

The modern treatment of diseases of the heart : a manual of clinical therapeutics / by Prof. Dujardin-Beaumetz ; translated from the fourth French edition by E.P. Hurd.

Contributors

Dujardin-Beaumetz, 1833-1895.

Hurd, E. P. 1838-1899.

Royal College of Physicians of Edinburgh

Publication/Creation

Detroit, Mich. : G.S. Davis, 1887.

Persistent URL

<https://wellcomecollection.org/works/vang5v73>

Provider

Royal College of Physicians Edinburgh

License and attribution

This material has been provided by This material has been provided by the Royal College of Physicians of Edinburgh. The original may be consulted at the Royal College of Physicians of Edinburgh. where the originals may be consulted.

This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.

**wellcome
collection**


Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

THE MODERN TREATMENT
OF EAR DISEASES

SAMUEL SEXTON

Fa 3. 66

R36739

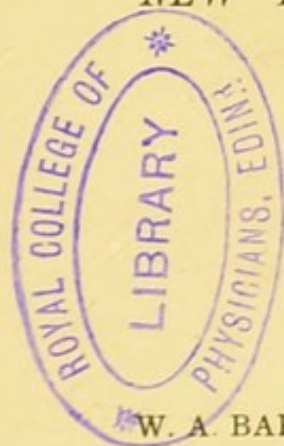


Digitized by the Internet Archive
in 2015

<https://archive.org/details/b2193969x>

THE
CLASSIFICATION AND TREATMENT
OF
Over Two Thousand Consecutive Cases of
EAR DISEASES

AT DR. SEXTON'S AURAL CLINIC,
NEW YORK EYE AND EAR INFIRMARY.



BY
SAMUEL SEXTON, M. D.,
AURAL SURGEON,
AND
W. A. BARTLETT, M. D., AND ROBERT BARCLAY, M. D.,
ASSISTANT SURGEONS.



1886.
GEORGE S. DAVIS,
DETROIT, MICH.

Copyrighted by
GEORGE S. DAVIS,
1886.

THE TREATMENT OF EAR DISEASES AS ILLUSTRATED
BY OVER TWO THOUSAND CONSECUTIVE
CASES, TREATED AT DR. SEXTON'S
AURAL CLINIC, AT THE NEW
YORK EYE AND EAR
INFIRMARY.

This work is intended to present a classified list of the aural cases recently seen in the practice of the infirmary, and to bring into prominence the more practical features demanding treatment. The relation in detail of the many cases of interest seen would not, it is believed, be so instructive as the presentation of general conclusions drawn from observations in the large field offered by the aural clinic; a few cases of special importance are, however, thought to be sufficiently instructive to be given. The importance of inflammation of the attic of the tympanum seemed to demand the considerable space given to its discussion.

The cases have been divided according to the anatomical location of the disease, and the whole subject is included under nine sections—namely : A, the auricle; B, the external auditory canal; C, the drumhead; D, the middle ear tract; E, complication of diseases of the middle ear tract; F, diseases of the mastoid process; G, important symptoms of ear disease; H, neuroses (reflex phenomena); I, deafmutism.

In the Appendix the drugs more commonly employed in treatment are given, as well as a description of the instruments used. Illustrative cuts of the instruments have been introduced.

A more complete classification of aural diseases than is afforded by the list of cases below will be found at the end of the work.

CLASSIFICATION OF 2,100 CONSECUTIVE CASES OF AURAL DISEASES MET WITH IN HOSPITAL PRACTICE.

A.—DISEASES OF THE EXTERNAL EAR.

AURICLE.

ABNORMALITIES:

	No of Cases.
Arrested development. { Microtia, - - - -	1
{ Congenital fistula, -	2
	<hr/>
Total,	3

CUTANEOUS DISEASES:

Comedo: acne punctata, - - - -	2
Dermatitis, - - - -	1
Eczema, - - - -	38
Erysipelas, - - - -	1
Herpes Zoster, - - - -	3
Intertrigo, - - - -	10
Syphiloderma, - - - -	1
	<hr/>
Total,	56

NEW GROWTHS:

Cyst, sebaceous, { with breaking down of cheesy	
contents, - - - -	5
Epithelioma, - - - -	2
Nævus vascularis, - - - -	1
Sarcoma, - - - -	1
	<hr/>
Total,	9

WOUNDS AND INJURIES:

Cleft lobule, - - - - -	3
Othæmatoma, contused wound, - - - - -	3
Total,	<u>6</u>

B.—EXTERNAL AUDITORY CANAL.

OTITIS EXTERNA:

Circumscripta acuta, - - - - -	71
Diffusa. { Acute, - - - - -	13
{ Chronic, - - - - -	30
Total,	<u>114</u>

ANOMALIES OF SECRETION:

Cerumen (excess), - - - - -	349
Desquamation, Laminated Epithelial plug, -	2
Desquamative Inflammation, - - - - -	11
STRICTURE (STENOSIS) 2: - - - - -	2
Total,	<u>364</u>

NEW GROWTHS:

Exostosis, - - - - -	2
Hyperostosis, - - - - -	1
Sebaceous tumor, - - - - -	1
Total,	<u>4</u>

FOREIGN BODIES:

A. Animate objects, - - - - -	9
B. Inanimate objects, - - - - -	12
Total,	<u>21</u>

C.—MEMBRANA TYMPANI:

Myringitis,	-	-	-	-	-	-	-	11
Rupture,	-	-	-	-	-	-	-	12
Exudation cyst.,	-	-	-	-	-	-	-	7
								<hr/>
Total,								30

D.—MIDDLE EAR TRACT.

Acute non-suppurative otitis media,	-	-	107		
Mucous or muco-serous	{	Subacute,	-	-	58
otitis media,		Chronic,	-	-	497
<hr/>					
Total,					662
Suppurative otitis media,	{	Acute,	-	-	242
		Subacute,	-	-	25
		Chronic,	-	-	389
Polypus,	-	-	-	-	33
<hr/>					
Total,					689

Of the above number, the following cases of middle ear diseases occurred in syphilitic and phthisical subjects:

Syphilitic inflammation of	{	Secondary, -	-	3
the middle ear tract -		Tertiary, -	-	14
				<hr/>
			Total,	17
Suppurative inflammation in phthisical subjects,				5
				<hr/>
			Total,	5

**E.—COMPLICATION OF DISEASE OF MIDDLE
EAR TRACT:**

Facial paralysis (Bell's palsy),	-	-	-	5
Fracture of base of skull,	-	-	-	2
Total,				7

F.—DISEASES OF THE MASTOID PROCESS:

Periostitis,	-	-	-	-	-	-	14
Caries and Necrosis,	-	-	-	-	-	-	12
Polypus,	-	-	-	-	-	-	12
Total,							38

G.—IMPORTANT SYMPTOMS OF EAR DISEASE:

I. Aural vertigo,	-	-	-	-	-	-	7
II. Anomalies of audition,	-	-	-	-	-	-	
Autophonia,	-	-	-	-	-	-	2
Aural hallucinations,	-	-	-	-	-	-	2
Dysacusma,	-	-	-	-	-	-	2

H.—NEUROSES (Reflex Phenomena):

Otalgia,	-	-	-	-	-	-	50
Total,							63

I.—DEAFMUTISM, 12:

DISEASES OF THE EAR.

A.—EXTERNAL EAR.—AURICLE.

CONGENITAL DEFECTS.—Only two cases are recorded, both of arrested development, *Microtia* and *Fistula Auris*. These defects are due to imperfect development in the closure of the first branchial cleft, and are often associated with absence of the external auditory canal, or with some other defect in the hearing organ. OPERATIONS have been undertaken to open a way down to the middle ear in cases of stenosis and atresia of the external auditory canal occurring with these anomalies. The two cases seen, however, were not suitable ones for this plan of treatment; indeed, operative procedures are not, as a rule, attended with much success.

CUTANEOUS DISEASES.

The cutaneous disease most frequently encountered implicating this region is ECZEMA, 38 cases of which are recorded. This painful and distressing affection of the ear, is of interest to the otologist from its frequent invasion of the external auditory canal, and even of the drum-head occasionally. In a considerable number of the cases the affection was associated with the Rheumatic diathesis, reflex sympathy from nasal catarrh, and difficult dentition. ECZEMA INTERTRIGO, an invasion of the fissure formed by the junction of the

auricle with the mastoid region was of frequent occurrence. The external auditory canal was involved in forty per cent. of the cases, and in two patients the dermic lining of the drum-head was affected.

Treatment.—When the Rheumatic diathesis was pronounced, the salicylate of sodium and Fowler's solution were given with good effect. The fluid extract of viola tricolor also proved efficacious, given in doses of ten to fifteen drops, three times daily, but never in sufficient quantity to produce a purgative action.

Local Treatment.—In the acute cases, benefit was derived from dusting the diseased surface once or twice daily with powdered Starch or Lycopodium, no moisture being allowed to the part. If the disease became chronic, or was so from the first, all crusts were removed once daily, with castile soap and water, and one of the following ointments applied.

- | | | |
|---|-----------------------------|---------|
| R | Ung. Zinci Oxidi | |
| R | Ol. Cadini..... | 3 j. |
| | Ung. Hydrarg. Ammoniat..... | 3 j. |
| | M. | |
| R | Ol. Cadini..... | 3 j. |
| | Ung. Zinci Oxidi..... | 3 j. |
| | M. | |
| R | Ferri Sulphat..... | gr. ij. |
| | Vaseline..... | 3 j. |
| | M. | |

When the canal was affected with the dry des-

quamative form of this disease, the exfoliated epidermal scales were removed by syringing the canal once daily, followed by insufflation of powdered Boracic Acid. In the moist, seborrhæic form, it may be necessary to use water to relieve the intense itching and discomfort produced by the secretion; though, if possible, it should be avoided, as experience has suggested that the parts should be kept dry, secretion being removed with the armed cotton holder. Boracic acid insufflations may be used daily, until the moisture is controlled and a dry dermic surface is obtained.

ERYSIPELAS of the auricle occurring during the progress of facial erysipelas is not infrequent, and, like eczema, is liable to invade the auditory canal and deeper parts, giving rise to stenosis and deafness. One example only of this affection was seen, and this occurred during the progress of facial erysipelas, recovery rapidly taking place under applications of lead and opium wash.

HERPES ZOSTER IDIOPATHICA.—THREE CASES. The patients in whom this rare affection of the auricle occurred were debilitated and broken-down subjects. The eruption involved the external surface in one case, and the internal in the others, and was characterized by several successive crops of vesicles accompanied by much pain and infiltration of the skin.

Treatment.—Rapid relief was obtained by puncture of the vesicles and applications of lead and opium wash.

TUBERCULAR SYPHILIDE.—Only one case of this tertiary lesion of syphilis was seen. The patient was much run down from exposure and intemperance. The disease was chronic and ulcerative in its course, and was ushered in by what appeared to be a dermatitis of the outer surface of the auricle, with the formation of a small crust on the helix where it curls over the top of the auricle; when this was removed, a deep undermined ulcer was exposed, involving the whole thickness of the dermic covering of the auricle.

Treatment.—The crusts should be removed carefully and the ulcer dressed with powdered iodoform. The constitutional treatment should consist of mercury and iodide of potash in small doses, and supportive measures. This treatment was adopted in the above case, and the acute local symptoms rapidly disappeared.

MORBID GROWTHS OF THE AURICLE.—*Sebaceous Cysts of the Lobule.*—FIVE CASES. In two of these cases the sacs were suppurating. Three cases were cured by removal of the entire sac, and one by electrolysis, three sittings being necessary.

FIBROMA OF THE AURICLE, usually located in the lobule and produced by ear-piercing, was seen but once. In this case the tumor was recurrent, and was located on the superior and inner surface of the pinna. *Treatment*—excision of the growth.

HÆMATOMA AURIS.—This affection, known under various designations, as othæmatoma, perichon-

dritis auriculæ, or the "insane ear," is characterized by an effusion beneath the perichondrium, causing swelling, tension and pain in the part. This swelling is mostly confined to the outer surface of the pinna; it may rupture spontaneously from over distention of the sac, or it may limit itself, and reabsorption coming to a standstill, may remain as a considerable tumor for an indefinite time. When reabsorption does take place, or when the part heals after incision, the perichondrium having been greatly stretched, contracts upon itself, and failing to adapt itself as before to the cartilage, produces more or less deformity. Though violence is usually the exciting cause, it is recognized that there may be a predisposition to this affection due to nutritive changes in the tissues of the perichondrium from centric causes. It is most frequently met with among lunatics. In the sane, it is found usually in the lower classes and in pugilists. In all of the recorded cases the disease was produced by direct violence.

Treatment.—It is a safe rule not to be in too great haste to interfere. During the early stage, when there was active effusion going on, aspiration repeated as the sack refilled was successful in limiting the amount of separation of the perichondrium. During the reabsorptive stage, massage practiced daily, *i.e.*, simple manipulation of the part between the thumb and forefinger, greatly facilitated the reparative process. Should the sac be greatly dis-

tended and threaten to rupture, an incision should be made.

MALIGNANT TUMORS of the auricle are not frequent. The notes include one of *sarcoma* of the concha occurring primarily, and two of epithelioma of the tragus. They were all removed with the knife and the wounds cauterized with the Paquelin cautery.

B.—AFFECTIONS OF THE EXTERNAL AUDITORY CANAL.

ACUTE CIRCUMSCRIBED INFLAMMATION.—Furuncle, 71 cases. Over 60 per cent. of this number were adults. It was found on analyzing the records of these cases, that in addition to the well-known predisposing causes of this affection, viz., general debility and exhaustion, notably occurring in females during pregnancy, that nervous impulses, propagated from diseased conditions of the mouth, teeth and throat, were very prominent etiological factors of the disease.

Treatment.—In the aggressive stage calcium sulphide (see appendix) given in doses of $\frac{1}{20}$ to $\frac{1}{50}$ of a grain every two hours, was found to frequently control and modify the inflammation, producing resolution in a number of cases. Pain was relieved with tincture of aconite (see appendix) in small doses.

In this affection incisions into the canal should not be made at random, for often the precise spot of inflammation, comprising a distended follicle, can be

discovered on careful search, and an incision into this point will usually be followed by relief. The tendency of the affection to recurrence was lessened by prompt removal of the causes.

DIFFUSE INFLAMMATION OF THE EXTERNAL AUDITORY CANAL.—There were thirteen examples of the acute variety of this affection, and thirty of the chronic, and they were almost invariably consecutive to disease of the middle ear. The few primary cases noted occurred in broken-down subjects, the disease usually exhibiting a chronic tendency and not infrequently extending by periosteal continuity to the periauricular and mastoid region, with little evidence of active inter-mastoid trouble.

Treatment.—Incision of the external auditory canal was rarely necessary; calcium sulphide, aconite, and general care were successful in producing a favorable result.

CERUMINOUS ACCUMULATIONS OCCURRED IN 349 PATIENTS. These collections may remain in the canal until they become quite hard, giving rise to no symptoms until impaction takes place, from sea-bathing, cleansing the ear with a towel, sudden movements of the head, from a fall, jumping, etc., or from a blow on the ear, and then the annoying and at times alarming symptoms produced, as autophonous voice, tinnitus aurium, deafness, vertigo and nausea, force the patient to seek relief.

