

EXPLANATION OF PLATE XXV.

Fig. 1.—Normal left drum membrane as seen by reflected daylight.
 Fig. 2.—Normal right membrane by lamp-light.
 Fig. 3.—Rupture of a partially thinned left membrana tympani by a kiss. Slight ecchymosis of the lower thin-limb margin of the ear, with injection of the vessels of the manubrium.
 Fig. 4.—Rupture of the left drum membrane by a blow on the ear. Ragged rent with extravasation in the round window and injection of the vessels along the malleus handle. The rent extends nearly vertically behind the umbo and gaps slightly.
 Fig. 5.—Rupture of the left membrane by puncture with a knitting-needle. Ecchymosis at the lower margin of the rounded opening and injection of the manubrium vessels.
 Fig. 6.—Double rupture of the right membrana tympani caused by a fall into the water. Slight injection. A semilunar rent in upper posterior quadrant and a longer, more crescentic tear below. Both are rather parallel to the circular fibres.
 Fig. 7.—Ecchymosis on the right membrana tympani back of the tip of the malleus handle.
 Fig. 8.—Pigmentation of the region of the umbo in the right membrana tympani—the remains of an extravasation.
 Fig. 9.—Pressure of the malleus handle on the left, with malposition of the anteriorly displaced lower fragment. Retraction of the circularized neighbourhood of the umbo, with distorted reflection of light and crescentic opacity of the lower anterior quadrant.
 Fig. 10.—Injection of the cuts of the upper half of the right drum membrane. Slight dulling of the incus or obscuring of details.
 Fig. 11.—Radial injection of the right membrana tympani. The malleus handle hidden by vascularization, and only the short process visible.
 Fig. 12.—Acute myringitis of the left membrana tympani. Inflammation limited to upper half, whereas lower portion, including sides all details except a faint indication of the short process.
 Fig. 13.—Acute myringitis of the left membrane, with intense radial dark injection. Exfoliated epithelium upon the posterior portion and a line of purulent fluid below.
 Fig. 14.—Acute myringitis of the right membrana tympani, with two abscesses in the posterior half.
 Fig. 15.—Granulations upon the left membrane in chronic myringitis.
 Fig. 16.—Chronic myringitis, with granulations of all details by epidermal exfoliation.
 Fig. 17.—Chronic myringitis of the left membrana tympani, with receding injection, swelling of the entire membrane, and a scab-like lagging posteriorly filled with pus.
 Fig. 18.—Ulceration of the right membrana tympani in chronic myringitis. Line of pus collecting below.
 Fig. 19.—Chronic myringitis of the left membrana tympani, after the removal of an impacted mass of cerumen. Injection of the vessels of the manubrium and dulling of the light reflex.
 Fig. 20.—Erosions upon the left drum membrane, before and behind the manubrium.
 Fig. 21.—Sunken left membrane in chronic acute otitis media, with prominence of the posterior fold, dark condensation of the membrane, and bright point in front of the short process.
 Fig. 22.—Serrate indrawn fold, as seen in a case of acute simple otitis media. Malleus and incus not seen in view of the short process.
 Fig. 23.—Marked retraction of the left membrana tympani in acute catarrhal otitis. Drum shadow and posterior fold prominent; incus much obscured; "serrate" of the malleo-incus zone, and dark calc. condensation of the membrane.
 Fig. 24.—Injection and swelling of the left membrana tympani in acute otitis media.
 Fig. 25.—Condensation in the right drum cavity, with curved surface line visible through the membrane.
 Fig. 26.—Condensation with irregular surface line in the left membrane; dark and retraction of the posterior part, crescentic light spot in front of the short process.
 Fig. 27.—Retraction of the upper posterior quadrant of the left membrana tympani, with marked thickening in the posterior half of the right membrana tympani. A small oval perforation in the posterior part of the membrane.
 Fig. 28.—Perforation of the left membrana tympani by exsufflation in simple acute otitis media. Hanging upper margin and swelling of the entire membrane.
 Fig. 29.—Crescentic opacity of the posterior portion of the left membrana tympani in chronic otitis media.
 Fig. 30.—Peripheral opacity of the drum membrane in chronic catarrh.
 Fig. 31.—Faint opacity of the left membrana tympani in chronic otitis media.
 Fig. 32.—Striker, rounded membrane, with prominent posterior fold and crescentic shadow.
 Fig. 33.—Darkish atrophic area in the upper part of the membrana tympani.
 Fig. 34.—Atrophic left membrana tympani, showing the malleo-stapedial joint.
 Fig. 35.—Atrophic and retracted L. membrane in chronic catarrhal otitis.
 Fig. 36.—Discoloration of the posterior half of the right membrana tympani by reflected sunlight.
 Fig. 37.—Hyperemia of the drum membrane in chronic catarrh of the tympanum, showing the malleus handle, the short process, and the manubrium.
 Fig. 38.—Acute otitis media with swelling of the membrane and injection of the vessels of the manubrium. Promontory discernible.
 Fig. 39.—Retracted manubrium, promontory discernible.
 Fig. 40.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 41.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 42.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 43.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 44.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 45.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 46.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 47.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 48.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 49.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 50.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 51.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 52.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 53.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 54.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 55.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 56.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 57.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 58.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 59.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 60.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 61.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 62.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 63.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 64.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 65.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 66.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 67.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 68.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 69.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 70.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 71.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 72.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 73.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 74.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 75.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 76.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 77.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 78.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 79.—Darkish atrophic area in the posterior part of the membrana tympani.
 Fig. 80.—Darkish atrophic area in the posterior part of the membrana tympani.

