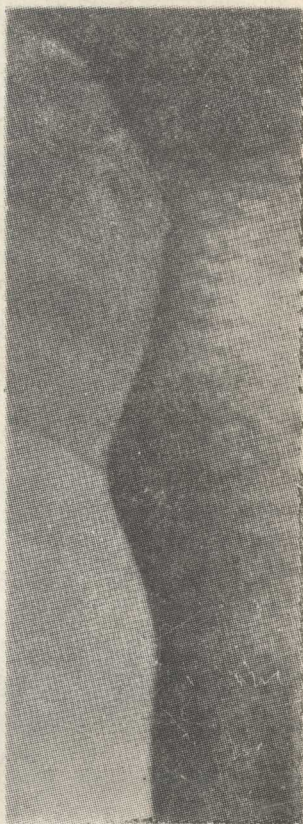
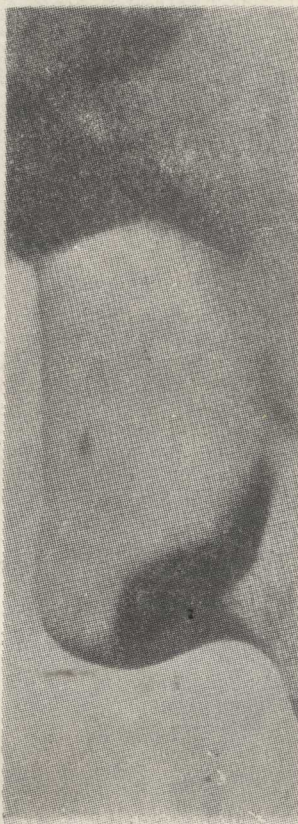


**E. H. Miles Foxen**  
**Lecture Notes on**  
**Diseases of**  
**the Ear Nose**  
**and Throat**

Fifth edition



NOTES ON  
DISEASES OF THE EAR  
NOSE AND THROAT

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FIFTH EDITION



BLACKWELL SCIENTIFIC PUBLICATIONS

OXFORD LONDON EDINBURGH

BOSTON MELBOURNE

© 1961, 1968, 1972, 1976, 1980 by  
Blackwell Scientific Publications  
Editorial offices:  
Osney Mead, Oxford, OX2 0EL  
8 John Street, London, WC1N 2ES  
9 Forrest Road, Edinburgh, EH1 2QH  
52 Beacon Street, Boston,  
Massachusetts 02108, USA  
214 Berkeley Street, Carlton,  
Victoria 3053, Australia

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First published 1961  
Reprinted 1962, 1965, 1967  
Second edition 1968  
Reprinted 1970, 1971  
Third edition 1972  
Reprinted 1975  
Fourth edition 1976  
Reprinted 1978  
Fifth edition 1980

Printed and bound in Great Britain  
at the Alden Press, Oxford.

DISTRIBUTORS

USA

Blackwell Mosby Book Distributors  
11830 Westline Industrial Drive  
St Louis, Missouri 63141

Canada

Blackwell Mosby Book Distributors  
120 Melford Drive, Scarborough  
Ontario, M1B 2X4

Australia

Blackwell Scientific Book  
Distributors  
214 Berkeley Street, Carlton  
Victoria 3053

British Library  
Cataloguing in Publication Data

Foxen, Eric Harry Miles  
Lecture notes on diseases of the ear, nose  
and throat.—5th ed.  
1. Otolaryngology  
I. Title  
616.2'1      RF46

ISBN 0-632-00652-8

## PREFACE TO FIFTH EDITION

ALTHOUGH the fourth edition has been thoroughly revised, the object of this book remains the same—to act as a guide to beginners by laying emphasis on important conditions and on the principles of otolaryngological practice.

Even during the last four or five years enormous advances have been made in the field of audiology, and although much of this particular discipline is far beyond the scope of a small introductory book it remains a fact that the House Officer should at least be aware of what tests are available for further investigation in a particular case of deafness. For this reason the advanced methods are mentioned and the interested reader is given guidance regarding further reading in more detailed textbooks.

