles. To dentists they can afford valuable information in assessing the handicap of patient's speech after fitting of artificial denture subsequent to teeth extraction and obturators after maxillectomy operation, thus helping him to minimise the speech defects so produced by suitable alterations in the denture and obturators.

In correcting the speech defects (speech therapy) they provide a means of visual aid to the patients who by seeing the palatogram of a particular speech sound can be trained to approximate his tongue with the palate at the same place as is shown in the palatogram and thus helping him in the proper articulation of the defective speech sounds.

We hope that these Hindi palatograms will be utilised for the purpose outlined above, and will be found useful by E. N. T. and Plastic Surgeons of India.

ACKNOWLEDGEMENTS

The authors are grateful to Dr. K. P. Choudhary, B.D.S. (Hons.), L.D.S. (R.C.S., Eng.), Reader in Dental College, K. G. Medical College, Lucknow, for supplying the artificial palate and stimulating suggestions on palatograms.

A case of an Adamantinoma of the upper jaw

BY

S. N. JAIN, M.S., Hyderabad.

Adamantinoma is commonly associated with Mandible. Occasionally cases have been reported in relation to superior maxilla, pituitary region and Tibia. Robinson (1937) and Mosher (1944) have recorded 80% cases in the mandible and in a series of 58 cases reported by Havens (1939) only five cases were found in maxilla. Handousa (1951) has reported only fourteen cases from his mature experience in a centrally located and well attended Hospital at Cairo.

The term Adamantinoma is misleading as tumour never forms enamel. Robinson has suggested the term "Ameloblastoma" to indicate its origin from enamel forming cell, the ameloblast. Havens thinks that this tumour arises from para-dental debris while others believe it to arise from cells of primitive enamel organ.

It is commonly seen in females and is painless. It may be solid or cystic. But cystic ones are likely to be mistaken with cysts of Dental origin as happened in the case reported. Trauma is supposed to make the rate of growth quicker. Coarse honey combing on x-ray is supposed to be typical of adamantinoma.

Recurrences are common after incomplete removal but metastasis is rare.

Histological picture varies so greatly in different parts that Handousa strongly recommends against relying on punch and aspiration biopsies.

Mrs. P. 40 year old Hindu, female, was admitted to the Sarojini Hospital on 7-9-59 with a history of the gradual increasing swelling of the right cheek, painless, for over



Fig. 1-a

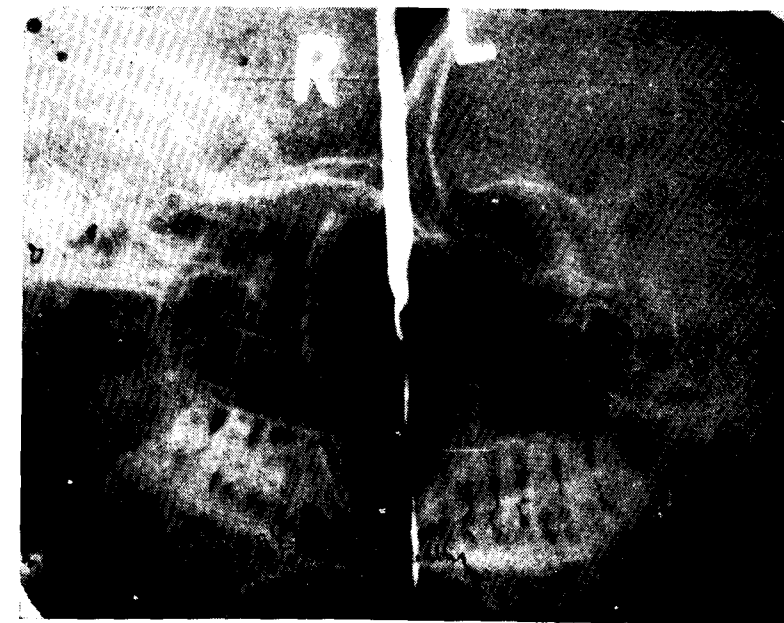


Fig. 1-b

Fig. 1 (a & b). X-rays of the nasal sinuses. A. P. and Lateral views.