Anomalies of secretion (seborrhœa etc.) and

desquamative inflammation of the external auditory canal are frequently local manifestations of diathetic disturbances.

Treatment.—In many of the cases the mass was removed with the syringe (see appendix, fig. No. 13). Care should always be taken during the operation of syringing, to pull the auricle a little upward and backward, thus straightening out the canal, and then a few well-directed streams of warm water against the upper or lower wall of the canal, thus avoiding the injurious effect of the direct impact of the stream against the drum-head, will be all that is necessary. But when the mass is hard and dry from the absorption of its aqueous constituents, it was often found necessary to dislodge it from the fundus with the curette (see appendix, fig. No. 6) and then effect its removal with syringe and forceps. The use of these instruments should never be resorted to without the best means of examination and illumination. In difficult cases an inspection of the canal should be frequently made during the process of syringing, when the plug may be found dislodged and lying loosely in the lumen, and may be removed with the dressing forceps.

Two examples of LAMINATED EPITHELIAL PLUG OR KERATOSIS OBTURANS (C. H. Burnett) were seen. This mass is due to the accumulation and impaction of successive layers of epidermal scales, is very difficult of removal, requiring the cautious use of the curette,

forceps and syringe; several sittings are frequently required to effect the desired result.

Eleven cases of DESQUAMATIVE INFLAMMATION and SEBORRHŒA are noted. Pruritus and tinnitus aurium caused by the accumulated products, consisting of a moist creamy secretion, were the prominent symptoms, rather than pain. The painlessness of this affection aids in the establishment of a differential diagnosis between this disease and chronic diffuse inflammation.

Treatment.—Relief is effected by the removal of secretions, by syringing, daily if necessary, and insufflations of powdered boracic acid or salicylic acid, the former being used abundantly and the latter more sparingly. When desquamation and secretion diminish, no moisture should be used in the treatment. Before applying the powder the canal should be wiped gently with an armed cotton holder, using the best absorbent cotton for this purpose rolled into a small pledget on the end of the vulcanite holder. The powder may then be applied by means of the insufflator (see appendix, fig. 19).

FOREIGN BODIES.

INANIMATE OBJECTS are not often encountered in young infants, but are more frequently met with in older children, being introduced by themselves or by playmates. The meatus, especially in children, is so naturally contracted by the fold of cartilage which

forms the posterior border of this opening, that foreign bodies slipped beyond this constriction, may be indefinitely retained.

ANIMATE OBJECTS.—A considerable number of patients presented themselves with insects in the ear. The frequency with which the bed-bug and cockroach gain entrance into the canal, was noticeable, especially among those living in tenement houses, where these insects abound.

Treatment.—There should be no undue haste to effect removal, as often the accomplishment of this object requires the skill of an expert, and the energetic efforts seemingly required, may, in the hands of the unskillful, result in serious injury to the middle ear. In this way more damage might be inflicted than could possibly result from the presence of the foreign body, which is in itself comparatively harmless, unless pushed in beyond the isthmus, or impacted from efforts at removal. In one case a roach had remained in the canal for one year; and in another, that of a boy, a cherry pit remained in the canal for the same length of time, no damage to the parts being detected in either case. In the removal of any object, an anæsthetic is always necessary in very young and nervous children, unless syringing alone is employed, as efforts at removal while the child is moving about, are likely to result in pushing the body further in, and then a simple case

becomes a complicated one. The exact size, location, and nature of the object should be determined before the operation. In regard to the choice of instruments, if the object is lodged just within the folds of the meatus, extraction may readily be accomplished with the curette (see appendix, fig. No. 6), or, if further in, the patient being firmly held, a few well directed streams of water to one or the other side of the object will usually be successful.

When the foreign body is well down in the cul-de-sac, the curette or hook can not always be introduced behind it without endangering the drum-head; the syringe, therefore, must first be used, and if unsuccessful, extraction can usually be effected with the foreign body forceps (see appendix, fig. 12), which are of the greatest value when the object is impacted anywhere in the canal. Under no circumstances should any attempt at removal be made unless the parts can be fully exposed by speculum and proper illumination. This is especially important in using the foreign body forceps in cases of deep impaction. If the landmarks are obscured from accumulated secretions, or by blood clots, the canal should be gently cleansed with a few syringe-fuls of warm water. In those cases in which the body has been pushed against the drum-head, and the parts swollen and inflamed from the injury inflicted by efforts at removal, it is advisable to delay, while efforts are made to reduce inflammation.

C.—MEMBRANA TYMPANI.

MYRINGITIS.—Eleven cases presented themselves for treatment. This condition was invariably caused by trauma or by sea-bathing, and was characterized by congestion of the dermic lining of the drumhead, pain, and tinnitus aurium.

Treatment.—In all of the cases the congestion rapidly subsided under the internal administration of the tincture of aconite in small doses.

RUPTURE OF THE MEMBRANA TYMPANI.—TWELVE CASES. The causes recorded were, sudden concussion, or compression of the air in the external auditory canal, from falls on the auricle, or blows of the hand, as in boxing the ears. The number of cases produced in the latter way are quite considerable, and since the assailant is liable to damages, as shown by several suits in the New York courts, where from five to twenty-five thousand dollars damages have been claimed, and recovery made for a smaller sum, it is to be hoped that this cruel practice will be less frequent.

A few cases were noted occurring in catarrhal patients with diseased drum-heads, from forcibly blowing the nose. The symptoms of this accident were: sudden deafness, tinnitus aurium, vertigo, and hæmorrhage, or serous discharge from the ear; on inspection, the line of fracture could often be seen, usually in the anterior-inferior quadrant. Most of these cases recovered satisfactorily; but in a few,

where there had been previous treatment—instillations and medicated drops—the results were not satisfactory, purulent inflammation of the middle ear resulting.

EXUDATION CYSTS OF THE DRUMHEAD.—SEVEN CASES. These cysts were not infrequently seen during the first stages of acute catarrhal inflammation of the attic, or atrium, and they occurred in those cases produced by violence to the drum-head or middle ear, as in sea-bathing. Their contents were serous or sero-sanguinolent, and they were often of sufficient extent to involve the entire drum-head, making the diagnosis somewhat perplexing.

Treatment.—When they are large and extensive, their contents had better be evacuated with the myringotome. Syringing should be avoided, unless irritating blood clots form.

D.—MIDDLE-EAR TRACT.

ACUTE NON-SUPPURATIVE INFLAMMATION OF THE MIDDLE-EAR.—107 CASES. This number may be divided into two classes, in one of which the inflammation was limited to the cavity of the atrium, and in the other the attic was the principal seat of the disease. Of the former there were 93, and of the latter 14, inclusive of cases in which both cavities were involved. Almost all of the former class of cases were due to diseased conditions of the upper

air tract, "head colds," etc., while the latter were attributable in many instances to sea-bathing.

Treatment.—It is of the greatest importance to prevent the formation of pus in these cases, and this object was accomplished in many instances. Calcium sulphide was given in $\frac{1}{20}$ to $\frac{1}{50}$ gr. doses every two hours in adults, and in children, usually in smaller doses. Pain in the more decided cases, whether dependent upon the neuralgic condition of the tympanic plexus, from reflex nervous sympathy, or upon distension of the tympanic cavity from accumulated secretions, was relieved with tincture of aconite, pulsatilla, or gelsemium (see appendix), remedies having a marked controlling influence over the fifth pair of nerves and their connections. A large number of these cases terminated in resolution, but it is probable that in some of them after passing from under observation, suppuration subsequently occurred.

CHRONIC CATARRHAL INFLAMMATION OF THE MIDDLE-EAR.—555 CASES. The frequency and prevalence of head catarrh is well known, and the intimate association existing between the region involved by this disease and the middle-ear tract, should be kept in mind. For, as is well known, it is by the gradual progress of this affection, with its acute exacerbations, that destructive changes in the transmitting mechanism of the hearing organ are produced. In children, especially, the vascular activity at the age of puberty, overwork, and foul air in schools, with conse-

quent nerve exhaustion, all tend to produce catarrh in the upper air tract and middle-ear, with subsequent deafness, often great, even at a very early period of life. The symptoms noted in the more decided cases were the following: Aural vertigo, otalgia, autophonia, tinnitus aurium, and aural hallucinations of a distressing character.

AUTOPHONIA occurs during the progress of many of the acute and chronic diseases of the middle-ear tract and external auditory canal. It consists in hearing one's own voice in the head, or of reverberations of the sound, described as an "echo" or "double hearing" (*paracusis duplicata*). The explanation of this phenomenon is, that the sound vibrations arrive at the tympanum by two distinct routes;—namely, by the air through the external auditory canal, and through the tissues of the head and via the eustachian tube. In health these latter vibrations are excluded and pass out unperceived, the conducting mechanism responding only to vibrations arriving through the canal. But in certain diseased conditions of the chain of ossicles or where altered tension of the *membrana tympani* exists, the transmitting mechanism fails to respond to sound waves arriving in the natural way, and then vibrations produced, by phonation, etc, are perceived through the tissues of the head. The natural movements of the circulation in the tympanum are perceived as noises and constitute 'tinnitus aurium.' Persons requiring the use

of the voice in singing, or musicians, not hearing musical tones naturally, are unable to sing or play correctly; the former class of patients, are apt to suspect the vocal organs as being the seat of the trouble, especially if they are subject to catarrhal affections of the throat.

Twenty-five per cent. of the total number of these cases were children and adolescents, in whom the aural disease was associated with the hypertrophic form of pharyngeal catarrh, and enlarged tonsils, and it was in this class that the greatest success in treatment was obtained.

Treatment.—It was found that the use of mercury (see appendix) in minute doses given three or four times daily, continued for a long period of time, combined with the systematic removal of secretory products from the naso-pharynx when necessary, and the use of soothing applications, produced a beneficial effect upon the mucous membrane of the upper air tract, manifested by diminution in the activity of the catarrhal process, and lessening of the vascular engorgement. Markedly hypertrophied tonsils were removed, and dead teeth, giving rise to irritation, were extracted.

It is of importance that aural catarrh should be recognized at an early period, that measures may be taken to arrest the progress of the disease before serious impairment of the hearing organ has been produced.

Space will not permit entering into details in a

limited work of this character, but it may be stated in a general way, that the above treatment was often successful, and that while it may not always be possible to eradicate the disease, we may certainly arrest its further progress.

ACUTE PURULENT INFLAMMATION.—267 CASES. Fifty per cent of these were children under ten years of age, in whom the aural affection was the direct effect of a general acute catarrhal condition, the upper air tract being especially invaded. In many of these cases there was catarrhal fever, exhibiting a tendency to periodicity, accompanied by gastric disturbance, rhinitis and earache. Such a condition in young children, who are unable to describe their symptoms intelligently, is frequently termed "malarious," the advent of an aural discharge first disclosing the nature of the affection.

Twenty-five per cent. were between the ages of ten and twenty-five years, and during the summer months fully 75 per cent. of this number were males, in whom the disease was produced by sea-bathing. In considering the history of this class, it is found that the water may injure the drum-head by sudden forcible impact, as when driven against the meatus in surf-bathing. To the habit of standing in the cold air after bathing, allowing the head and ears to dry by evaporation, injury of the middle ear may also be traced. But the most frequent cause of injury in this group was the entrance of water

into the tympanum through the Eustachian tube, from the impact of a wave against the open mouth and nostrils, or from strangling during diving and swimming. Many of these patients recalled the fact that they had "strangled" and "got water up the nose" and the forcible efforts to expel this by blowing the nose were followed by aural pain and discomfort. The effect of fresh water bathing upon the middle ear is the same, but in a less degree, injury doubtless occurring in a similar way, from diving and sporting in the water. There were thirteen examples of acute inflammation of the ATTIC OF THE TYMPANUM caused by the sea-bath, or acute head catarrh, and two followed the use of the Russian bath.

Before alluding further to these cases, it will be necessary to give a brief description of the anatomical area referred to as the *attic of the tympanum*. The tympanum is divided into two main compartments, the atticus tympanicus and atrium. The attic is bounded above by the tegmen, internally by the prominence of the tympanum and externally by the auditory plate, and is situated on a plane directly above the atrium. It is divided by the malleus and incus into two compartments, and these communicate with each other above, with the atrium or lower part of the tympanum below, anteriorly with the eustachian tube, and posteriorly with the antrum. The inner compartment communicates more freely with the atrium below, than the outer. The mastoid antrum, a prolonga-

tion of the attic into the mastoid body, is covered also by the tegmen, and opens into this cavity through the petro-mastoid canal. Figures 1 and 2 afford an illustration of these parts.

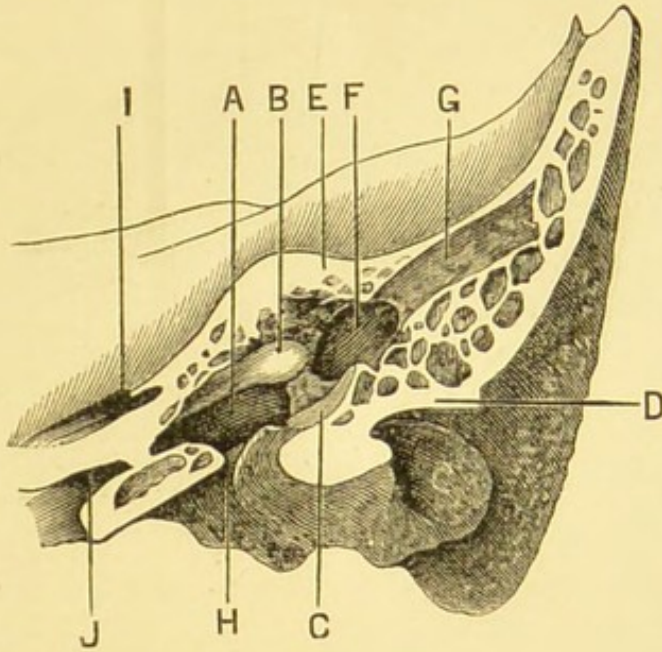


FIG. 1.

FIG. 1 (Leidy).—Section of the left temporal bone through the squamosa, immediately in advance of the external auditory meatus. *A*, atrium of the tympanum; *B*, prominence on the inner back part of the attic; *C*, scute at the outer part of the attic; *D*, auditory plate; *E*, tegmen; *F*, mastoid antrum; *G*, anterior passage of the same; *H*, canal for the long process of the malleus; *I*, hiatus of the facial canal; *J*, Eustachian tube.