It might be argued that there was no point in retaining the essay questions set between the years 1958–66. Nevertheless, the author firmly believes that the best way of revising for any examination in essay or multiple choice form is to test oneself with questions which have been set previously.

Westminster Hospital, London SW1  
1980

E. H. MILES FOXEN

## PREFACE TO FIRST EDITION

THIS book is intended for the undergraduate medical student and the house officer. It is hoped that, though elementary, it will also prove of use to the general practitioner.

Many conditions encompassed within the so-called 'specialist' subjects are commonly seen in general practice, and the practitioner is therefore obliged to be familiar with them. He is not asked to perform complex aural operations, or even to be acquainted with their details, but he is expected to appreciate the significance of headache supervening in otitis media, to treat epistaxis, and to know the indications for tonsillectomy.

Emphasis has therefore been laid on conditions which are important either because they are common or because they call for investigation or early treatment. Conversely, some rare conditions and specialized techniques have received but scant attention, whilst others have been omitted, for the undergraduate should be protected from too much 'small print', which will clutter his mind, and which belongs more properly to post-graduate studies.

The study of past examination questions should be an integral part of the preparation for any examination, and students are strongly advised to 'work-up' the examination questions at the end of the book. Time spent in this occupation will certainly not be wasted, for the questions refer, in every case, to the fundamentals of the specialty.

E. H. MILES FOXEN

## ACKNOWLEDGEMENTS

I AM most grateful to Dr Peter Hansell's Department of Medical Illustrations at Westminster Hospital and Medical School for the illustrations in this book. Almost all the line drawings were executed by the late Jill Hassell. The numerous illustrations which she prepared with such ready cooperation remain a tribute to the memory of a devoted Medical Artist.

I am also grateful to Down Bros. and Mayer & Phelps Ltd who have made available certain blocks for illustration of instruments, to Alfred Peters & Sons Ltd for the photograph of their Clinic Audiometer and to Keeler Instruments Ltd for the photograph of two of their Oscopes.

I am indebted to the authorities of the Universities of Cambridge, London and Oxford, and the Committee of Management of the Examining Board in England for permission to reproduce questions which have been set in final examinations in surgery.

Finally, I must pay tribute with grateful thanks to the care and patience exercised by my secretaries, Mrs Dulcie Fletcher—who prepared the manuscript for the first edition—and Miss Wendy Kaye whose meticulous attention to detail has helped to launch subsequent editions and reprints.



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# CHAPTER 1

## THE EAR: SOME APPLIED ANATOMY

The auricle, composed of cartilage and closely adherent perichondrium and skin, is developed from six tubercles. Fistulae and accessory auricles may develop if these tubercles fail to fuse.

The external auditory meatus, about one inch in length, has a skeleton of cartilage in its outer third (where it contains hairs and ceruminous glands) and bone in its inner two-thirds. The skin of the inner part is exceedingly thin, adherent and *sensitive*. At the medial end of the meatus there is a depression, the antero-inferior recess, in which *wax, debris or foreign bodies may lodge*.

The tympanic membrane (Fig. 1) is composed of three layers, skin, fibrous tissue and mucous membrane, the middle layer being absent in the pars flaccida. The drum-head is set at an angle of  $55^{\circ}$  with the floor of the meatus, and in the infant this angle is considerably less.

The tympanic cavity, though tall (15 mm) and long antero-posteriorly (15 mm), is extremely *narrow*, the tympanic membrane being only 2 mm from the promontory, a point to bear in mind when performing myringotomy. The upper part of the cavity—the epitympanic recess—contains the head of the malleus and the body of the incus, and communicates posteriorly via the aditus with the mastoid antrum (Fig. 2). The latter

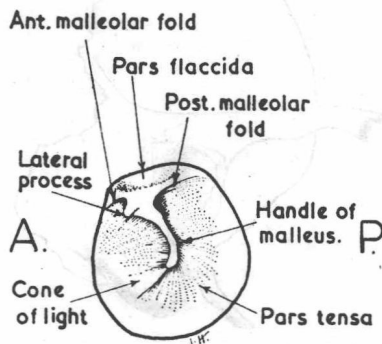


Fig. 1. The normal tympanic membrane (left).