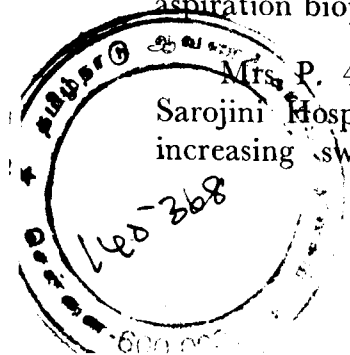




Fig. 2
Histological section.



Fig. 3
Post operative photograph of the patient with the prosthesis *in situ*.

four years. There was no history of nosebleeds. This was operated at other hospital before one year with the following notes: "Under local anaesthesia sublabial incision taken and cyst wall separated from the cheek. The anterior wall of the cyst excised and the posterior wall scraped. The cyst appeared filled with fluid which came out after sublabial incision. The posterior part of the cyst spongy. No communication with the antrum noted. The spongy wall removed for biopsy, antrum entered and scraped, antrum cavity very small, packed with gauze". Biopsy report was not available.

On examination there was an uniform swelling of the right upper jaw. Skin over it was freely mobile. There was no proptosis. All the teeth were intact. The lateral wall of the nose was pushed medially. There was fullness of the palate on the right side with impaired mobility. Sublabial scar could be seen and also the bulging of the alveolar margin. Following investigations were done: Blood Kahn reaction: negative. Blood E. S. R. 20 and 28 mm. Blood group B. Screening of the chest normal. Xray nasal sinuses (Fig. 1) shows partial destruction of the maxillary sinus with coarse trabecula superimposing the area. Examination of the eyes, nil abnormal.

Under gas and oxygen anaesthesia pharynx was packed and the tumour was exposed of Moores lateral rhinotomy incision, with extension below the lower eyelid. Maxilla was excised with the growth. Zygomatic process was also included in the removed piece. Pterigoid plate was not involved. The cavity was packed with tape soaked in Bipp and skin sutured. This pack was reinserted after one week and completely removed in a fortnight. Dentures were fitted at this time.

Biopsy report was as Follows (Fig. 2).

The histological sections examined show an epithelial neoplasm in which the cells are arranged in islands, strands and columns with intervening connective tissue. The epithelial elements are composed of stallete cells anastomosing with each other bounded peripherally by imperfectly columnar cells

145368

JL

483: 422, 01422
N60.12.4

arranged in a pallisading manner. Degenerative changes have resulted in many cystic spaces. These features are suggestive of an Adamantinoma.

Post operatively patient had an oedema of the lower lid which was thought due to cutting of the lymphatics in the incision. This responded well to *infra* red therapy and (Fig. 3) shows the patient with prosthesis *in situ*.

ACKNOWLEDGEMENT

My thanks are due to Dr. P. Ramchander, Superintendent, Sarojini Devi Hospital and Dr. S. S. Dounde, senior Honorary E. N. T. Surgeon under whose side this patient was treated for permission to report this case. Drs. Kathirvelu and O. M. Satyendran helped me with radiological and pathological aspects respectively.

REFERENCES

1. Handousa, A. B. (1951): Journ. of Laryngology, Vol. 65, p. 715.
2. Havens, F. Z. (1939): Arch. Otolaryng., Vol. 30, p. 762.
3. Mosher, W. F. (1944): Arch. Otolaryng., Vol. 40, p. 61.
4. Robinson, H. B. G. (1937): Arch. Path. Vol. 23, p. 831.

New! CORTOLA-m

Sodium Sulphacetamide—10% Hydrocortisone—1%
in 3 c.c. dropper bottles

An worthy successor to:

CORTOLA

Sodium Sulphacetamide—30% Hydrocortisone—1%
in 3 c.c. dropper bottles

For prompt control of allergy, inflammation tissue damage, and eradication of causative bacteria in Diseases of the External Eye and the Anterior Chamber.

★

East India Pharmaceutical Works Ltd.
CALCUTTA-26

Association Notes

The next annual meeting of the General body of the Association of Otolaryngologists of India will be held on Sunday 5th February 1961 at Bangalore at 9-30 a.m.