Fig. 47.—Injection, swelling, and discoloration of the right membrana tympani with congestion of the manubrium; crescentic light reflex, and exudation in tympanum visible in lower portion. Acute suppurative otitis media.
 Fig. 48.—Small perforation in lower anterior quadrant of the injected left membrana tympani. Exfoliation of epidermis hiding manubrium and leaving but faint indication of the short process. Small (pulsating) point of light from the fluid in the perforation. Acute otitis media suppurativa.
 Fig. 49.—Purulent collection in front of lower portion of right membrana tympani hiding details.
 Fig. 50.—The same membrana tympani after cleansing. Perforation back of umbo; gray-red membrane with irregular and dim light spot. Acute suppurative otitis media.
 Fig. 51.—Pointing perforation of the posterior portion of the right membrana tympani. Membrane red, especially the very prominent posterior half. At the nipple-like apex of its lower part a small perforation. Light reflex broad and faint, and short process barely discernible.
 Fig. 52.—Small perforation in Shrapnell's membrane above the short process, from which a drop of exudation is hanging. Membrana flaccida red and swollen, and manubrium strongly injected. Broken light spot.
 Fig. 53.—Recent perforation in the swollen and livid R. drum membrane, showing a (pulsating) point of light from the fluid within it. Membrane bluish-red, with sodden flakes of exfoliated epidermis lying here and there, tiny glistening reflections. Vessels along malleus handle visible. Fluid in the bottom of the meatus gives a faint crescentic reflex.
 Fig. 54.—Small perforation in centre of anterior half of membrane in chronic suppurative otitis. Membrane dull, with apparently thickened manubrium, and the mucosa of the inner tympanic wall dark red.
 Fig. 55.—Perforation in the upper posterior quadrant of the right membrana tympani in chronic suppuration with caries. The dislocated incus is seen in the opening.
 Fig. 56.—The same membrane several months later, showing thickening along the manubrium, the meatus gone, and the stapes visible. Granulation masses have cut over the lower margin of the opening.
 Fig. 57.—Reniform perforation in lower half of membrana tympani, with thickening of the membrane, especially along the malleus handle, and dullness of the surface. Glistening layer of fluid near anterior margin.
 Fig. 58.—Heart-shaped perforation involving the major part of the drumhead, leaving but a narrow remnant along the manubrium and at the periphery. Discharge has ceased and the tympanic mucosa appears yellowish-red, with a glistening streak posteriorly and branching vessels upon the promontory.
 Fig. 59.—Central perforation of the middle of membrana tympani, with the tip of the manubrium projecting into the opening, through which the congested inner wall can be seen.
 Fig. 60.—Partially adherent central perforation, with marked retraction of the membrane. Manubrium drawn in and up, and posterior fold prominent. A crescentic band fastens the upper margin of the opening to the suggested promontory. Comma-shaped reflection of light.
 Fig. 61.—Double perforation in lower part of the left membrana tympani in chronic suppurative otitis media. Manubrium indrawn; light spot broken and tympanic mucosa injected.
 Fig. 62.—Two large oval perforations of the right drum membrane, leaving but a narrow band of normal membrane extending up to the malleus handle. Anteriorly a whitish crescent of chalk deposit: Discharge has ceased and the promontory is reddish-yellow.
 Fig. 63.—Large, round perforation, with marked retraction of the right membrana tympani, through the upper part of which the incus is discernible. Promontory red and hyperplastic.
 Fig. 64.—Extensive destruction of the right drum membrane, leaving but a narrow periphery, with such retraction of the manubrium that it is almost lost to view. Thickening around the short process, and granular condition of tympanic mucosa.
 Fig. 65.—Large perforation in lower anterior quadrant, filled by polypoid granulations of the mucosa of the tympanum, standing out as a raspberry-like mass in the plane of the membrane.
 Fig. 66.—Perforation in lower quadrant, through which projects a knob of polypoid granulations hiding the margins of the opening. Manubrium markedly retracted, with prominence of the posterior fold. Crescentic opacity of the posterior part of the membrane.
 Fig. 67.—Commencing cicatrization of a perforation below the umbo of a much retracted left membrana tympani, with "cones of light" extending in upon the bluish-gray scar tissue.
 Fig. 68.—Scar in anterior portion of opaque and retracted left membrana tympani. Broadening of the tip of manubrium and area of thickening of membrane posteriorly.
 Fig. 69.—Central heart-shaped perforation closed by a thin cicatrix. Light spot upon the depressed scar, and thickening of the perforation margins.
 Fig. 70.—Central depressed cicatrix of L. membrane, with the tip of malleus handle projecting into the opening. Chalk deposit near anterior margin.
 Fig. 71.—Almost complete replacement of the left membrana tympani by scar tissue. Marked retraction of manubrium, behind which the incus is visible. Broken reflex upon the indrawn cicatrix.
 Fig. 72.—Two rounded cicatrices in L. membrana tympani, with retracted malleus handle. The membrane is thin and dark above, showing the descending process of the incus, but gives a marked cone of light below.
 Fig. 73.—Cicatrized double perforation, with irregular chalk deposit below in the right drum membrane.
 Fig. 74.—Sunken left membrana tympani, with thin cicatrix which closes a rounded perforation below, belying out after the inflation.
 Fig. 75.—Irregular crescent of calcification in posterior portion of the dull left drumhead.
 Fig. 76.—Two oval deposits of chalk in the left membrana tympani, occupying the greater part of each half of the membrane, and extending, on either side, close to the manubrium.
 Fig. 77.—Right membrana tympani, showing a large calcified area anteriorly, a small one up and back, and a perforation below with chalk deposit in its thickened lower margin.
 Fig. 78.—Left membrana tympani, with irregular chalky deposits on either side of a depressed cicatrix closing an oval opening, the lower margin of which is calcified.
 Fig. 79.—Dark-red retracted left membrana tympani, with large perforation, out of the anterior portion of which a dark crimson polypus protrudes. Promontory yellowish-red.
 Fig. 80.—Cholesteatomatous mass protruding from a perforation in the red and swollen right membrane.