Seven of the examples of acute inflammation of the atticus tympanicus were of an acute catarrhal character, and were illustrative of the first stage of

this affection, with a simple congestive condition of the membrana flaccida and integumentary lining of the canal, which to one unfamiliar with the anatomical

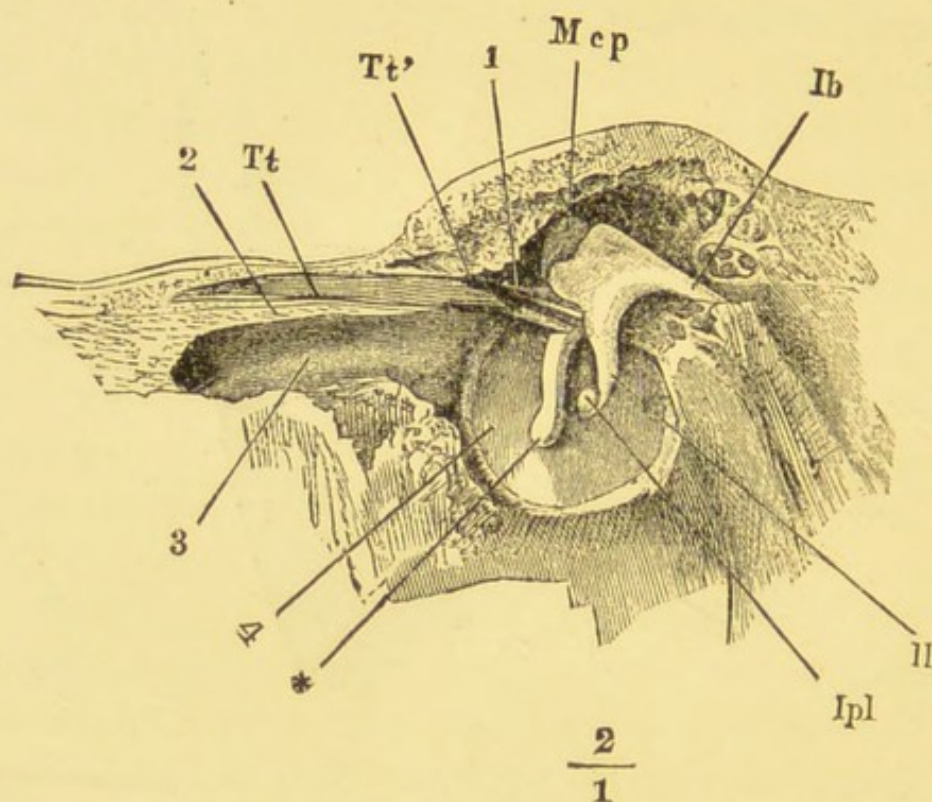


FIG. 2.

FIG. 2.—View from within the right tympanum and contiguous parts. From Henle. *Tt*, *Tt'*, tensor tympani; *Mcp*, head of the hammer; *, handle of the same; *Ib*, short, *Il*, long process; *Ipl*, lenticular process of the incus; *I*, chorda tympani; 2, septum tubæ; 3, tube; 4, drum-head.

limitations of this disease, would be often overlooked. In the later stages closure of the outlets of the attic, with serous and bloody effusion, produces distension and detachment of the membrana flaccida and adjacent

canal wall, and forms a bulging sac, which more or less completely obscures the membrana tympani from view. These seven cases were characterized by intense neuralgia in the ear, extending over the mastoid and occiput, with cutaneous hyperæsthesia often suggesting a suspicion of mastoid or meningeal disease. Deafness was in no instance a prominent symptom, since the atrium and membrana tympani were not particularly involved. In all of these cases, under prompt treatment, the regressive stage began at this period. The six other cases of this affection did not come under observation until purulency had been established, and although their course was protracted, they all yielded successfully to treatment. Acute periostitis of the external auditory canal was more frequently noticed as a complication of this affection than of simple inflammation of the atrium. Three cases of acute purulent inflammation of the atrium were seen, occurring as a complication of measles. The histories of these patients allude to the occurrence of earache during the activity of the exanthem, and to the subsequent appearance of an aural discharge without any treatment having been directed to the local condition. This fact is suggestive of the importance of an aural examination being made in the exanthemata, when complaints suggest the existence of aural disease. The further progress of this complication might then be arrested by timely and appropriate treatment. The following causes of this disease are

noted in a few cases, and are so infrequent as to be invested with particular interest: Squirting of water from the mouth into the external auditory canal of a playmate, scratching of the canal with a hair-pin, the use of the nasal douche, and sniffing up salt water, and afterward blowing the nose.

Treatment.—Rest is of importance during the acute stage. Whenever possible, these patients were confined to their rooms, which were kept at an equable temperature, until the aggravated symptoms had subsided, and then moderate exercise was not too long delayed, about the room, or out of doors if the weather permitted. In young children in whom the acute inflammation of the atrium was but a local manifestation of a general acute catarrhal condition of the upper air tract, minute and frequently repeated doses of mercury were given (see appendix); or, when purulency threatened, or had become established, calcium sulphide in small doses proved very efficacious. Earache, often very severe, and particularly so in young children in whom dentition was active, could usually be relieved by tincture aconite, or preferably, tincture pulsatilla. In neglected and unfavorable cases occurring in older children and adults, tincture of gelsemium was sometimes efficient, especially so in those cases complicated by severe hemi-crania.

Local Treatment.—Manipulations of an active nature are inadvisable during the first stages of this affection, as any meddlesome interference with these

parts, when they are in such a highly inflamed condition, is injurious. Attempts, therefore, at cleansing or wiping the canal were most gently made until the acute symptoms had subsided. Then, of course, it was found that the careful removal of the inflammatory products, followed by the insufflation of some of the powdered preparations (see appendix) in use at the Infirmary, using a Sexton's insufflator (see appendix, figure No. 19) for this purpose, materially assisted in producing a healthy and reparative action in the diseased tract. When there was no reaccumulation of purulent matter, and the powder remained dry in the canal, it was thought best not to disturb it too soon, for in cases where there is considerable loss of substance of the drum-head, the powder exercises a protecting influence, forming a dry crust over the perforation, beneath which cicatrization proceeds rapidly. The rapidity with which, under this treatment, cases of even a severe character may be relieved, is shown in the following cases:

CASE I.—*Acute inflammation of the attic and atrium. Discharged cured in two weeks.*

Male, æt. 8. No previous ear trouble. For past five weeks pain at times in right ear, with scanty discharge. Loss of sleep and appetite. On examination, free purulent discharge from the right ear is found, and only the posterior inferior segment of drumhead is seen, the same being fleshy in appearance. Hears ordinary voice in this ear. Left ear normal. In this

case calcium sulphide, $\frac{1}{50}$ of a grain, was administered every two hours at first, afterward less frequently, under which treatment the pain, never very great, entirely subsided in two days, and the discharge in eight. Fourteen days later the canal was dry, and the drumhead found to be rapidly resuming its normal appearance.

CASE No. II.—*Acute purulent inflammation of atrium and attic of both ears, rhinitis, hypertrophied tonsils, carious teeth. Discharged cured in eleven days.*

Female, æt. 8. Long subject to "cold" in the head, toothache and pain in the ears. After exposure, four weeks since, had pain, tinnitus, and deafness in right ear, followed by a discharge. These symptoms ceased in one week, but reappeared three days ago, accompanied by pain and discharge from the left ear. Both canals found filled with purulent matter. Right drum-head not seen, the left congested and bulging. *Ordinary voice* heard in both ears. In this case, calcium sulph., $\frac{1}{50}$ gr. every two hours, was given with tincture aconite, and by the following day pain had ceased. Insufflations of boracic acid powder being made every third day, the discharge ceased altogether by the 11th day. Patient regained normal hearing in three weeks.

CASE No. III.—*Acute purulent inflammation of the attic and atrium. Severe pain relieved effectually by calcium sulph. in two days.*

Male, æt. 3. No previous ear trouble. For past

five weeks child has been suffering with pain and discharge in right ear. Pain especially severe during last few days. On examination, right canal found filled with purulent matter. Drum head not seen. Ordinary voice heard in this ear. Left ear normal. Child treated with small doses of calcium sulph. only every two hours. Pain had ceased two days afterwards, and discharge was very slight. Patient next seen 14 days later, when canal was found dry, and drum head clearing up. There had been no discharge for several days. Low voice heard in affected ear.

When the inflammation was confined to the tympanum, with moderate congestion and bulging of the membrana flaccida, the remedies previously mentioned were often successfully employed, without surgical interference, but in run-down subjects or where there had been neglect or mal-treatment, severe purulent inflammation ensued, with extensive detachment of the membrana flaccida from the auditory plate; and there was always a profuse discharge, for which free drainage was maintained, or established when not present. This was accomplished by a free incision through the bulging sac of the membrana flaccida, the knife being carried well up under the auditory plate. The bone itself sometimes giving way from necrotic softening, especially at its posterior position, may be perforated. The free communication between the attic and Eustachian tube may be also availed of as another means of affording drainage, in those cases

in which there is no opening in the membrana flaccida; the inflammatory secretions being drawn down through the Eustachian tube, by suction applied with catheter and syringe (vide case in Lancet, Oct. 18, 1884).

CHRONIC PURULENT INFLAMMATION.—389 CASES. In these cases the disease had existed for a varying period of time, from six weeks to twenty-five years; in many of them it originated in infancy.

In a very large percentage, otorrhœa existed as a direct sequence of scarlet fever and measles, and those affected often regarded the disease as a natural effect of the fever, "which would run itself out in time," or if controlled, "would be driven into the system." In many of the patients, the occurrence of great deafness, or painful and alarming complications, only forced them to apply for relief.

There was a considerable number of cases of chronic purulent inflammation occurring principally in children with depraved constitutions, hypertrophic rhinitis, enlarged tonsils, and eczema about the face and head, and where the membrana tympani was largely absent, the tympanum filled with exuberant granulation tissue, the external auditory canal ulcerated. The inflammatory secretion in these cases was always profuse, and of a viscid muco-purulent offensive character, the disease running a protracted obstinate course, never showing much tendency to improve, until treatment had produced some favorable alteration in the catarrhal condition of the naso-pharynx.

Polypoid tumors were present in 33 cases, and nearly one-half of these were associated with carious disease of the tympanum and ossicles. There were several very marked examples of chronic purulent inflammation of the atticus tympanicus. When these patients were seen before any extensive destruction of the parts had occurred, there was often found an imperforate membrana tympani, with the membrana flaccida detached and perforated, usually in the posterior segment; less frequently in front of the ossicles. In the greater number of cases, however, the inflammatory process had in some degree extended backward along the petro-mastoid canal into the mastoid antrum and cellules, and even to those cells lying in the tegmen or above the external auditory canal. The membrana tympani was more or less destroyed, and with possibly the retained malleus (for the ossicles are often absent in these cases), was retracted and adherent to the inner wall of the tympanum, thus partially occluding the outlets from the attic to the atrium. Polypoid masses were frequently found in these cases, growing from the antrum or attic, and protruding through the perforation in the flaccid membrane, or dipping down behind the membrana tympani into the atrium. The mechanical interference which these pathological conditions offer to the escape of secretions from the attic often makes inflammation of this cavity a very serious matter; for with an acute exacerbation of the disease, the escape of

purulent matter into the atrium, auditory canal or Eustachian tube is often effectually prevented, and extension to the cranial cavity is likely to occur. In children especially, owing to the comparatively large extent of this area, and to the imperfect closure of the petro-squamosal suture of the cranial cavity is much more likely to take place.

Tympano-mastoid abscess occurred, as a complication of inflammation of the attic, in a few cases of a subacute type, as the direct result of obstructed drainage from partial closure of the outlets of this cavity. The accumulated secretions forced their way from the attic, between the membrana flaccida and annulus tympanicus or edge of the auditory plate, at the Rivinian segment, and burrowing along the canal over the bony meatus, finally reached the external surface of the mastoid process producing an œdematous, boggy post-aural swelling. Such cases are liable to drain by spontaneous rupture of the sac, into the posterior wall of the canal, through a reopening of the passages in the middle-ear, or through a post aural opening, made by incision.

Treatment.—In the treatment of this class, though cleanliness is imperative, the too frequent syringing and douching to which a running ear is subjected, is injurious. In a large number of cases the trouble is increased by neglect, but notwithstanding this fact, the not infrequent evidence of spontaneous cure should warn us not to institute a too meddlesome

plan of treatment in any instance. In those cases in which the atrium only was the seat of disease, with perforation of the membrana tympani, powdered insufflations were used, applied as soon as the diminishing discharge permitted. When there was exuberant granulation tissue on the walls of the tympanum, the membrana tympani being largely absent, pressure was employed by means of powdered boracic acid, packed with moderate tightness with a pledget of cotton wool. In a certain number of cases, usually those in which the profuseness of the secretions served to loosen up this plug, too rapidly for any pressure to be effectual, the destruction of these masses was easily accomplished with the cutting curette or cutting forceps. In most cases the naso-pharynx required treatment by means of local applications, and mercury in small doses was given where the secretion was markedly mucous. In debilitated patients of a strumous tendency, syr. ferri iodid. given in gtt. v. to gtt. x. doses, three times daily, often had a happy effect. In otorrhœa, complicated by ulceration of the external auditory canal, and often by caries of some portion of the walls of the tympanum, calcium sulphide seemed indicated, and was usually given in $\frac{1}{20}$ to $\frac{1}{50}$ of a grain doses three or four times daily.

In a certain number of cases of attic inflammation the patients presented themselves for treatment on account of painful or alarming symptoms consequent upon an exacerbation of the chronic disease. On ex-

amination of such patients, periostitis of the auditory canal and mastoid process was often found. The inner extremity of the canal was often occupied by the bulging sac of the membrana flaccida. In such cases the tendency manifested by the pent-up products of inflammation to escape through the wall of the canal or membrana flaccida was taken advantage of, and the parts were freely perforated. When patients are early treated in this way, the more grave symptoms not to be expected. When tympano-mastoid abscess existed, in the absence of urgent symptoms, it was not always deemed advisable to interfere immediately, for often in the course of 24 to 48 hours drainage was re-established through the natural outlets. When this did not take place, the matter was liberated by an incision into the posterior wall of the canal, or by Wilde's incision.

SYPHILITIC DISEASE OF THE MIDDLE EAR TRACT, 17 CASES.—Five of these were striking examples of the invasion of the middle ear by syphilitic infection. In three of this number there was sudden, and in one instance profound deafness with autophonia, occurring in subjects in whom the hearing power was alleged not to have been previously impaired, although the presence of a congestive condition of the upper air tract and drum-heads in these patients was suggestive of previous catarrhal changes in the tympanum. The aural affection appeared during

the early stage of the secondary period in three cases, and during the tertiary, in the remaining two.

Treatment.—The administration of mercury and iodide of potash in small doses, continued for some length of time, was followed by a marked diminution in the annoying character of the autophonous phenomena, and some improvement in the hearing power. Our experience has been that the employment of large doses of these remedies, especially of the iodide of potash, is not advisable, as the effect upon the aural condition is uncertain, and the damage inflicted upon other organs, is not infrequently quite severe.

The other twelve cases had either acute or chronic affections of the middle ear, mostly suppurative, but were not at the time suffering from any of the active manifestations of the disease. In all of these patients the local disease yielded to appropriate treatment.

CHRONIC PURULENT INFLAMMATION OF THE MIDDLE EAR IN PHTHISICAL SUBJECTS.—There were five cases of purulent inflammation of the middle ear occurring in phthisical subjects, and in each instance the destructive character of the local disease was marked; the soft parts of the tympanum breaking down very rapidly; a noticeable feature was the entire absence of pain in the ear while sloughing was in progress. The purulent discharge in these cases was always profuse, and the loss of hearing power very great.

Treatment.—This is necessarily more or less palliative, as the aural affection is but the local manifestation of a general condition, usually occurring in cases where the pulmonic condition is well advanced. Reparative action is not to be expected in these cases, but the discomfort and pain experienced, may be much alleviated by careful cleansing.