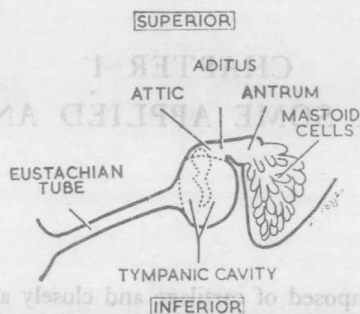


Fig. 2. The tympanic cavity showing its relationship to Eustachian tube and mastoid cells. The tympanic membrane and malleus are indicated by broken lines.

has an important surface marking on the temporal bone postero-superiorly to the external meatus. This is the **suprameatal triangle of Macewen**, which is bounded above by the posterior root of the zygoma, behind by a vertical line dropped from the zygomatic root to the posterior wall of the meatus, and anteriorly by a line joining the first two and tangential to the postero-superior meatal wall (Fig. 3).

The anatomical features of the medial wall of the tympanic cavity are crowded; lateral semicircular canal, facial nerve, oval and round windows and promontory being within a few millimetres of each other (Fig. 4). An injury of this region, therefore, is likely to have devastating results—facial paralysis, labyrinthitis, deafness, and, perhaps, meningitis.

The Eustachian tube, about one and a half inches in length, is more horizontal and relatively wider in the infant than the adult. Thus in

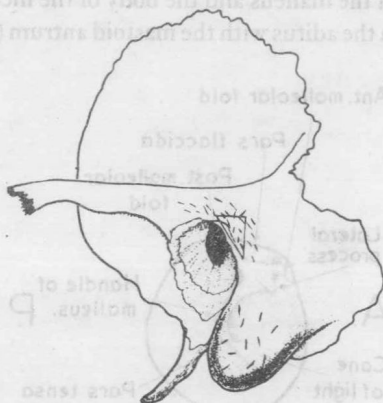


Fig. 3. The suprameatal triangle of Macewen.

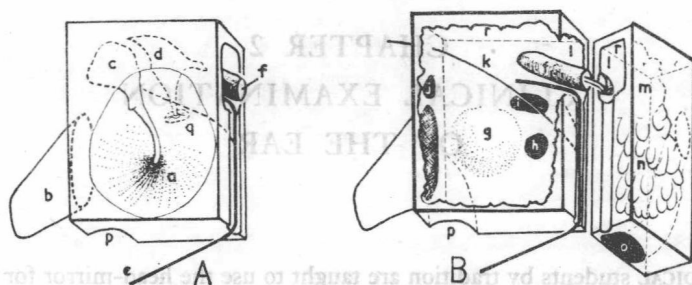


Fig. 4. Diagram of the middle ear cavity and some of its immediate relations. In A the tympanic membrane is present. In B the tympanic membrane and ossicles have been removed and the mastoid antrum and cells swung medially in order to show the relationship of facial nerve, lateral semicircular canal and aditus.

a. Tympanic membrane. b. Eustachian tube. c. Malleus. d. Incus. e. Facial nerve. f. Lateral semicircular canal. g. Promontory. h. Round window. i. Oval window. j. Canal for tensor tympani. k. Chorda tympani. l. Aditus. m. Mastoid antrum. n. Mastoid cells. o. Lateral sinus. p. Internal carotid artery. q. Stapes. r. Tegmen.

infantile gastro-enteritis vomitus can enter the tympanic cavity with ease.

The facial nerve is a subcutaneous and relatively unprotected structure in children of under two. *Post-aural incisions must be kept high* (Fig. 5).