The Human Tympanic Membrane, in Health and in Disease.

Copied by permission from Prof. Kurd Bürkner's Atlas von Beleuchtungsbildern des Trommelfells; Jena, 1886: Fischer.

BIBLIOTECA
FIG. DE MED. U. A. N. 64
7796

to be transparent enough to show much of the coloration of the parts beyond it; and the milkiness of opacities or the darkness of thinned areas serves easily to differentiate the affected portions. Yet it is fair to question how far we clinicians are really familiar with the ideally normal drumhead; certainly among hundreds of presumably normal school children I have seen few that even approached to a moderate ideal; and once, in a child with hearing that seemed to be absolutely normal, I found a drum membrane so delicate that it was almost as invisible as though a microscopic cover-glass had been placed across the canal. Such transparency or any approach to it deprives us, to a large extent, of our power to appreciate the extreme obliquity of the drumhead. On the other hand, an opacity makes this conspicuous and leads the beginner to think that such inclination is exceptional. Confusion in this regard



FIG. 1700.—Right Membrana Tympani, Showing an Oval Cicatrix Closing a Perforation in Front of the Manubrium. Posteriorly a large crescentic mass of chalk occupies the entire thickness of the membrane and stands out above it on both surfaces. From a preparation of Politzer's in the College of Physicians, Philadelphia. (Randall and Morse.)

is likely to continue so long as text-books teach that the adult drum membrane differs in its inclination from that of the infant, which every one knows to approach the horizontal.