AGENDA

1. Minutes of the meeting held on 6th January 1960 at Medical College Baroda.
2. Honorary Secretary's report.
3. Honorary Treasurer's report.
4. The Editor's report.
5. Acceptance of new members.
6. Election of President.
7. Election of President elect as per new Constitution.
8. Election of Honorary General Secretary.
9. Election of Honorary Treasurer.
10. Nomination of Honorary Associate Secretary by the President.
11. Election of three members to the Governing body.
12. Venue of the next annual Conference.
13. Vote of thanks to :
 - (a) Chairman of the reception Committee.
 - (b) Members of the reception Committee.
 - (c) The various pharmaceutical concerns for their Co-operation.
 - (d) Auditors Messrs. Bhansali and Mehta.
 - (e) Auditors Messrs. K. John & Co., auditors for the journal account.
 - (f) Railway board and particularly to the Deputy Director Mr. Sri Raman.
14. Nomination of Messrs. Bhansali and Mehta as auditors for the year 1961.
15. Nomination of Messrs. K. John & Co., as auditors for the journal account for year 1961.
16. Report of the Committee appointed to look into the standardisation and sale of hearing aids audiometers and otoscope etc.
17. Election of Founder members for the All India Academy.
18. Subject of Symposium.
19. Any other business with the permission of the Chair.
20. Vote of thanks to the President.

Dr. R. A. F. COOPER,
Hon. Secretary.

NOTE:—Concession forms have been posted to every member under certificate of posting by the Honorary Secretary Dr. R. A. F. Cooper, but in case someone has not received, please write to Dr. R. A. F. Cooper, Naosari Building, Dadabhoy Naoroji Road, Bombay-1.

**THE THIRTEENTH ANNUAL CONFERENCE OF THE
OTOLARYNGOLOGISTS OF INDIA**

BANGALORE 1961

The following is the tentative programme for the Conference.

2nd Feb. 1961	6-00 to 7-00 p.m.	Governing Council meeting.
"	8-00 p.m.	Dinner (at Shilton or Central Hotel).
3rd Feb. 1961	8-00 to 9-00 a.m.	Registration of delegates.
"	9-15 a.m.	Group Photo.
"	9-30 a.m.	Inauguration of the Conference by Governor or Chief Minister (We are expecting letter from the Governor of Mysore for interview to fix up detail by 17th January 1961).
"	10-30 a.m.	Opening of Exhibition by the Health Minister.
"	11-00 a.m.	Joshi Memorial Lecture (All this will be in the Bangalore Medical College Auditorium).
"	1-00 p.m.	Lunch.
"	1-45 p.m.	Inauguration of Scientific Session by the Director of Medical Services in Mysore, Bangalore.
"	2-00 p.m.	Symposium on Paralysis of Facial nerve.
"	4-00 p.m.	Tea.
"	5-00 p.m.	Lecture on Auditory Function by Sir C. V. Raman in the Raman Institute. Delegates will be taken by the Conference conveyance.
"	6-00 to 8-00 p.m.	Rest or sight seeing.
"	8-30 p.m.	President's Dinner with variety entertainment.
4th Feb. 1961	9-00 to 12-30 p.m.	Scientific Session.
"	12-30 to 1-30 p.m.	Lunch.
"	1-30 to 4-30 p.m.	Scientific Session (List of names enclosed).
"	4-30 p.m.	Tea and (sight seeing later).
"	8-30 p.m.	Dinner and Entertainments.
5th Feb. 1961	9-00 to 12-30 p.m.	General Body Meeting.
"	1-00 p.m.	(i) Lunch 2 p.m.—Break of Arrangements. (ii) Trip to Mysore and other places if desired.