The mastoid cells vary considerably in development. In a temporal bone they may extend into the squama, the zygoma, and along the petrous to its tip. Mastoiditis in such a bone will be extensive.

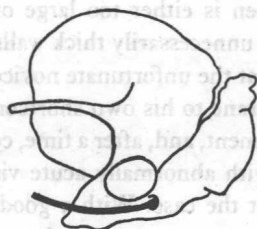


Fig. 5. The unprotected facial nerve in the infant.

## CHAPTER 2

### CLINICAL EXAMINATION OF THE EAR

MEDICAL students by tradition are taught to use the head-mirror for the clinical examination of patients attending ear, nose and throat departments. This is desirable, and with a little practice most undergraduate students acquire skill in inspecting the nose and pharynx and even the nasopharynx and larynx. But in order to interpret what he sees in the ear with the head-mirror and simple aural speculum, the average student requires not weeks but months of practice, and for this reason it is better for him to master the use of the electric otoscope (auriscope) from the outset, for this is the instrument he will probably use in general practice (Fig. 6).

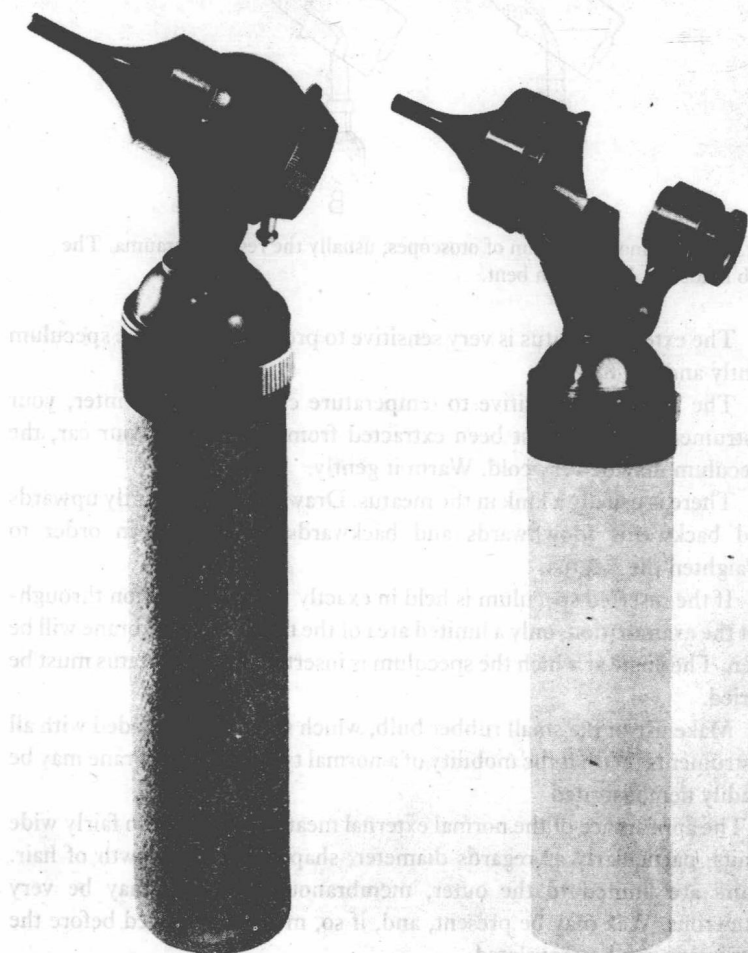
When students commence clinical work on their general firms and express a desire to examine their patients' ears, they are not infrequently handed an otoscope which conforms to the following standards:

- 1 The battery is 30-40 per cent efficient.
- 2 The bulb-carrier has become bent, and the feeble glimmer emanating is not even directed out of the end of the speculum, but rather to one side (Fig. 7).
- 3 The speculum chosen is either too large or too small (usually the latter). It may also have unnecessarily thick walls.