Only a totally opaque drumhead, then, shows us solely its own color: in all other cases much must depend upon the degree of congestion of the inner tympanic wall and the degree to which its tint is revealed by the transparency and proximity of the drum membrane. The promontory is normally of a pale straw color and about 3 mm. distant from the umbo, but depression may bring this or other portions of the drumhead nearer to, or even into contact with, the underlying structures (Plate xxv., Figs. 39 and 44). The opacity may vary from epidermal thickenings or exfoliations or similar changes in the mucosa, to fibrous thickenings of the *membrana propria* or the chalky formations which succeed cellular infiltrations of slight vitality. The thinnings may be cicatricial closures of former perforations or atrophic areas hardly differentiable from such scars. While the thinnings may be non-inflammatory and due to mere pressure, the perforations, scars, or infiltrations point back to antecedent congestion, infiltration

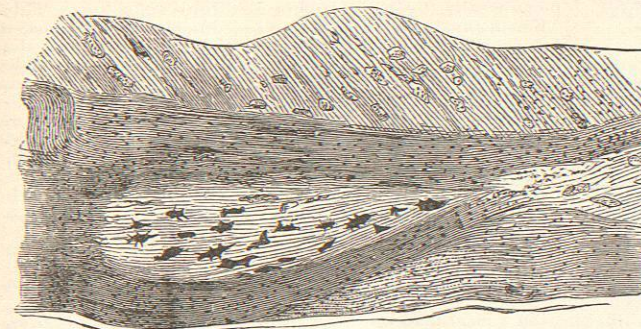


FIG. 1710.—Section of a Partially Calcified Membrana Tympani from a Young Man who Died of Tuberculosis after Suffering with a Purulent Otitis. The layers of the membrane are altered beyond clear recognition, and a small area in the midst of the calcification shows bone corpuscles. (Poltzer.)

and consecutive changes, and often rebut any negative history furnished by the patient.

The diagnosis between epidermal flakes lying upon the drumhead and the fibrous or chalky areas in its substance is not always easy; but good illumination through the well-straightened canal can give enough parallax, espe-

cially in the rarer cases in which binocular vision can be used, to clear up many doubts; and the delicate use of the cotton-tipped probe can safely and quickly remove most of the merely adherent material. If the parts are moistened, this may be accomplished more easily, and any deposit of boric acid and such medicaments can be promptly removed. The fibrous plaques can usually be distinguished from the chalky by the interstitial vagueness of the former and the sharp-cut and apparently prominent character of the chalk. (Plate xxv., Figs. 31-34, 75-78). Such a chalky area is often thicker than the normal membrane and seems to stand out above its surface (Figs. 1709 and 1711); but it is really seated in the middle layer and is covered by a thin film of living tissue, which on the exterior, as seen in life, can be made to flush by touching it.

Such congestion gives a yellowish or orange tint to the chalk plaque or can wholly hide it from view,—points that must be taken note of, especially in those cases in which chalk deposits have come to view as though newly formed within a few weeks. Months or years are usually required for such formations. The seat of chalk may be in any portion of the tense membrane, probably never in the flaccid; it is most commonly seen in the intermediary zone between the margin and the manubrium. Peripherally along the annulus and centrally along the malleus handle uncalcified areas are usually present even in extreme cases of calcification; and it is curious how extensive can be the process without interference with the hearing or with the even excessive mobility elicited by the pneumatic speculum. Virtual ankylosis of the malleus by a rigid membrane is possible, but must be extremely rare, since perhaps the only recorded case is that shown in the accompanying figure (Fig. 1712).