AURAL POLYPI —Thirty-three cases. The greater proportion of this number were intra-tympanic polypi, taking their origin from some portion of the middle ear tract. The mucous variety of this growth was most frequently encountered, only two of a myxofibromatous type, and one fibroma being seen. There were five multiple polypi recorded. Their origin is due to the local irritation consequent upon the existence of purulent inflammation of the middle ear tract. Neglect, the excessive use of warmed instillations, heat and moisture are all of them favorable to the growth of granulation tissue. In their development they may rapidly grow to a considerable size, as was shown by the case of a man, 30 years of age, who had acute purulent inflammation of the attic and atrium. The membrana flaccida in this case was bulging and detached, and was perforated in the posterior segment. In the course of ten days, after coming under observation, a small polypoid mass presented at the perforation, developing four days later to sufficient size to be removed with the snare. On the other hand months, or even years, may elapse before

these tumors reach large proportions, and then they frequently present at the external meatus, or even in the concha, occupying the whole of the canal, which is often found considerably dilated from absorption of its osseous substance. These severe examples were sometimes found associated with mastoid disease, with a post-aural opening through the cortex of the bone. Polypoid tumors of the attic or mastoid antrum were usually associated with great or entire destruction of the membrana tympani and membrana flaccida; but they were frequently found in neglected cases of chronic purulent inflammation of the attic, with an imperforate membrana tympani, the growth presenting through a perforation in the membrana flaccida. Several examples of fungosities or extra-tympanic polypi were encountered, usually springing from the posterior wall of the external auditory canal. These masses, always due to middle ear inflammation were usually found to spring from a sinus extending into the antrum or cellules.

The symptoms noted in connection with polypoid tumors were those always indicative of chronic purulent inflammation, viz., otorrhœa, deafness, etc., and frequently vertigo, nausea, otalgia, facial palsy, autophonia, hæmorrhage, and offensive odors.

Vertigo, when associated with an acute exacerbation of chronic ear disease, was evidently due to labyrinthine pressure, from an increase in the size of the tumor, or sudden accumulation of secretions.

Neuralgic symptoms were also frequently produced by the same conditions. Facial palsy in severe cases with necrosis of the tympanic walls, may be due to injury of the nerve in its course through the tympanum, produced by the pressure of the tumor. In this instance, the removal of the tumor would be apt to be followed by relief. The offensive odors present in many cases of long standing were due to the decomposition of retained pus. In some of the patients an offensive odor was imparted to the breath from the escape of purulent matter from the tympanum through the Eustachian tube into the pharynx. The alarming symptoms which sometimes occur in cases complicated with polypoid growths, point to their danger, and indicate the necessity for prompt surgical treatment.

Treatment.—When the growths were of sufficient size, or were pediculated, they were always removed with a Sexton's aural snare (see appendix, figure 1), the instrument being used in 14 cases. In performing this operation, care was always observed to first definitely ascertain the point of attachment of the pedicle, by means of the probe, the parts being previously cleansed by syringing, and dried with an armed cotton wool carrier. The greatest gentleness was observed in this process, as polypi are liable to bleed from the slightest manipulation, the hemorrhage interfering somewhat with subsequent procedures. The operation consists in passing a loop of wire over the

body of the tumor, carrying it down to the point of attachment and then tightening the wire; in this way in most instances, the tumor is readily amputated. But in polypi of the myxo-fibromatous or fibroid type, the hard dense tissue of which they are composed resists the cutting action of the wire, and the operation is completed by forcible traction and the mass removed by evulsion. Polypoid masses and exuberant granulation tissue, springing from the walls of the atrium or external auditory canal, were removed with the cutting hoe-shaped curette or the cutting forceps. The hæmorrhage resulting from this operation was sometimes quite free, but was effectually controlled with a few syringefuls of hot water. The after-treatment consisted in most cases in daily cleansing of the auditory canal and tympanum, followed, if necessary, by insufflations of powdered boracic acid, sometimes pretty copiously used, pressure applied by means of a pledget of cotton wool of considerable size and thickness, carried well down to the fundus of the canal on a cotton wool carrier; the dressing to be renewed whenever loosened by accumulated secretions. In other cases the exuberance and vascularity of the granulation tissue will necessitate the frequent use of the curette or forceps, dressings being applied as above described. Where polypi of the atrium or attic were inaccessible, owing to the small opening in the drum-head, the greatest success was derived from of instillations of alcohol,

five or ten drops, three times daily. The ear should be turned up and held so for a few minutes after each instillation in order to confine the alcohol to the fundus and tympanum. This treatment was effectual in five cases of long standing with polypoid masses of considerable size. Not infrequently decided syringing was sufficient to detach smaller growths of a mucoid type. ESCHAROTICS were never employed in the treatment of polypi, as the superficial ones are inefficient, while the destructive ones cannot be controlled and are liable to endanger surrounding structures. ANÆSTHETICS were only resorted to in unmanageable young children, or in adults who could not be prevailed upon to endure the moderate amount of pain accompanying the operation.

HYDROCHLORATE OF COCAINE instillations, 4-per-cent. solution, 10 gtt. at a time, and repeated several times, were employed in a few cases of intratympanic polypi (the membrana tympani being absent) with, it is believed, some slight local anæsthesia.

OTALGIA, 50 CASES.—There were fifty cases of earache from reflex irritation propagated from the retention of decayed or dead teeth in the jaws. Over 60 per cent of this number were females, the greater proportion being children. The painfulness of this affection was often aggravated by the abusive measures, consisting of instillations, etc., applied for relief by parents, sympathizing friends, and others. Even in the aggravated cases the external auditory canal

and drumhead were found free from hyperæmia or other evidences of inflammation. Not infrequently the pain was confined to distinct areas or spots in the canal, as was illustrated in one case in which the body and tip of the tragus alone were the seat of pain. This quickly subsided after the removal of several dead teeth from the lower jaw on the affected side.

Treatment, consisting in the prompt removal of all diseased teeth, was followed by almost instantaneous relief, even in cases of long duration. The following case is illustrative:

Case IV. Female, æt. 30. The patient has catarrh of the upper air-tract, and during the past four years has had repeated attacks of earache in the left ear. Each attack lasted for a period of, from two to ten days, and was not accompanied by tinnitus, deafness, or discharge. The present attack commenced four weeks ago, and the pain has continued until the present time. On examination, both external auditory canals and drumheads were found to be normal in appearance. There were several dead teeth and shells in both the upper and lower jaws. The extraction of all dead teeth and the removal of tartar was followed in a few hours by complete relief from the pain, which has never recurred up to the present time.

In young children, the irritation consequent upon active or difficult dentition was often the cause of the earache, and in such cases this reflex irritability was frequently controlled with the tincture of pulsatilla.

**G.—COMPLICATIONS OF DISEASE OF THE MIDDLE
EAR TRACT.**

BELLS' PALSY, 5 CASES.—In one of the cases facial palsy had existed for years, with an obscure history of previous aural disease, the patient applying for treatment for furunculosis of the external auditory canal. The other four were severe cases in which the lesion was produced by injury to the nerve by the inflammatory process, in some part of its course through the tympanum.

DEAFNESS FROM FRACTURE OF THE BASE OF THE SKULL, 2 CASES.—Both of these patients applied for treatment of chronic purulent inflammation of the middle ear, resulting from a fracture of some portion of the petrous bone, involving the tympanum or drum-head, as was shown by the occurrence of hemorrhage and watery discharge from the ear at the time of the accident, followed by purulent matter.

PERIOSTITIS EXTERNA, 14 CASES.—Inflammation of the periosteal lining of the canal and mastoid process occurred as a complication of the more severe cases of acute and chronic inflammation of the attic and atrium; in the latter associated with an acute exacerbation of the chronic disease. It was often accompanied by marked aggravation in the local symptoms, with pain and tenderness over the mastoid process, conditions likely to give rise to a suspicion of inter-mastoid trouble.

Treatment.—It was sometimes considered advisable to cut open the integument in the canal, and although pus is very rarely found, the operation often affords relief. When swelling and fluctuation over the mastoid process indicated the presence of pus, Wilde's incision was performed. During the first stages pain and tension were relieved by aconite and other remedies usually employed for relief in acute middle ear inflammation.

CARIES AND NECROSIS OF THE MASTOID ANTRUM AND CELLULES.—11 cases.—In all of these patients, purulent inflammation of the middle-ear tract had existed for a considerable period of time, and in most instances had been entirely neglected. Polypoid masses were present in all, and in a few instances were largely instrumental in producing an extension of the disease to the deeper parts. In these neglected cases where the mastoid antrum and cellules become affected with subsequent caries, the retention of purulent secretions is not unusual, and since this region is separated from the brain and its membranes by a thin plate of bone only, the inflammatory products might extend by absorption, or by direct transmission, especially where defects in the bone existed. Septic absorption or purulent meningitis are thus a not unlikely termination.

In children, especially, is the antrum more likely to be the seat of danger, as the mastoid cellules are insignificant until after puberty; the antrum is, more-

over, in very young children, in communication with the cerebral structures through the petro-squamosal suture, which remains patent for some time after birth. Six of the total number of cases were children with chronic otorrhœa and caries of different portions of the attic, antrum and auditory plate. The sequestræ formed in these cases were exfoliated through the external auditory canal, or through a sinus behind the auricle produced by a tympano-mastoid abscess. Drainage through the external auditory canal in these cases is very difficult to maintain, owing to detachment and collapsing of the canal. The two following cases were instances of the above :

CASE V.—A child seven years of age, with otorrhœa of four months' standing. An abscess slowly formed over the mastoid process, without marked local symptoms, coincident with partial subsidence of the aural discharge. Examination at the time disclosed a partially detached and collapsed canal, which obscured the fundus from view. The abscess was opened, and free drainage was established, the sinus extending from the opening behind the auricle, into the tympanum and canal. No opening through the cortex of the mastoid could be detected.

The external surface of the auditory plate was carious in different spots. The sinus was kept patent with catgut tents, and from time to time sequestra were thrown out through the tract; their exfoliation being accompanied frequently by pain in the ear, and

swelling of the tissues about the auricle. In three months the aural discharge ceased, the sinus closed, and examination of the tympanum, showed entire destruction of the drum-head. The atrium cavity was plainly seen, its walls being covered with dry glistening cicatricial tissue.

CASE VI.—A girl, four years of age, with otorrhœa in the left ear of two years' duration. During the six months previous to coming under observation, three abscesses had formed on the left side of the head, neck and face; the patient had lost strength and become emaciated. On examination, there was a post-aural sinus, through which the probe passed into the mastoid antrum, exposed bone being detected along the sinus and in the antrum. The external auditory canal was filled with a polypoid mass, presenting at the meatus. The patient had some elevation of temperature. The polyp was snared, and free drainage maintained through the canal and sinus, and the patient given constitutional and local treatment. In six weeks pains in the ear were complained of, and a large sequestrum, from the direction of the antrum, protruded into the external auditory canal, its size and presence seriously interfering with drainage. The removal of the sequestrum could only be accomplished by either incising the cartilaginous meatus or by partially detaching the auricle and turning it forward, thus enlarging the post-aural sinus. Both of these procedures were considered inadvisable

in so young a subject, and treatment being continued for a few days longer, the sequestrum loosened, and was extracted through the canal, with Sexton's foreign body forceps. The patient then made a rapid recovery. (The case is reported in full in the New York Medical Journal, Sept. 13, 1884.)

Two other cases terminated fatally, and in both serious complications had arisen before coming under observation. In one (case VI), the whole extent of the auditory plate was diseased, and the antrum and attic were filled with polypoid masses; there was also Bell's palsy. Symptoms of meningitis rapidly followed, and the patient died in convulsions. Post mortem examination showed that the products of the inflammation had extended through the petrosquamosal suture to the brain, with resulting purulent meningitis. The walls of the antrum and adjacent cellules were eroded away, and the entire auditory plate was necrosed. In the other (case VII), similar conditions were present, but in addition, a perforation through the cortex of the antrum had been produced, in consequence of defective drainage. There was also paresis of the facial nerve. The polypus was removed; the patient passed from under observation, and as was subsequently ascertained, died in convulsions.

The remaining cases of children and adults, seven in number, were examples of caries of the atrium and attic; the membrana tympani and membrana flaccida,

being extensively destroyed, and, in some cases, the ossicles gone.

The growth and vascularity of granulation tissue in these cases is very active, and unless controlled by treatment, fills up the tympanum and fundus of the canal in a very short time.

Treatment.—In chronic purulent inflammation of the attic and atrium, a free outlet to purulent secretions was maintained by the removal of polypoid masses and exuberant granulations. In some cases the attic may be drained through the passages between this cavity and the atrium below, the posterior one, which is of very considerable size in children, being utilized for this purpose. Sexton's syringe, with appliance for the middle ear (see appendix, fig. 13), will aid in accomplishing this object, as by passing the nozzle of the instrument well up under the membrana flaccida, and through this structure, should a perforation be present, a stream of water may be directed into the attic and antrum, and the parts thoroughly cleansed.

In perforative disease of the cortex, with post-aural sinus, drainage can be maintained by introducing cat-gut tents into the tract, folded end foremost, and in case the sinus enters the cellules, this tract may be enlarged by daily increasing the number of folds.

By the thorough removal of inflammatory products, and the use of the local remedies described

under treatment of chronic otorrhœa, the recurrence of granulation masses was prevented, and the exfoliation of sequestra greatly facilitated.

The poor physical condition of these patients always necessitated the employment of tonics, wholesome food and available hygienic measures.

But few cases were seen in which the presence of grave symptoms suggested the advisability of operative procedures upon the mastoid cortex, with a view to liberating pent up secretions, in the antrum or cellules. Indeed a wound made into this region may seriously complicate matters, and in the case of children might not reach the antrum. An opening, therefore, through the cortex cannot always be regarded as a more efficient means of drainage than that of keeping the natural passage clear.

AURAL VERTIGO.—SEVEN CASES. This symptom occurred in patients having chronic catarrh of the nasopharynx and middle-ear, with some loss of hearing power. In all of them, there was a distinct history of sudden vertigo, staggering, nausea, vomiting, and ringing in the ears, without marked increase of deafness. This group of symptoms sometimes described as MÉNIÈRE'S disease, is not always indicative of inner ear trouble. In one patient, a man 50 years of age, there was rhinitis, and both drum-heads were the seat of advanced catarrhal changes. This patient had frequent vertiginous attacks, accompanied by dysacusma and autophonia, induced by blowing the

nose, "gaping or coughing," recovery taking place in a few hours or continuing with more or less severity for days. Other patients gave a history of only one marked attack.

Treatment.—It is important that careful inspection should be made of the external auditory canal and drumhead, and foreign bodies, cerumen, etc., should if present, be removed. In a number of the patients affected, appropriate remedial measures, directed to the chronic catarrhal condition of the upper air tract, prevented a recurrence of the attacks.