It is not surprising that the unfortunate novice attributes his failure to see the tympanic membrane to his own shortcomings rather than to the inadequacy of the instrument, and, after a time, comes to regard otologists as being gifted either with abnormally acute vision or an unduly vivid imagination. This is not the case. With a good instrument and a little instruction, the veriest tyro may examine the tympanic membrane with ease, but he must first make sure of the following basic requirements:

- 1 The battery is well up to standard.
- 2 The main beam of light is directed out of the end of the speculum.
- 3 The speculum is the largest which can be inserted without causing pain.

Having obtained a satisfactory instrument, remember the following points:



**Fig. 6.** Electric otoscopes. The two excellent models illustrated are manufactured by Keeler Instruments Ltd.

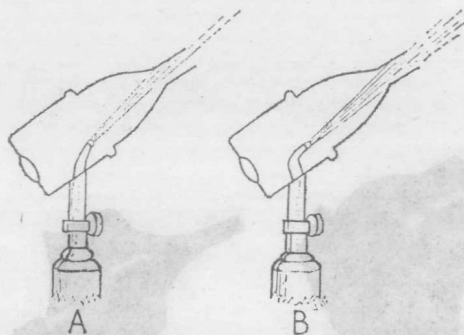


Fig. 7. A common condition of otoscopes; usually the result of trauma. The bulb holder in A has been bent.

- 1 The external meatus is very sensitive to pressure. Insert the speculum gently and not too far.
- 2 The meatus is sensitive to temperature change. If, in winter, your instrument case has just been extracted from the boot of your car, the speculum may be very cold. Warm it gently.
- 3 There is usually a kink in the meatus. Draw the auricle gently upwards and backwards (downwards and backwards in infants), in order to straighten the meatus.
- 4 If the inserted speculum is held in exactly the same position throughout the examination, only a limited area of the tympanic membrane will be seen. The angle at which the speculum is inserted into the meatus must be varied.
- 5 Make use of the small rubber bulb, which should be provided with all instruments. With it the mobility of a normal tympanic membrane may be readily demonstrated.

The appearance of the normal external meatus varies within fairly wide limits, particularly as regards diameter, shape, and the growth of hair. Hairs are limited to the outer, membranous part, but may be very numerous. Wax may be present, and, if so, must be removed before the inspection can be completed.

Normal tympanic membranes also vary to some extent both in colour, translucency, size, shape and inclination to the sagittal and horizontal planes. The student is therefore advised to examine as many normals as possible, for such an occupation, though somewhat arduous, is the only means of acquiring the ability to recognize the abnormal without hesitation.

## CHAPTER 3

### TESTING THE HEARING

CLINICAL testing of the hearing is a process involving three definite stages, which should always be carried out in the same order.

Stage I. Simple assessment of the degree of deafness.

Stage II. Tuning fork tests.

Stage III. Audiometry.

#### SIMPLE ASSESSMENT OF THE DEGREE OF DEAFNESS

The patient is asked to sit in a chair, facing the wall, at one end of the room, and to occlude the deafer ear by pressing with his finger against the tragus. He is instructed to repeat after the examiner whatever the latter says.

The examiner, commencing at the far end of the room, whispers test words or numbers, and approaches until the patient is able to repeat the words accurately. If moderate or severe deafness is present, it may be necessary for the examiner to employ 'Conversational Voice'. The distance from patient to examiner is now noted, and might be expressed, for example, in a slightly deaf person as W.V. (whispered voice) at 5' or in a case of severe deafness, C.V. (conversational voice) at 6".

Now the deafer ear is tested in the same way, the better ear being occluded.

There is a trap for the unwary. Suppose it is found on this preliminary testing that a gross difference in the hearing acuity of the two ears is present, e.g. R. Ear W.V. 12': L. Ear C.V. 2', it is quite possible that the more deaf ear is, in fact, very much more deaf than at first presumed. It may, in fact, be totally deaf. The reason is that though the patient appeared to hear C.V. at 2' with the L. Ear, he was, in fact, hearing the voice with his R. Ear, simple occlusion of the meatus being an inadequate method of suppressing hearing in a good ear.