The margins of perforations, open or cicatrized (Fig. 1711), may show crescentic areas of chalk; and the scar tissue itself may in rare instances undergo such chalky infiltration. In very exceptional cases true bone has been found (Fig. 1710); but usually we have merely the amorphous deposit of lime salts in the poorly vitalized infiltrating cells, as in other parts of the body. The fibrous thickenings of the drumhead differ principally in having had more vitality and thus having gone farther in the process of organization. They may be found encircling nearly all open perforations and many of those which have healed, forming a rounded rim contrasting more or less strongly with the thin scar tissue or the darker area of perforation. It is largely by the presence or absence of this

marginal thickening that we judge whether such a thin area is cicatricial or merely atrophic (Plate xxv., Figs. 69-72).

Far more important than some more conspicuous changes are

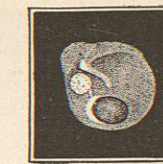


FIG. 1711.—Retracted Left Membrana Tympani, Showing a Depressed and Adherent Cicatrix below the Umbo, with Calcification of the Margin of the Perforation. Below the short process there is a round disc of chalk apparently standing above the general surface.

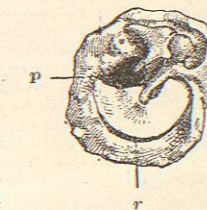


FIG. 1712.—Extensive Calcification of the Left Membrana Tympani. (View from within.) r, Narrow uncalcified portion at the lower periphery of the membrane; in front of the manubrium mallei a second narrow strip of uncalcified tissue is visible; p, an irregularly shaped opening in the upper posterior quadrant of the membrane. The malleus and the drum membrane are stiff and immovable. The incus and stapes are disconnected. The latter ossicle, however, is perfectly movable. Similar pathological alterations existed in the right ear. In both ears the patient was able to distinguish whispered words correctly at a distance of eighteen metres (the entire length of the room). (After Politzer.)

the fibrous thickenings which may be seen in the drumhead (Plate xxv., Fig. 46) as expressions of adhesions to the structures within (Fig. 1713). These may seriously impede the due mobility of the ossicular chain, even when they are invisible or microscopically small. Many definite and still more numerous indeterminate or accidental bands span the various parts of the tympanic cavities, especially the attic, and may here immobilize essential parts of the conducting mechanism. Through normal or excessively thin membranes the delicate tendon of the stapedius can generally be seen emerging from the opening of the pyramid to insert itself

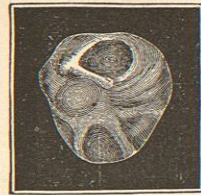


Fig. 1713.—Scared and depressed drumhead, with fibrous bands within. (From Politzer.)

upon the head of the stapes; and about this, as well as about the crura of the stirrup and from them to the walls of the oval-window niche, folds of mucous membrane are apt to stretch which need little inflammatory thickening to become obstructive. Some of them may bind the tympanic membrane to the incus shank, to the Troeltsch fold, or to the promontory. Similar folds may accompany the tendon of the tensor tympani; and although they are out of sight behind the malleus handle, their pathological contraction may be noted by the rotation of the retracted manubrium. In the pernicious or sclerotic catarrhs such lesions, especially at the oval and round windows, may cause great deafness with little or no external sign,—deafness much greater than that due to even extreme displacement of the ossicles and drum membrane by pneumatic pressure dependent upon Eustachian stenosis. This last, indeed, is often conspicuously absent and the tube gapes widely to admit air too freely,—in clear evidence that treatment *per tubam* must be medicinal, not mechanical. Some indication of the abnormal condition of the tympanic lining is often furnished in sclerotic cases by Loewenberg's test of inflating vapors of chloroform; for it must needs

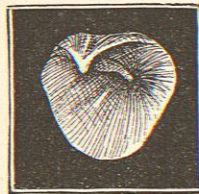


Fig. 1714.—Left Membrana Tympani of a Man Thirty Years of Age, in whom, as a consequence of coryza, a marked swelling of the mucosa of the tube has occurred. The indrawn membrane is of violet-gray color. Relief of the extreme dullness of hearing was secured after three weeks' treatment by inflation. (Poltzer.)

be a much altered mucous membrane to which chloroform feels cold; yet this occurs even in early stages and at times when visible congestion is present both in the drumhead and on the inner or labyrinthine wall of the tympanum.

