tion of the mastoid. In such cases, we found twice a cochlear fistula. Even if its endostal layer is intact, prognosis is poor.

According to our experience, cholesteatoma is very often situated posteriorly and involves the weak point of the retrotympanum, medially to the facial nerve. It is necessary to skeletonize the mastoid part of the facial nerve and to open the posterior hypolabyrinthine cells between the sigmoid sinus and facial nerve, underneath the posterior semicircular canal. This may be done in pneumatized cases as high as the sinus tympani (figure 4).

If the hypotympanum cholesteatoma is very large, growing downward along the internal carotid artery and jugular vein, a part of the tympanal ridge must be removed after locating the facial nerve. Open technique with or without posterior obliteration is usually necessary.

Sometimes, the hypotympanum cholesteatoma becomes an intrapetrous one: a trans-otic approach with re-routing of the second and third portions of the facial nerve, is the only way to remove it.

Management of the retrotympanum

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Foreword

☐ I would like to begin by thanking very sincerely Professor Marquet for his friendly invitation. I am also indebted to Prof. Guerrier (Montpellier, France), Dr. Proctor (Detroit, USA), Prof. Carachon (Grenoble, France), Dr. Deguine (Lille, France), Prof. Portmann (Bordeaux, France), Dr. Sanna (Parma, Italy), Dr. Sheehy (Los Angeles, USA) and Prof. Zini (Parma, Italy) for their collaboration in preparing my lecture.

☐ The posterior region of the tympanic cavity, the retrotympanum, is probably the most complicated area to study from both the anatomical and the surgical point of view. Before considering surgical techniques for removal of diseased tissue from the retrotympanum, it is helpful to recall its specific anatomy.

☐ The retrotympanum is derived from the second branchial arch. The ossification of Reichert's cartilage will result in the formation of Proctor's styloid complex, composed of three eminences: the pyramidal, styloid and chordal eminences.

☐ Arising from the eminences with between them, the promon-
tory and the posterior lip of the round window niche, lie, more or less clearly evident, numerous ridges or bridges: the chordal ridge, the ponticulus, the pyramidal ridge and lastly the subiculum. Andrea reports a doubling of the ponticulus, the posterior tympanic ridge.

These bridges or ridges with the facial canal demarcate the retrotympanic sinuses:
- two supra-pyramidal or external sinuses: the supero-external, facial sinus or facial recess and the infero-external, lateral tympanic sinus separated by the chordal ridge,
- two infra-pyramidal or internal sinuses: the supero-internal, posterior tympanic sinus and the infero-internal sinus, sinus tympani, separated by the ponticulus.

The anatomical variations of the retrotympanum concerning the surgeon are essentially those of the facial nerve canal. They are frequent:
- congenital bony dehiscences associated or not with protrusion of the nerve,
- anatomical variations in the course of the facial canal. Any soft tubular structure in this region, even outside of the classic course of the facial nerve must be subject to caution.

The retrotympanum takes a most important place in surgery for chronic middle ear disease. Cholesteatoma frequently invades the retrotympanic sinuses. In parallel, residual or recurrent cholesteatoma is also very frequently seen in this region. The figures quoted, taken from the literature, prove that the complete removal of cholesteatoma from the retrotympanum is impossible in at least one fifth of cases. Therefore, it is essential for this purpose to visualize the retrotympanic sinuses.

The approach to the retrotympanum differs essentially according to the tympanoplasty technique chosen and particularly to whether the surgeon does or does not take a conservative approach as regards the posterior wall of the external ear canal: canal wall up or down procedure.

Where the posterior canal wall is conserved, access to the retrotympanum is done by a combined approach: transmeatal and transmastoid. By transmeatal procedure, the surgeon can visualize the internal sinuses: the posterior tympanic sinus and part of sinus tympani. This latter and part of the external sinuses can be visualized indirectly by means of tiny mirrors, such as that of Zini, who describes this technique as an “indirect microtympanoscopy”.

Eradication of lesions will take place by means of blunt instruments. We use curved micro-dissectors that are spatulated, being oriented to either the left or the right. Sheehy proposes the use of a right-angle dissector. We suggest working with the dissector by placing a tiny cotton wool ball between the sinus wall and instrument to avoid damaging the facial nerve or penetrating into the labyrinth.