AURAL HALLUCINATIONS.—TWO CASES. In a certain number of cases of chronic aural catarrh the occurrence of autophonous phenomena of a marked and peculiar character, might lead to the supposition that those affected were subject to some mental disorder. In these cases, the hallucinatory period frequently commences at a time when the autophonous perception of voice and sounds arising from the performance of the physiological functions of the circulation, respiration and swallowing are less marked or have even ceased, and it is *then* that the mind may be strangely fantasied, the wits seem to go "a wool gathering," and strange hallucinations take place. Under these conditions, musical persons give harmonious coloring to the acoustic phenomena experienced. Thus rythmical pulsation of some of the vessels in the region of the ear are described as sounds of "murmurs," or "sighing of zephyrs." Other sounds

are compared "to birds singing." In susceptible persons the imagination may give rise to the conception of musical strains, as though from an organ or choir. In other cases, autophonia occurring in coarse and brutal persons may affect the mind quite differently, producing hideous or demoniacal imaginings.

In one case observed the hallucinations were of a musical character. The patient, 72 years of age, was a music teacher, and had suffered from rhinitis; the deafness had become so bad of late as to prevent him continuing his occupation. He now has tinnitus aurium and autophonous voice, and hears conversation only when shouted. The drumheads give evidence of advanced catarrhal changes. In respect to this patient's aural hallucinations it may be stated, that they have been experienced in some degree for four years past. He states that if after composing an air, he proceeds to play it on the piano, finishing the first few bars, and then stopping, the rest of the piece is immediately completed by a full orchestra, apparently, and played through correctly. When alone in his room, familiar orchestral airs are heard at times. He fancies that his daughter, who has been dead for a year, sings familiar airs to him. Ordinary street sounds, as the rumbling of horse-cars or trucks, seem musical. The patient makes the singular mistake of believing the tinnitus, etc., to be subjective or imaginary, whilst the musical tones and sounds made by "a visitor from another world," he believes to be actual.

In another instance the hallucinations, as is frequently the case, were subsequent to inordinate alcoholic indulgence. The patient was a woman 39 years of age, an habitual drunkard, having had several attacks of delirium tremens. She has been treated for delusional insanity at a public clinic in this city. She has had catarrh with tinnitus aurium and deafness in both ears. Two months ago, after a spree, she "heard devils in the left ear" calling her bad names. The voices, are described as proceeding from both male and female persons, "devils, belonging to another world," who have "put up a job on her;" and are not due, therefore, to any diseased condition of the ear. During the past two weeks the hardness of hearing has greatly increased. On examination, both drumheads were found to be the seat of catarrhal changes. She hears low ordinary voice in the right ear, and ordinary voice in the left.

In cases of this character, the patients may frequently be relieved of their hallucinations, but the tinnitus aurium and false hearing often are permanent.

H.—DEAFMUTISM, 12 CASES.

Nine were between six months and three years of age, three between three and ten years of age. The proportion of males and females were about equally divided. The alleged causes were as follows, viz.: three were attributed to scarlet fever and measles, with "gatherings" in the ears; four

to typhoid and typhus fever; one to cerebro-spinal meningitis; one to chronic purulent inflammation of the middle ear, and one was recorded as a congenital deaf mute. In the greater proportion of these cases an aural examination detected some defect in the transmitting mechanism. Thus in seven there was deformity of the drum-head—arrested development—due to imperfect intra-tympanal air renewal and chronic catarrh in the middle ear tract at a very early period of life. In three there was more or less destruction of the transmitting mechanism from purulent inflammation. The remaining two patients did not return for a complete examination.

In regard to the degree of deafness, four could hear shouted voice only, and the remainder were conscious of vibratory movements imparted to the room as by jarring the table or slamming a door. Dysacusma was present in one case.

A number of partially deaf children were scarcely able to hear ordinary conversation. Such children were very apt to be considered slow and backward, learning to talk late in life. In these patients repeated "head colds" resulting in nasal catarrh and enlarged tonsils, had greatly impaired the condition of the upper air tract, and a nasal tone of voice was frequently present. Their enunciation and articulation were also very defective, as they often failed entirely to hear certain sounds or words and were, therefore, liable to leave them out of their

speech. Thus the hissing of the voice may not be heard at all, and such words as "sir" pronounced "thir," and "sausage" as "thausig," etc. The neglect of this class much more frequently results in dumbness than would occur if more pains were taken in their education, for if children with defective hearing organs have but little, if any opportunity to employ them, it is probable that the continuous disuse of the sensory tract would finally lead to its deterioration. The dumbness of deaf children, therefore, bears no constant relation to their aural defectiveness, as intellectually bright children, with favorable opportunities for learning will make more rapid advances, than a child mentally dull.

In regard to deafmutes or those whose impaired sense of hearing debars them from the benefits of education by ordinary methods, circumstances have seemed to make their separate education a necessity: But these, and the partially deaf, who hear ordinary voice at five feet distance, could be taught with hearing scholars, were special provision made in regard to seating distance from the teacher, etc. Simple tubes are of value in conducting sound to the child's ear, where close contact with the mouth is inconvenient; and this method may be availed of, to enable the child to compare its own voice with that of the teacher. Instruction at school should begin early, and the child should be encouraged to use its own voice frequently. If this course be adopted, fewer children would be found without any hearing sense.

APPENDIX.

The following drugs (triturate tablets) alluded to in the preceding pages have been employed at Dr. Sexton's clinic, at the Infirmary for some years; the tablets commend themselves as containing the medicine in a state of minute division from long continued trituration of the drug with sugar of milk, and for convenience in dispensing. The tablets are of convenient size for administration and are made by compressing the trituration. They are kept ready for use at Messrs. Caswell, Hazard & Co., Fraser & Co., and Boericke & Tafel, in New York, and doubtless may be obtained in other cities.

Mercurius vivus, is the metallic mercury as treated above. Tablets contain $\frac{1}{10}$ to $\frac{1}{50}$ of a grain and upwards. This preparation is similar to but much more efficacious than the *Hyd. cum creta* of the old pharmacopœa.

Calx Sulphurata (commonly misnamed sulphide of calcium). The form known as Hepar Sulphur is made by mixing the sulphur with lime made from the oyster shell. By many it is preferred to the ordinary preparation of the pharmacopœa. Tablets are made of this drug the same as from the different preparations of mercury.

Acidum Boracicum. Boric acid may now be ob-

tained in the form of a very fine powder, in which form it is used in the treatment of aural diseases.

Acidum Boracicum and Calendula.—This mixture is made of equal parts by weight of boracic acid in a powdered state and the tincture of calendula. The mass is subjected to a low heat until the alcohol is evaporated off, when it is rubbed in a mortar until free of lumps. It may be reduced by the addition afterwards of more or less boracic acid. The preparation is especially efficacious as a dressing in acute purulent inflammation of the middle-ear, and in ulceration of the external auditory canal with offensive discharges.

Tincture of Calendula should be prepared from the fresh flowering herb (*calendula officinalis*, Linné). The valuable vulnerary qualities of this plant suggest its employment in recent wounds; it may also be employed as a stimulant in chronic suppuration.

Salicylic Acid, employed in long standing chronic purulent inflammation of the atrium or attic of the tympanum. It may be used pure or reduced by rubbing it up with some neutral powder.

Tincture of Pulsatilla, and gelsemium, should be made from the fresh herb. The former is best suited to the acute catarrhs of children.

Tincture of Aconite. The drug employed is made from the tuberous root.

INSTRUMENTS REFERRED TO IN THE FORE-
GOING PAGES.

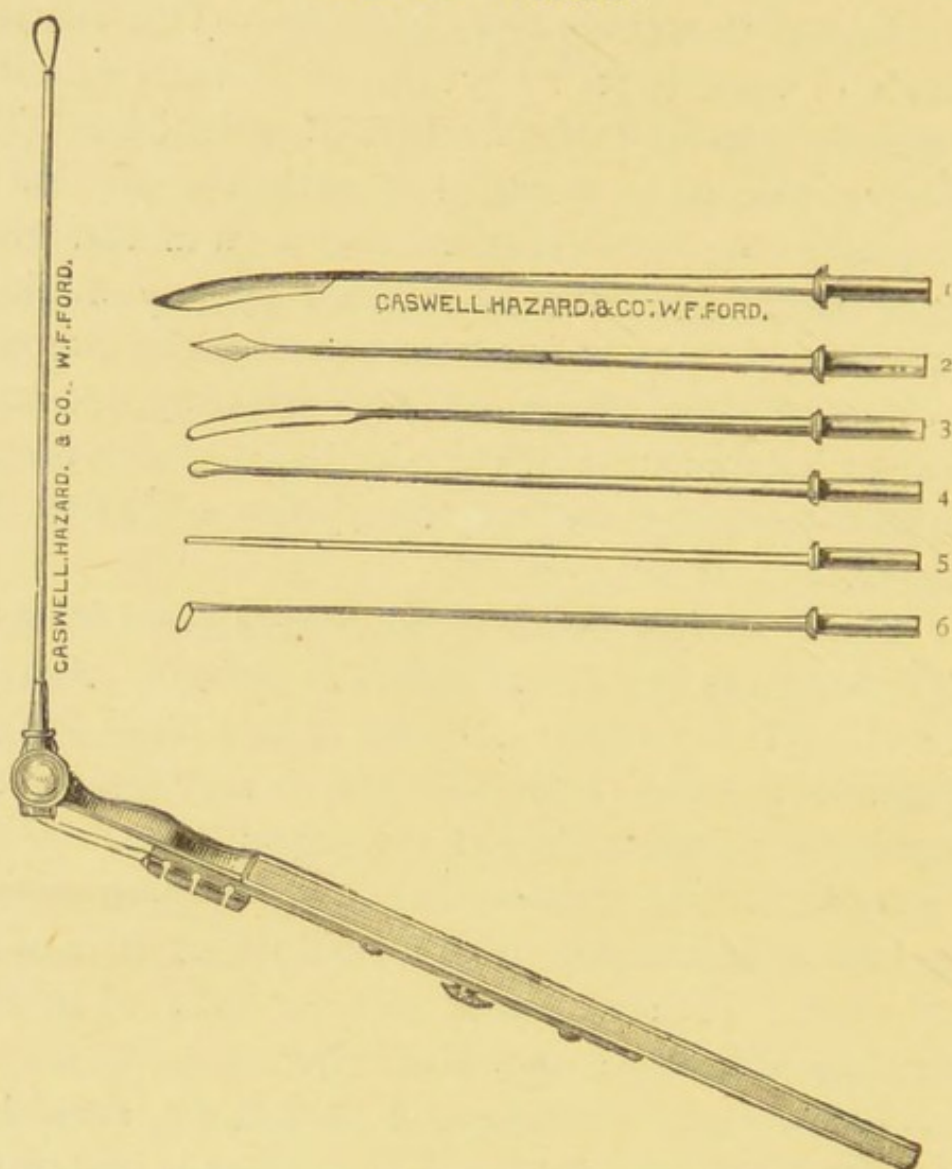


FIG. 1.

Polypus Snare (Fig. 1).—This instrument consists of a handle, cannula, and wire loop. The handle is $4\frac{1}{2}$ inches long, made of ivory, has at one end a receiving cylinder, and on its anterior surface a slid-

ing bar, and at one end of which is a milled button by which it is drawn down by the thumb of the hand in which it is held, while at the other end of the bar are three notches, into which the wire is passed. The three angular turns thus made secure the wire more firmly than can be done by winding it around a post, as in most snares. The axis of this cylinder forms an angle of 110° with the long axis of the handle, thus permitting simultaneous vision and manipulation at the extremity of the adjusted portion. The wire used is made of malleable iron, No. 35.

The six instruments described below are made to fit the receiving-cylinder of the snare-handle for manipulation therewith.

1. *Sharp-pointed Ear-knife.*
2. *Myringotome.*—Lance-shaped, with both edges sharpened.
3. *Probe-pointed Ear-knife.*—Nos. 2 and 3 are small bistoury blades, suitable for any cutting operations in the canal.
4. *Stout-silver Probe.*—Made rather strong, with large bulb. It is less liable than more slender probes to injure the parts and to cause bleeding.
5. *Silver Cannula.*—A part of the polypus-snare, made of coin silver; $\frac{1}{24}$ inch in diameter.
6. *Hoe-shaped Scraper.*—This is $\frac{1}{16}$ by $\frac{1}{32}$ inch in surface, with sharp edge, for the removal of gran-

ulation tissue from the tympanum and adjacent parts.

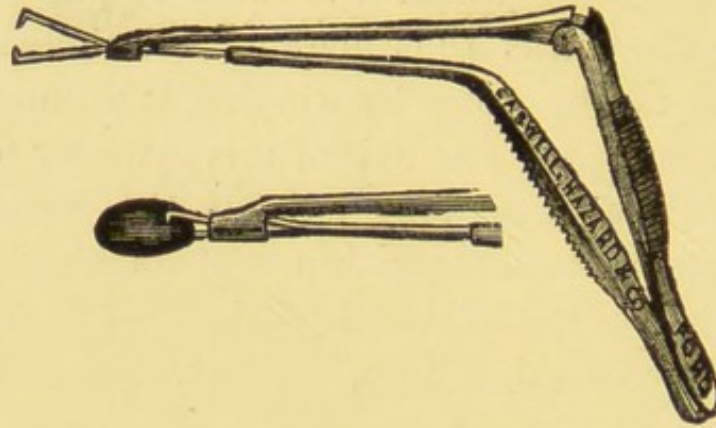


FIG. 2.

Foreign Body Forceps (Fig. 2).—This instrument is made to seize an object by a sliding ring, which glides down over the blades to their end, when the handle is pressed by the thumb and fingers. Upon the extremity of each blade is one needle-point, so set that the forceps can take hold of a presenting surface without the exertion of any propulsive force. The two blades attached to one bar, can rotate in the handle, thus allowing an object, when in the process of removal, to adapt itself to the conformation of the canal. The attachment by two needle points provides an axis upon which the foreign body can move from side to side, also. This instrument will prove especially useful in cases where foreign bodies lie impacted anywhere within the canal or tympanum, as with it very strong traction can be made. The

combination ear forceps, fig. 12, has a foreign body point (4) the same as this instrument.

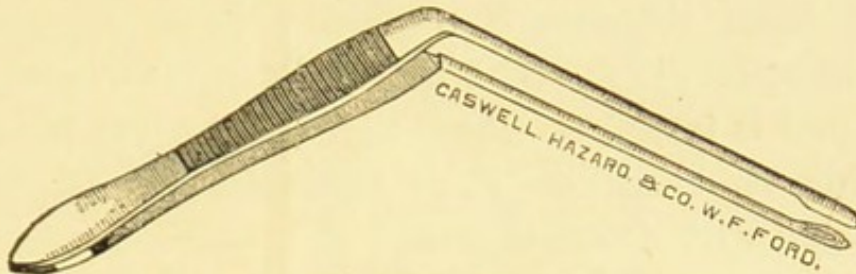


FIG. 3.

Small Dressing Forceps.—Handle, $2\frac{1}{4}$ inches in length and having slender branches of about the same length, with broad, smooth ends, which meet with great precision.