The depressed, retracted, or collapsed drumhead of chronic tympanic catarrh has been elsewhere considered, but some points in connection with it may be dealt with here. Primarily this abnormal position tends to affect the drumhead as a whole, for preponderant external pressure is the cause of the displacement. The umbo is deepened, the malleus handle is foreshortened, and the short process becomes more prominent, perhaps even thorn-like in its appearance, although rather because of the depression of surrounding portions than from its own protrusion; finally, the posterior and sometimes the anterior fold show an equal or even a greater degree of prominence (Fig. 1714). If retraction, strictly speaking, plays a part in producing these effects, it must be due



Fig. 1715.—The same Membrana Tympani immediately after the inflation. (Poltzer.)

to excessive tension of the tendon of the tensor tympani, and then usually shows itself in a slight rotation and forward displacement of the manubrium. One is sometimes puzzled how to explain why the malleus handle can be drawn so sharply in without being arrested by contact with the promontory, for its tip may be lost behind the short process, or in collapsed cases it may be drawn back and seem higher than the short process (Fig. 1718). Inflation may largely reduce the displacement (as shown in Fig. 1715) moving the malleus as well as the membrane farther outward than should be possible in health, or it may wholly fail to produce more than a tiny bleb-like protrusion, perhaps at the upper posterior margin, in demonstration that air has entered the tympanum, but has not been able to lift the depressed drumhead from its contact or adhesion with the inner wall. Such rigidity of the apparatus is not always due to attachments to the inner structures; for we must remember that the circular fibres of the membrana propria do much to give the funnel shape to the normal drum membrane (Fig. 1716) and tend to increase this when the other elements of tension are removed, as when the drumhead is cut loose. Hence a deep depression (Fig. 1717) might be maintained or even caused by a pathological increase of the influence of these fibres.

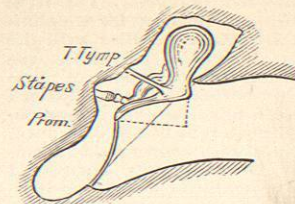


Fig. 1716.—Diagram of Normal Position of Membrana Tympani, Showing the Inclination of the Manubrium and Upper Segment to the Axis of the Auditory Canal.

Of some practical interest also are the partial depressions of the tympanic membrane, since they may escape hasty study and the appearance be considered normal; or they may be noted and misunderstood. More commonly at the lower anterior portion the drumhead may show a darker zone bordered peripherally by a sharp line of light reflection. This "Knickung" of the Germans—"kneeing," as I have termed it—is a terrace-like break of the contour of the membrane (Fig. 1719) which may be single or multiple (Fig. 1720) and the peripheral line of light comes from the edge of the undepressed membrane. Why this margin maintains its normal plane is evident from the section shown in Fig. 1708, where, at the margin, the circular fibres are so specially in evidence. When such a depression occurs near the middle of the drumhead it is readily mistaken for the surface line of fluid within the tympanum (Figs. 1723 and 1724).

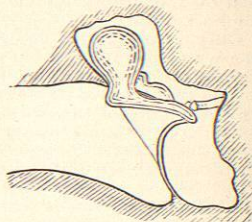


Fig. 1717.—Diagram of a Retracted Membrana Tympani, Showing the Manubrium Drawn almost Directly Inward.

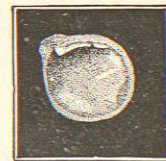


Fig. 1718.—Left Membrana Tympani of a Boy of Six Years with Nasal and Tubal Obstruction. Manubrium drawn up almost out of sight, the tip being higher than the short process; behind it the incudo-stapedial joint is visible, and below and posteriorly the dark niche of the round window is discernible. There is a faint reflection of light near the normal position and a stronger one on the promontory near the stapes.

The epidermal exfoliations from the surface of the drumhead concern us here in several relations. It is probable, as is elsewhere discussed, that the epithelium of the drumhead is capable of reproducing itself more rapidly than can that of any other part of the body. This has great physiological importance, since it is most active at the centre and as it were overflows the rest of the membrane

from this point, seeming to push the rest of the epidermal layer before it to the periphery or out upon the wall. In health such a migration carries the older skin free of the drumhead, so that not even these tiny scales shall exfoliate upon its surface where they might interfere with the delicacy of its function. This cannot continue, of course, in disease, when the desquamation is exaggerated, as it is after all dermal inflammations; and much subjective noise and annoyance is sometimes occasioned by the presence of such flakes upon the vibrating membrane. This migration can transport superficial extravasates and other lesions to the periphery or clear of the membrane; and it has been claimed that even an artificial perforation, with an eyelet inserted to keep it open, has been observed thus to traverse a part of the drumhead. In medico-legal cases such change of position might give rise to conflicting testimony as to the location of lesions, which although intrinsically of no special significance, might be magnified into important discrepancies.