A simple method of avoiding this error is by introducing the measure of masking the better ear by applying to it a Bárány noise apparatus whilst the deafer ear is tested by C.V. The noise emitted by the clockwork



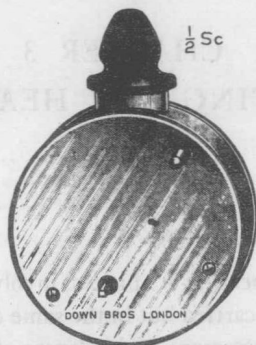


Fig. 8. Bárány noise apparatus.

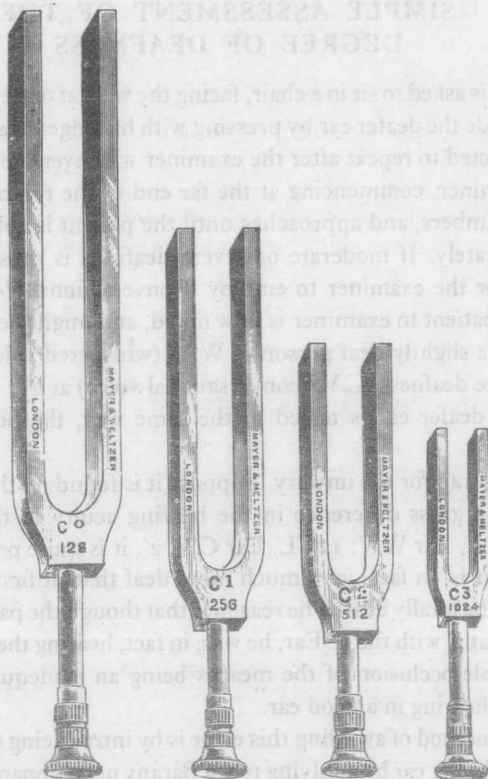


Fig. 9. Tuning forks. The 512 c.p.s. fork is the most useful.

mechanism of this little machine effectively occupies the attention of the better cochlea (Fig. 8).

The limitations of voice and whisper tests must be borne in mind. They are approximations. Voices vary in clarity and pitch. Nevertheless, these tests are of great value, and should always be carried out before proceeding to tuning fork tests or audiometry.

## TUNING FORK TESTS

Before considering the tuning fork tests it is necessary to have a basic conception of the classification of the different types of deafness. Almost every form of deafness (and there are many) may be classified under one of three headings:

Conductive deafness.

Sensorineural deafness.

Mixed conductive and sensorineural.

**Conductive deafness** (Fig. 10). There is some obstruction, defect or lesion of the external meatus, tympanic membrane, middle ear cavity or ossicles which interferes with the normal passage of air-borne sounds to the cochlea (e.g. wax, perforations, middle ear disease, otosclerosis).

**Sensorineural deafness** (Fig. 11). There is some defect of the cochlea or auditory nerve whereby nervous impulses from cochlea to brain are attenuated (e.g. Menière's disease, senile deafness, VIIIth nerve tumour).

**Mixed deafness.** Conductive and sensorineural factors are both present in the same ear.

**Explanatory note.** Otologists may refer to one patient as having 'good bone-conduction', or to another as having 'poor bone-conduction'. These terms are frequently misunderstood by students, who infer that the skull

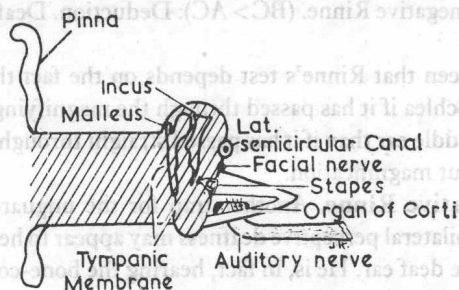


Fig. 10. Conductive deafness is caused by an abnormality of the external or middle ear (shaded).