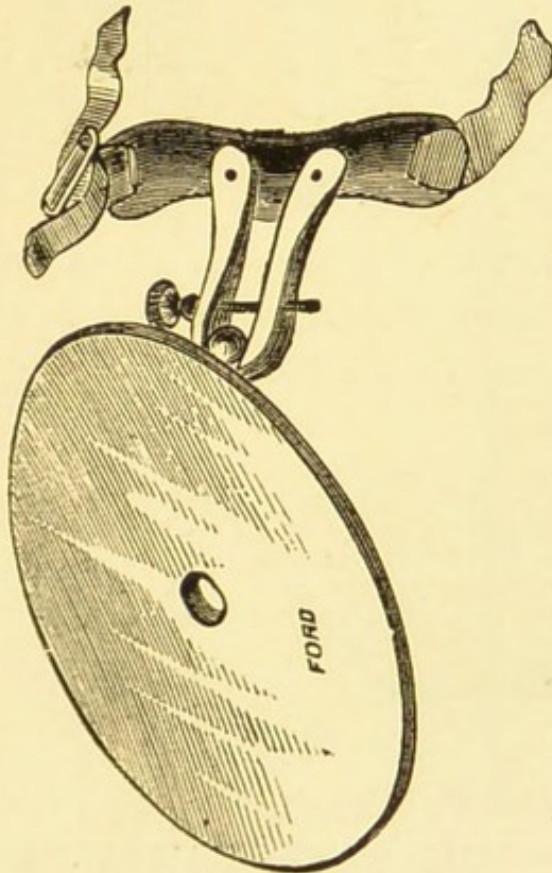


FIG. 4.

Head-mirror and Adjustable Band (Fig. 4).—This mirror is concave, $2\frac{1}{2}$ inches in diameter, about 6 inches focal distance, and perforated in the centre. The head-band is of strong silk ribbon one inch wide, and is fastened, when adjusted to the head, by a sliding shoe-buckle. The forehead-rest is padded and faced with chamois skin.

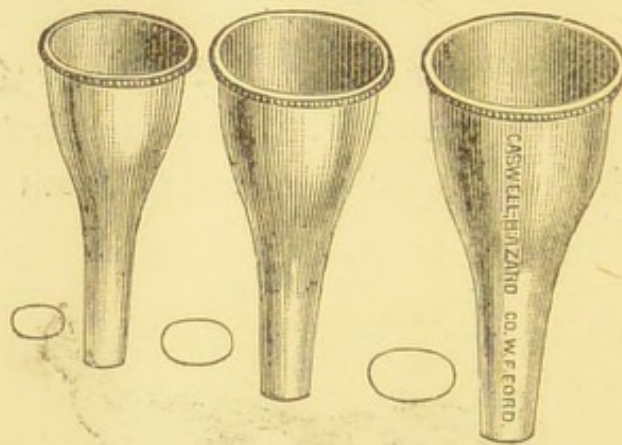


FIG. 5.

Aural Specula (Fig. 5).—Made of German-silver, after the pattern of Gruber, of three or four different sizes. They may be used also as nasal specula at the anterior nares.

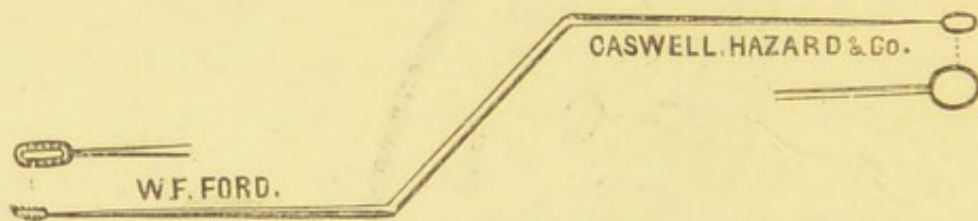


FIG. 6.

Curved Double Curette (Fig. 6).—Terminates at one end in a plain ring curette, at the other in a

toothed, hooked curette. The latter is especially ser-



FIG. 7.



FIG. 8.

viceable in cases of foreign body in the canal, where syringing proves unavailing, or where the intruder is of such hard or smooth nature that the foreign-body forceps cannot secure a hold. In nearly all such cases it can be forced between the object and the wall of the canal, when, from its firm hold, effective traction can be made.

Vulcanite Cotton-Wool Carrier (Fig. 7).—Is $5\frac{1}{2}$ inches long, highly polished, except at the tip of the more tapering end, where the cotton-wool is twisted on for wiping out the canal or tympanum. The more abruptly conical end permits cotton-wool to be slipped off easily and left in the canal, when desired, as absorbent, tampon or dilating tent when rolled together very tightly.

Aluminium Cotton-wool Carrier (Fig. 8).—Is light and delicate, terminating in a sickle-shaped curve; is useful for making applications to the more remote portions of the cavity of the tympanum, or to cleanse it with cotton-wool brush.



FIG. 9.

Two Bladed Scalpel (Fig. 9).—The one blade

has a straight back, the other a back and cutting edge of equal curves. Both are secured by a sliding catch. Especially adapted for incising the mastoid region or for superficial cutting operations on auricle or meatus.

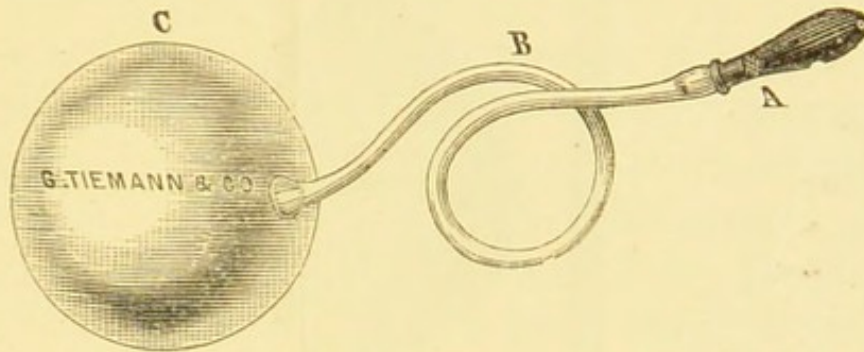


FIG. 10.

Rubber Bulb with Attachments for Rarefaction and Condensation of the Air in the External Auditory Canal (Fig. 10).—It consists of a soft rubber bulb, connected by a flexible tube to a hard rubber nozzle, the latter somewhat olive-shaped and adapted to fit into the entrance of the external meatus, where, when used, it is pressed against the opening with sufficient force to make the fitting as nearly air-tight as possible. The instrument must be carefully used, as the drum-head is ordinarily never stimulated to action by a greater force than the wave-pulses of the air. When the instrument is to be used for suction—rarefaction—the bulb is collapsed by pressure, before the nozzle is applied to the ear. Upon removing the pressure of the hand, the bulb gradually resumes its expanded condition; thus rarifying the air in the

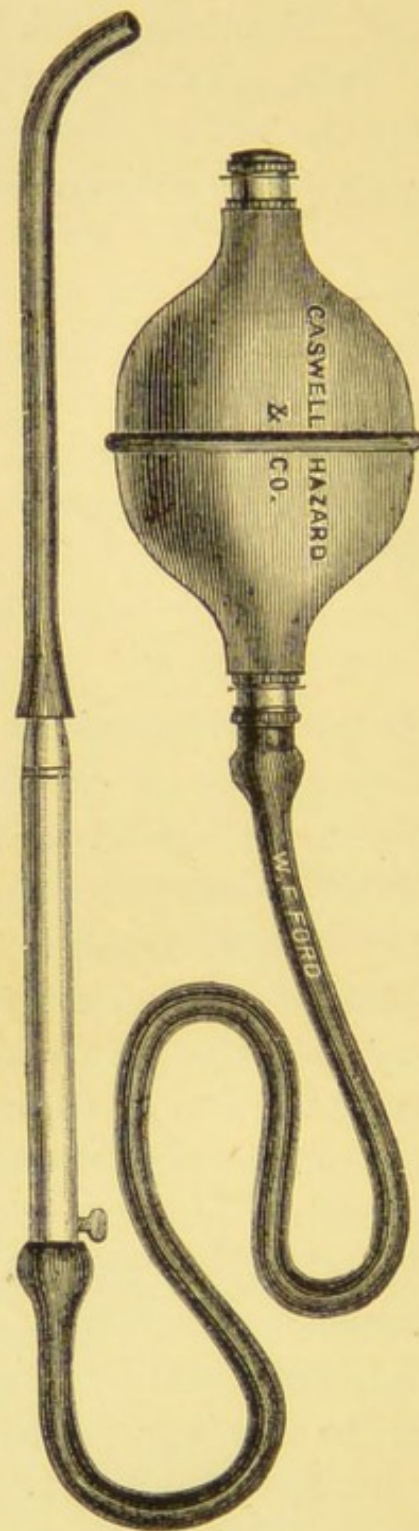


FIG. II.

meatus externus. If it is desired to put the m. t. and ossicula in motion, the bulb is alternately compressed and expanded while the nozzle is in contact with the ear.

Flexible Eustachian Catheter (Fig. 11).—Is made of rubber somewhat larger than those ordinarily used. It adapts itself to the walls of the nasal passage on introduction, collapsing readily on meeting resistance. Its lodgment in the mouth of the eustachian tube is facilitated by the great curvature of the pharyngeal end, which this soft and flexible material permits of. In cases of lateral deviation of the nasal septum with closure of one side, this catheter may often be introduced into either Eustachian tube while the instru-

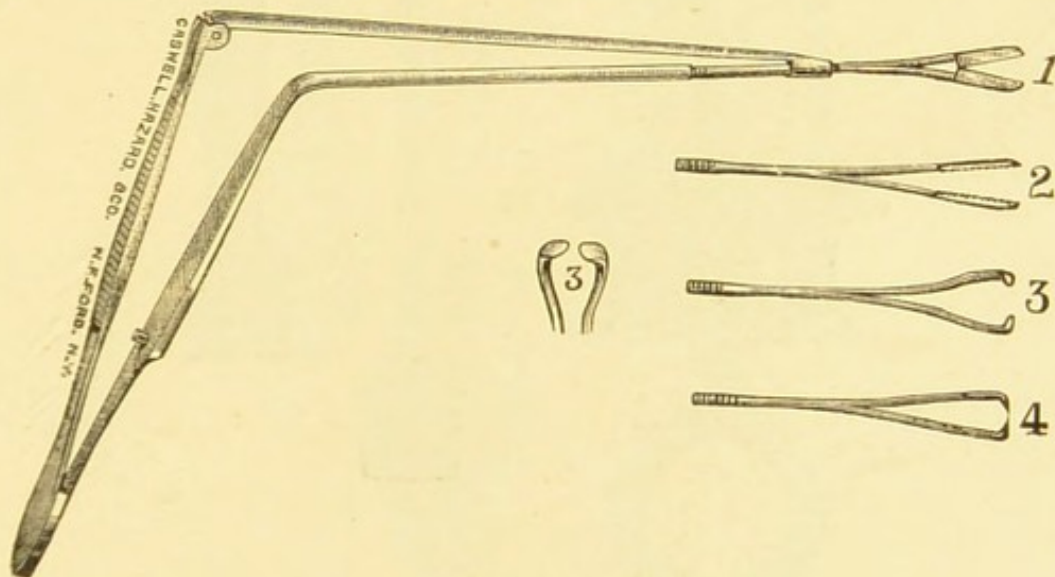


FIG. 12.

ment remains in the unobstructed meatus. It is $11\frac{1}{2}$ centimetres long, the rubber being one millimetre in

thickness. The sizes mostly used are 5 and 7. The vulcanite canula ($8\frac{1}{2}$ centimetres long, by $\frac{1}{2}$ centimetre in diameter) has a small knob which should correspond

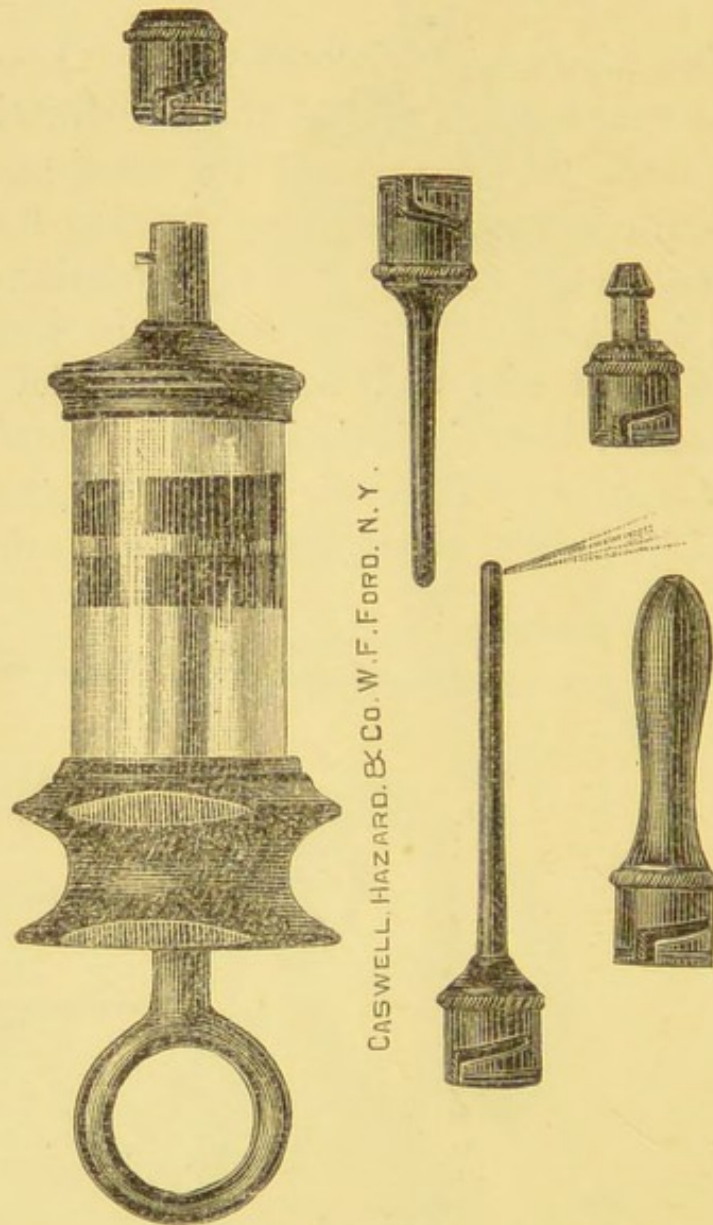


FIG. 13.

with the concavity of the curved beak of the catheter, when introduced into the latter. Inflation may be

made with the ordinary insufflating ball, connected with the canula by rubber tubing.

Combination Ear Forceps (Fig. 12).—The handle is the same as the previously described Foreign-body Forceps, and has the following four adjustable operating points:

1. *Scissors*, for trimming away redundant tissues from the walls of the external auditory canal.
2. *Serrated Dressing Forceps*.