T. MANICKAM,
Conference Secretary.

**Names of delegates who are reading papers in the Conference
to be held on 3rd, 4th & 5th Feb. 1961.**

1.	Dr. T. Manickam	...	Otogenic Brain Abscess	15 Mts.
2.	" N. K. Apte	...	"Foreign bodies as operative"	10 "
3.	" J. V. De Sa	...	"Endolaryngeal Arytenoi- dectomy for Bilateral abductor paralysis"	15 "
4.	" V. S. Subramanian	...	"Shea's fenestration of oval window....."	10 "
5.	" A. B. Narayana Rao	...		
6.	" H. L. Anand	...	(1) "Veingraft Stapes Surgery for Otoscle- rosis" (2) "Cadavar Operation specimens for view under the Micros- cope"	10 "
7.	" G. Lakshmipathi	...	"Chorion Epithelioma in Nose"	15 "
8.	" A. Sinha	...	"Fibrous dysplasia of facial bones"	20 "
9.	" M. M. Nath	...	"Part in Symposium"	
10.	" R. V. Rao	...	"Fluorosis and VIII Nerve"	
11.	" B. P. Apte	...	"In symposium on Facial Pary pathology aspect"	
12.	" D. L. Changanani	...	"Maiden attempt for Sur- gery of Pharyngolaryn- geal cancer"	15 "
13.	" Daryao Singh	...	"Medicine in Australia"	25 "
14.	" O. P. Gupta	...	"The significance of pho- netics of speech to the Otolaryngologists"	15 "
15.	" P. Rama Raju	...	"Progress in Audiology"	15 "
16.	" S. N. Jain	...	"Some aspects of Endos- copy"	15 "
17.	" M. L. Bhatia	...	"Conservative treatment of deafness caused by adhesive otitis media"	15 "
18.	" Chandra	...	"Cancer cheek"	15 "
19.	" Rajendra Nath Misra...		"Observation on masking"	15 "
20.	" P. R. Kulkarni	...	"Fractures of face"	20 "
21.	" W. G. Atre	...	"Cosmetic Rhinoplasty"— 16 mm. film silent—450 ft.	

T. MANICKAM,
Conference Secretary.

PRESS NOTE

Subject.—Beit Memorial Fellowship for Medical Research.

The Beit Memorial Fellowships to promote the advancement by research of medicine and allied sciences in their relation to medicine are available to Indian nationals. The next election of junior fellows for the award of such fellowships will take place in May, 1961. Junior Fellowships have successive values of £ 900, £ 950 and £ 1,000 for three years. As a rule, superannuation benefits are provided, to which the successful candidates will be required to contribute 5% of the annual stipend and to which the Trust will make a contribution of 10 per cent. Candidates must have taken a degree in a faculty of a University approved by the Trustees in Her Majesty's Dominions, Protectorates and Mandated Territories, India, Pakistan and the Republic of Ireland, or a medical diploma registrable in the United Kingdom. Elections to Junior fellowships are rarely made above the age of thirty-five years. Applications from candidates must be received not later than the 1st February, 1961. Candidates must submit evidence that they can be given accommodation in the Departments where they propose to work, which must be either in Great Britain or Ireland. Forms of applications and other detailed information may be obtained from the Secretary to the Government of India, Ministry of Health, New Delhi.

ANNOUNCEMENT

HANS VON LEDEN, M.D.

30, N. Michigan Avenue, Chicago 2, Illinois

ANDOVER 3-2999

December 12, 1960

The William and Harriet Gould Foundation announces the winner of the Gould Award for 1960: Dr. Janwillem van den Berg of the University of Groningen in The Netherlands. The Award was presented to Dr. van den Berg in recognition of his contributions to laryngeal physiology.

The Gould Award is presented annually for outstanding contributions to basic laryngeal research. The candidate is selected by an International Committee, which at present consists of Professor Cotoji Satta, M.D., Tokyo, Professor Dr. Luzius Ruedi, Zurich, Professeur Georges Portmann, Bordeaux, and Dr. Hans von Leden, Medical Director, 30 North Michigan Avenue, Chicago 2, Illinois.

The Award includes an illuminated plaque and a cash prize of \$ 350.

UNI U. C. B. (India) Prvt. Ltd.

22, BHULABHAI DESAI ROAD

BOMBAY-26



ATARAX

(Hydroxyzine Hcl.)

A mild tranquillizer without
side reactions

Now available Tabs. of
10 mg. and 25 mg. also
available in Syrup and Drops

LONGIFENE

(Bucizine Hydrochloride 25 mg.)

A long acting potent
Antihistaminic
(for Rhinitis and Pruritus)

Now available
Tablets

For further particulars, please contact:

M/s. GANAPATHY & Co.

103/104, Linghi Chetty Street

MADRAS-1