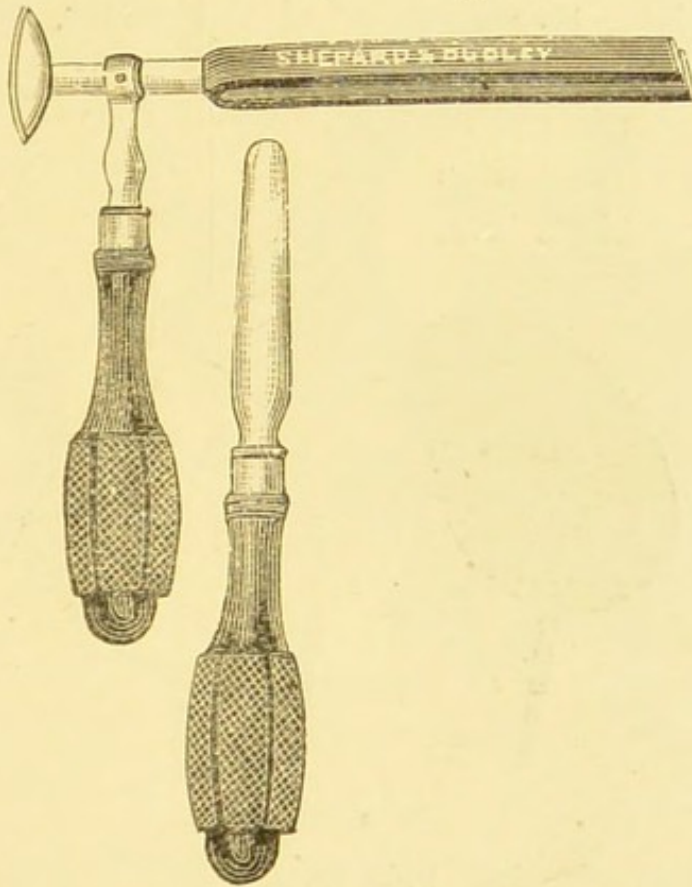


FIG. 14.

3. *Cutting Forceps*, for removing polypoid or other tissues inaccessible to the scissors, or for snipping

off small adenoid growths from the inner wall of the visible pharynx.

4. *Foreign Body Forceps Point.*

Glass Aural Syringe (Fig. 13).—The mountings and tips being of vulcanite rubber, verdigris cannot possibly form in this syringe. It holds about $\frac{2}{3}$ iss water when filled, and works very freely. It is so made that a little water always remains in the forward end of the barrel after using, which keeps the packing always moist. Evaporation of the water, when not

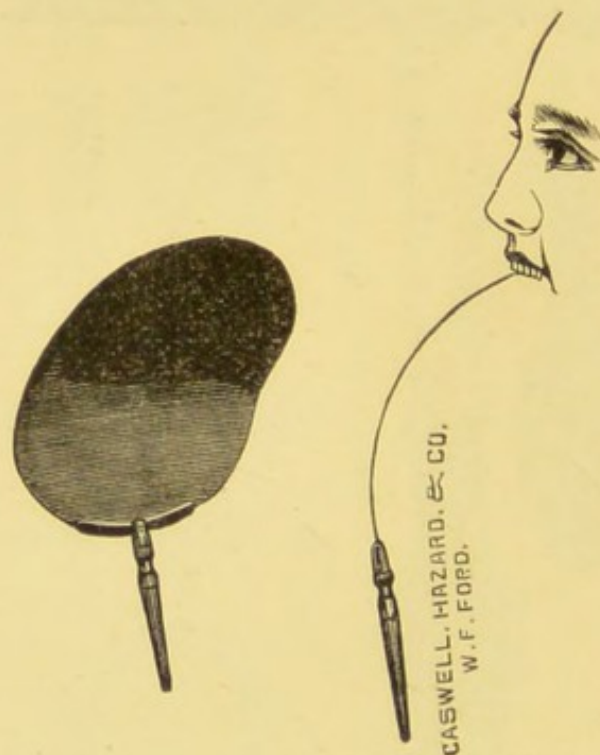


FIG. 15.

used, is prevented by the attachment of a vulcanite cap. The three tips provided are fitted on to the barrel by means of a bayonet-fastening. One tip supplies

a small direct current of water; from another a stream is emitted at a right angle with the long nozzle, very near the point, and will be found useful in syringing out the attic, etc. The third nozzle fits into the meatus closely and may be employed in diseased condition of the deeper parts.

Tuning-Fork and Striker (Fig. 14).—The striker consists of a bougie-shaped piece of metal about $2\frac{1}{2}$ inches in length, with a handle of wood of about the



FIG. 16.

same length. The metal part may be mounted with a piece of rubber-tubing near the end, so that in striking the tuning fork, overtones will be prevented.

Hard Rubber Acoustic Fan (Fig. 15).—Is made

of polished sheet hard rubber fan-shaped, and bent to the necessary curvature. When in use, it is made taut by pressing the handle upwards.

Binaural Conversation Tube for the Aural In-



FIG. 17.

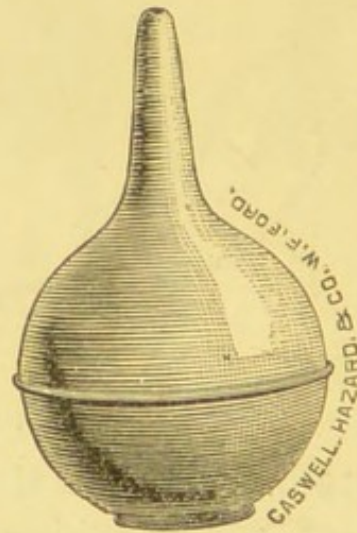


FIG. 18.

struction of the Deaf (Fig. 16).—This instrument is

fitted to the ears by two metallic tubes which are drawn together by a spring placed between them, and is self-retaining. It has one mouthpiece for the speaker and one for the hearer, both of which communicate with the ears of the patient, by means of the metallic tubes. It is recommended for the binaural transmission of

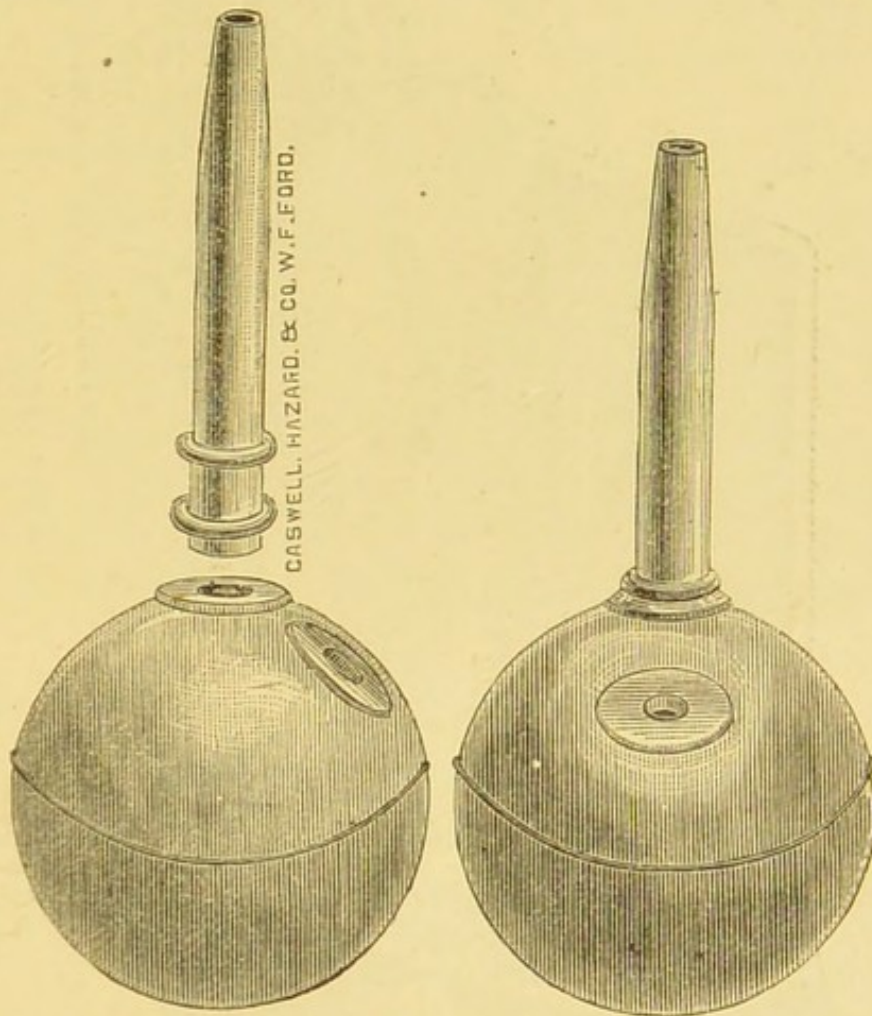


FIG. 19.

sound in cases where some hearing power remains in both ears. It is serviceable in teaching nearly all very

deaf children and in conversing with deaf people. The sound of the voice is heard through this instru-

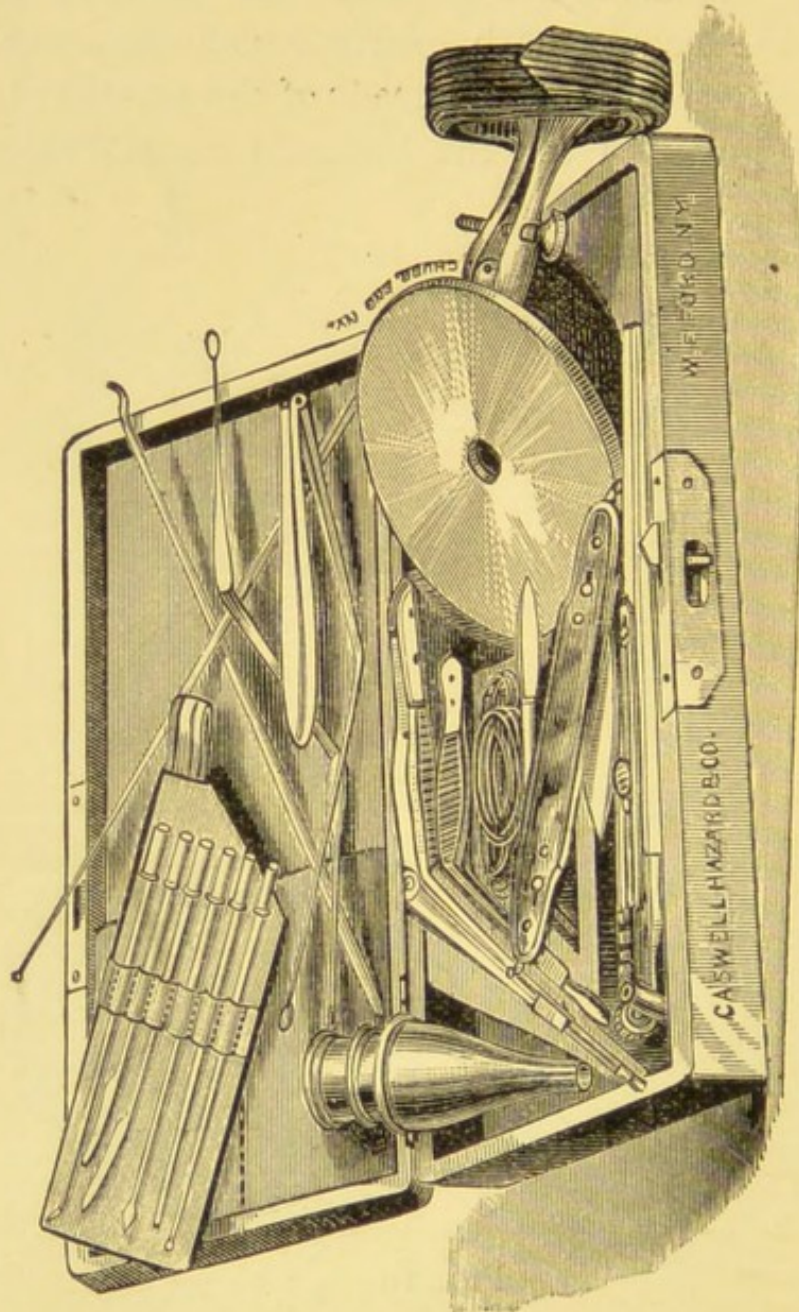


FIG. 20.

Dr. Sexton's Aural Pocket Case (Fig. 20).

ment in a natural tone, thus avoiding the painfulness of ear-trumpets and conical tubes.

Brass Aural Syringe (Fig. 17).—Length of barrel $2\frac{1}{2}$ inches, length of tip, two inches. It is intended for the patient's own use, when prescribed by the physician.

Rubber Bulb Syringe (Fig. 18).—It is made entirely of soft rubber, and of a size convenient for carrying in the pocket.

Aural Powder Insufflator (Fig. 19).—It consists of a soft rubber ball about $1\frac{3}{4}$ inches in diameter with two small orifices as shown in the cut; one of these admits a glass tube held in place by a projecting rim, the other is to be closed by the finger when expelling powder into the ear by sudden compression of the bulb. The glass tube is charged by pressing its open extremity down into a shallow, wide-mouth vial containing the powder to be used.

NOMENCLATURE AND CLASSIFICATION OF DISEASES OF THE EAR.*

EXTERNAL EAR—AURICLE.

I. *Abnormalities.*

a. Arrested development.

1. Abnormal position.
2. Absence of auricle, or parts of auricle, and altered shape, as lapping, convolutions, due to absence of cartilage.
3. Microtia.
4. Congenital fistula.

b. Excessive development.

1. Plurality.
2. Abnormal enlargement.
3. Polyotia (Auricular appendages).
4. Reduplication.

c. Irregular development (?).

* I am aware of the incompleteness of this list, and of the difficulty, if not impossibility, of reconciling the views of various writers as to the nomenclature of aural diseases. A few changes have been made, some of them at the suggestion of Dr. Charles H. Burnett, Philadelphia, since the list appeared in the New York Medical Journal, August, 1885.

S. S.

II. *Cutaneous Diseases.*

- a.* Callosities.
- b.* Comedo—Acne punctata [Sebaceous tumor?].
- c.* Dermatitis.
- d.* Eczema.
- e.* Erysipelas.
- f.* Erythema, Flushing.
- g.* Furuncle, Abscess.
- h.* Gangrene [from Embolism, Low Fevers, or Freezing].
- i.* Herpes zoster (Auriculæ idiopathica).
- i.* Hydroa.
- k.* Ichthyosis (congenita).
- l.* Intertrigo.
- m.* Keloid.
- n.* Leprosy.
- o.* Lupus (erythematosus, maculosus, ex ulcerans).
- p.* Molluscum fibrosum.
- q.* Myxoderma [a neurosis whose ætiology is undetermined].
- r.* Nævus.
- s.* Pemphigus gangrenosus.
- t.* Pernio [Frost-bite].
- u.* Phagedæna [Cancrum oris].
- v.* Phlegmon (acute, chronic).
- w.* Syphiloderma (erythematosum, papulare, tuberculare, pustulare, squamosum, ser-

piginosum, ecthymatosum, ulcerativum, nodosum).

x. Tophi.

y. Trichophytosis [Ring-worm].

z. Ulcer.

III. *New Growths.*

a. Angioma—Glandular hypertrophy.

b. Cavernous tumor.

c. Cyst (dermoid, sebaceous). Atheroma, cornu, [Comedo? Acne punctata?]

d. Cornu. [*Vide* Cyst.]

e. Epithelioma.

f. Fibroma.

g. Fibro-sarcoma.

h. Lipoma, Steatoma [Atheroma?].

i. Myxo—fibroma.

i. Myxo—sarcoma.

k. Nævus vascularis [maternus].

l. Sarcoma.

m. Hæmatoma. [*Vide* Wounds and Injuries.]

IV. *Wounds and Injuries.*

a. Cleft of lobule [by ear-ring].

b. Lacerated wound.

c. Contused wound. Hæmatoma [Othœmatoma].

d. Incised wound.

e. Punctured wound.

f. Shot wound.

g. Effects of heat.

1. Burns.
2. Scalds.
- h.* Effects of cold.
 1. Frost-bite.
 2. Gangrene.
 3. Chilblains.
- i.* Effects of mineral and vegetable irritants.
 1. From acids.
 2. " caustic alkalies.
 3. " metallic compounds.
 4. " acrid vegetables [Nettle, etc.].
- j.* Effects of poison in wounds.
 1. From bites of insects, reptiles, and other animals.
 2. From septic infection.
 3. " poisoned weapons.

EXTERNAL AUDITORY CANAL.

- I. *Abnormalities.*
 - a.* Arrested development.
 1. Absence of external auditory canal.
 2. Atresia congenita (membranosa, ossea).
 3. Abnormal width.
 4. Congenital contraction.
 - b.* Excessive development.
 1. Thickening of cutaneous lining. [*Vide*
New Growths.]
 - c.* Irregular development.
 1. Meatus bivius.

- II. *Hyperæmia.*
- III. *Periostitis.*
- IV. *Circumscribed Inflammation.*
- V. *Diffuse Inflammation* (acute, chronic).
- VI. *Croupous Inflammation.*
- VII. *Gangrenous Inflammation.*
- VIII. *Desquamative Inflammation.*
- IX. *Extravasative Inflammation*
- X. *Skin Diseases.*
 - a. Eczema.
 - b. Erysipelas.
 - c. Erythema.
 - d. Herpes.
 - e. Pemphigus.
 - f. Ulcer—Hæmorrhage.
 - g. Cerumen (deficiency, excess), Cretaceous Bodies, Otomycosis (*Aspergillus Nigricans*, *A. Flavescens*, *A. Fumigatus*, *Graphium Penicilloides*, *Aschophora Elegans*, *Trichothecium*, *Mucor Mucedo* seu *Fuscus*, *Otomyces Hageni*, *O. Purpureus*).
- XI. *Anomalies of Secretion.*
 - a. Seborrhœa,
 - b. Desquamation—laminated epithelial plug.
- XII. *Stricture—Stenosis.*
- XIII. *Adhesion of Walls—Bands.*
- XIV. *Collapse of Cartilaginous Portion.*

XV. *Caries and Necrosis*—Communicating sinus from parotid gland, attic of tympanum, or adjacent pneumatic cells.

XVI. *Granulation*—Hæmorrhage.

XVII. *New Growths.*

- a.* Enchondroma.
- b.* Epithelioma.
- c.* Exostosis (pedunculated, broad-based).
- d.* Hæmatoma.
- e.* Hyperostosis.
- f.* Miliun.
- g.* Thickening of cutaneous lining of canal.
[*Vide Abnormalities.*]
- h.* Polypus [*Vide Middle Ear Tract.*]
- i.* Sarcoma.
- j.* Sebaceous tumor.

XVIII. *Wounds and Injuries.*

- a.* Lacerated wound.
- b.* Contused wound.
- c.* Incised wound.
- d.* Punctured wound.
- e.* Shot wound.
- f.* Fracture. [*Vide Wounds and Injuries of Auricle.*]

XIX. *Foreign Bodies.*

- a.* Animate objects.
- b.* Inanimate objects.

XX. *Ingrowing Hairs from Tragus and Canal pressing upon the Membrana Tympani.*

MEMBRANA TYMPANI.

- I. *Abnormalities.*
 - a. Arrested development.
 - 1. Absence of manubrium mallei.
 - 2. Absence of membrana tympani.
 - b. Excessive development.
 - c. Irregular development.
- II. *Trophic Changes.*
 - a. Atrophy.
 - b. Calcareous degeneration.
 - c. Opacity—Fibrous hypertrophy (?).
 - d. Cicatricial regeneration [manometric].
- III. *Myringitis, Simplex.*
 - a. Inflammation of pars flaccida (acute, chronic).
 - b. Inflammation of pars vibrans (acute chronic).
- IV. *Myringitis, Desquamative.*
- V. *Myringitis, Extravasative* [Hæmatoma of drum-head].
- VI. *Abscess.*
- VII. *Chronic Ulcer*—Hæmorrhage.
- VIII. *Skin Diseases.*
 - a. Eczema.
 - b. Erysipelas.
 - c. Erythema.
 - d. Ecchedermata of the manubrium.
- IX. *New Growths.*

- a.* Cholesteatoma.
- b.* Epithelioma.
- c.* Syphilide.
- d.* Tubercle.
- e.* Vascular tumor.
- f.* Keloid (cornu).
- g.* Moles.
- h.* Warts.

X. *Wounds and Injuries.*

- a.* Rupture.
 - 1. From boxing auricle.
 - 2. From pulling auricle.
 - 3. From falling on auricle.
 - 4. From syringing canal.
 - 5. From condensing air in canal or Eustachian tube.
 - 6. From rarefying air in canal or Eustachian tube.
 - 7. From fracture of base of skull.
- b.* Perforation by puncture, or incision, with foreign body, or instruments.
- c.* Abrasion from impacted cerumen, foreign body or instruments.
- d.* Concussion from impacted cerumen, foreign body, or instruments.
- e.* Straining from pulling auricle.
- f.* Effects of cold from bathing, diving, or syringing canal.

XI. *Foreign Bodies.*

- a.* Animate objects.
- b.* Inanimate objects.

MIDDLE EAR TRACT—TYMPANUM—ATRIUM, ATTIC,
AND ANTRUM.

I. *Abnormalities.*

- a.* Arrested development.
 - 1. Absence of membrana tympani.
 - 2. Absence of part or all of ossicles.
 - 3. Absence of tympanum.
 - 4. Absence of labyrinthine fenestræ.
 - 5. Absence of eminentia pyramidalis.
- b.* Excessive development.
 - 1. Fusion of ossicles.
 - 2. Overgrowth of ossicles.
 - 3. Superfluous ossicles.
- c.* Irregular development (?).

II. *Hæmorrhage*—Vicarious menstruation.

III. *Acute Non-suppurative Otitis Media.*

IV. *Mucous or Muco-serous Catarrhal Otitis Media*
(acute, subacute, chronic—trophic).

V. *Suppurative Otitis Media* (acute, subacute,
chronic).

VI. *Croupous, Diphtheritic, and Desquamative*
Otitis Media.

VII. *Caseous Otitis Media.*

VIII. *Chronic Dry and Adhesive Catarrhal Otitis*
Media.

IX. *Sclerosis.*

- X. *Caries of Tympanum.*
- XI. *Caries of Ossicles.*
- XII. *Fracture and Dislocation of Ossicles.*
- XIII. *Syphilitic Inflammation of Tympanum* (secondary, tertiary).
- XIV. *Embolism in Mucous Membrane.*
- XV. *New Growths.*
 - a. Cholesteatoma.
 - b. Cyst.
 - c. Epithelioma.
 - d. Exostosis of tympanum.
 - e. Exostosis of ossicles.
 - f. Hyperostosis of tympanum.
 - g. Hyperostosis of ossicles.
 - h. Osteosarcoma.
 - i. Polypus

{	mucous	}	muco-fibrous.
	fibrous		
	mucoid		
 - j. Tubercle.
- XVI. *Wounds and Injuries.*
 - a. Through Eustachian tube.
 - b. Through membrana tympani.
 - c. By fracture of base of skull.
- XVII. *Foreign Bodies.*
 - a. Animate objects.
 - b. Inanimate objects.

COMPLICATIONS OF DISEASE OF MIDDLE EAR TRACT.

I. *Periostitis of Cortex of [osseous] Ext. Auditory Canal.*

II. *Disease of Mastoid Process.*

- a.* Periostitis of cortex of mastoid process.
- b.* Inflammation of pneumatic cells of mastoid process (catarrhal, purulent, cheesy—acute, chronic). [All inflammations of the middle ear tract are *apt* to involve, in secondary inflammation, the pneumatic cells of the mastoid process, and *vice versa*.]
- c.* Caries and necrosis of mastoid process.
- d.* New growths of mastoid process.
 - a.* Cholesteatoma.
 - b.* Epithelioma.
 - c.* Exostosis.
 - d.* Hyperostosis.
- e.* Polypus. [*Vide* Polypus of Middle Ear Tract.]

III. *Circumauricular Abscess.*

IV. *Facial Paralysis* [Bell's Palsy].

V. *Fracture of Base of Skull.*

VI. *Pachymeningitis.*

VII. *Leptomeningitis.*

VIII. *Cerebral Abscess.*

IX. *Thrombosis.*

X. *Embolism.*

- XI. *Phlebitis.*
- XII. *Pyæmia.*
- XIII. *Constitutional Disease.* [Causing or modifying disease of middle ear tract.]
 - a.* Rheumatism.
 - b.* Phthisis.
 - c.* Rachitis
 - d.* Syphilis.
 - e.* Exanthemata.
 - 1. Scarlet fever.
 - 2. Typhus fever.
 - 3. Typhoid fever.
 - 4. Measles.
 - 5. Variola.
 - 6. Varioloid, etc.
 - f.* Whooping-cough.
 - g.* Diphtheria.
 - h.* Bright's disease.
 - i.* Diabetes.
 - j.* Genito-sexual disturbance.
 - 1. Puberty.
 - 2. Pregnancy.
 - 3. Menopause.
 - 4. Masturbation.
 - 5. Excessive venery, etc.
 - k.* Abuse of systemic materia medica.
- XIV. *Oral Irritation or Disease.*
- XV. *Orbital Irritation or Disease.*
- XVI. *Nasal Irritation or Disease.*

- XVII. *Pharyngeal Irritation or Disease.*
- XVIII. *Mumps.*
- XIX. *Disease of External Ear.*
- XX. *Disease of Internal Ear.*

MASTOID PROCESS.

- I. *Abnormalities.*
 - a. *Arrested development.*
 - 1. Ossification gaps in outer table.
 - 2. Absence of Pneumatic cells.
 - 3. Separation from the rest of the temporal bone.
 - 4. Total absence of mastoid process.
 - b. *Excessive development.*
 - 1. Very large pneumatic cells.
 - c. *Irregular development.*
 - 1. Anomalous character of blood-channels.
- II. *Hæmorrhage.*
- III. *Inflammation of Pneumatic Cells, Catarrhal (Primary).*
- IV. *Inflammation of Pneumatic Cells, Purulent (Primary).*
- V. *Periostitis Externa.*
- VI. *Caries and Necrosis.*
- VII. *Emphysema.*
- VIII. *Sclerosis (?)*. [Closing of pneumatic cells by ossification in old age.]

IX. *New Growths.*

- a.* Cholesteatoma.
- b.* Epithelioma.
- c.* Exostosis.
- d.* Hyperostosis.
- e.* Polypus. [*Vide* Polypus in Middle Ear Tract.]

X. *Wounds and Injuries.*

- a.* Contused wounds.
- b.* Perforated wounds.
- c.* Fracture.
- d.* Shot wounds.

XI. *Foreign Bodies.*

- a.* Animate objects.
- b.* Inanimate objects.

COMPLICATIONS OF DISEASES OF THE MASTOID PROCESS.

- I. *Diseases of External Ear and their Complications.*
- II. *Diseases of Middle Ear Tract, and their Complications.*
- III. *Diseases of Internal Ear, and their Complications.*
- IV. *Sinus of Neck.*
- V. *Torticollis.*

INTERNAL EAR.

- I. *Abnormalities.*
 - a. Arrested development.
 - 1. Absence of part or all of the labyrinth.
 - 2. Absence of auditory nerve.
 - b. Excessive development.
 - c. Irregular development(?).
- II. *Anæmia.*
- III. *Hyperæmia.*
- IV. *Hæmorrhage.*
- V. *Otitis Interna, Simplex.*
- VI. *Otitis Interna, Syphilitica(?)*.
- VII. *Otitis Interna, Typhoidea(?)*.
- VIII. *Otitis Interna, Parotitica(?)*.
- IX. *Caries and Necrosis.*
- X. *Diseases of Auditory Nerve.*
 - a. Hyperæmia.
 - b. Inflammation.
 - c. Atrophy.
 - d. Amyloid degeneration (Corpora amy-
acea).
 - e. Injury. Paralysis.
 - f. ^{*}New growths.
 - 1. Fibroma.
 - 2. Fibro-sarcoma.
 - 3. Glioma.
 - 4. Gumma.

5. Neuroma.

6. Sarcoma.

XI. *Wounds and Injuries.*

a. Through middle ear.

b. By fracture of base of skull.

c. Concussion.

COMPLICATIONS OF DISEASE OF INTERNAL EAR.

I. *Associated Disease* (local or constitutional).

II. *Brain Disease or Injury.*

III. *Fracture of Base of Skull.*

IV. *Disease of Middle Ear Tract, and its Complications.*

V. *Disease of Mastoid Process, and its Complications.*

EUSTACHIAN TUBE.

I. *Abnormalities.*

a. Arrested development.

1. Congenital absence.

2. Congenital obliteration or stenosis.

3. Angular bends.

4. Ossification gaps in wall of carotid canal.

5. Malposition of pharyngeal orifice.

b. Excessive development.

1. Congenital widening.

c. Irregular development.

- II. *Hæmorrhage.*
 - III. *Inflammation, Catarrhal (acute, chronic, trophic).*
 - IV. *Inflammation, Purulent (acute, chronic).*
 - V. *Inflammation, Croupous and Diphtheritic.*
 - VI. *Ulcer.*
 - VII. *Contraction.*
 - VIII. *Enlargement.*
 - IX. *Adhesions and Closure.*
 - X. *Diseases of the Tubal Muscles.*
 - a. Fatty degeneration and atrophy.
 - b. Hypertrophy.
 - c. Trichinosis.
 - d. Hæmorrhagic infarctions.
 - e. Paresis.
 - XI. *New Growths.*
 - a. Exostosis.
 - b. Fibroma.
 - c. Syphiloma.
 - d. Tubercle.
- WOUNDS AND INJURIES.
- XII.
 - a. Lacerated wound (in catheterization).
Emphysema.
 - b. Contused wound.
 - c. Abraded wound.
 - XIII. *Foreign Bodies.*
 - a. Animate objects.
 - b. Inanimate objects.

COMPLICATIONS OF DISEASE OF EUSTACHIAN TUBE.

- I. *Inflammation, Injury, New Growth, Foreign Body in Pharynx.*
- II. *Inflammation, Injury, New Growth, Foreign Body in Nares.*
- III. *Inflammation, Injury, New Growth, Foreign Body in Middle Ear Tract.*

IMPORTANT SYMPTOMS OF EAR DISEASE.

- I. *Neuralgia.*
- II. *Aural Vertigo.*
- III. *Anomalies of Audition.*
 - a. Autophonia, Tinnitus, Numbness.
 - b. Pseudacousma.
- IV. *Neuroses [Reflex phenomena].*
 - a. Pruritus auris.
 - b. Ear cough.
 - c. Epileptiform convulsions.
 - d. Otalgia.
 - e. Dysacousma.

MISCELLANEOUS.

- I. *Mumps [Resulting in Resolution, Suppuration, or Metastasis].*
- II. *Tonsillar Diseases.*
- III. *Inflammation, Injury, New Growths, Foreign Bodies of the Upper Respiratory Tract.*