Fig. 1720.—Retracted Membrane, Showing Foreshortening of Malleus Handle, Prominence of the Posterior Fold, and Visibility of the Margin of the Pocket of von Troeltsch as it Passes Forward to the Manubrium. The light spot is shortened, and beyond it anteriorly are two parallel curvilinear bright lines, marking the edges of abruptly depressed areas of the drum-head, one within the other. From a girl of ten years, with longstanding nasal and tubal obstruction.

They are cystic collections of epithelium and cholesterol and doubtless mark an involuted perversion of the epidermizing process. Of more importance, by far, is the occasional tendency of the epiderm to overrun the margins of a perforation. This results not merely in "skinning over" its edges and causing it to remain open, but also, by establishing grafts of epidermal flakes upon the mucous surface, in setting up a train of pathological changes the full importance of which we are as yet scarcely able to appreciate. It may prove to be no overstatement if I say that all chronic suppurations owe their persistence, in greater or less degree, to the resulting formation of cholesteatomatous material.

Perforation of the drumhead will be considered elsewhere in relation to

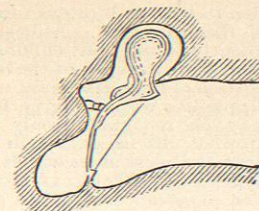


Fig. 1719.—A Schematic Section of an Indrawn Membrana Tympani, Showing Abrupt Change of Plane near the Lower Margin. The edge of the depression, being at right angles to the illuminating rays, reflects them back and forms a narrow glistening line; while the adjacent surface is depressed so as to give back little of the incident light.

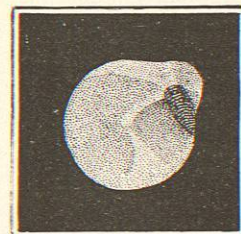


Fig. 1721.—Horn-like Growth in a Man Aged Seventy. A blackish conical mass, looking like cerumen, lay in front of the right drum membrane, with its outer part touching the anterior wall of the meatus. When seized with the forceps it was found to be attached to the short process, but was removed by slight torsion and traction. It proved to be a cuticular horn, 6 mm. long by 2 mm. in diameter, composed of cap-like layers arising from the short process. No reaction nor recurrence followed its removal.

the suppurating process of which it is a distinguishing characteristic. We may here deal with its production by trauma, by external or intralamellar ulceration, or by the more usual outbreak of serous, mucous, or purulent fluid from the tympanic cavity.

Ruptures of the drum membrane are generally described as straight or angled linear tears, gaping so little that the blood-stained margins alone mark the site until, on inflation, the lips of the opening are separated by the escaping air. Sometimes they are round, oval, or polygonal; and Politzer seems more frequently to have met them in this form. They are rarely multiple (Plate xxv., Fig. 6) and their form doubtless depends upon the relation of their direction to that of the fibres of the membrana propria. Helmholtz claimed that rupture of the circular fibres should precede that of the radial, which would explain such radiate openings as Politzer has depicted (Fig. 1729). The majority of those which I have seen were vertical slits back of the manubrium, as shown in Fig. 1728. Those due to penetration by a vulnerating body are usually round (Plate xxv., Fig. 5) and are more apt to be followed by suppuration, perhaps from injury to the inner wall. In such a case, as a matter of course, the suppuration would soon efface any characteristic appearance.

Ulceration of the outer surface of the drumhead, as shown in Fig. 1731, is rare; and interlamellar abscess is no more common. The latter has been described as a yellow point, which resembles the localized pointing of pus that is about to escape from the tympanum. The diagnostic point has been made that pressure with a probe will usually indent the prominent and inelastic abscess, and this dimple will remain for some time, as shown in Fig. 1730. The contents of such an abscess are also unaffected by inflation of the tympanic cavity; and, on evacuation, no complete perforation will be found. Such abscesses may burst inward instead of outward (Poltzer), as recognized by the disappearance of the pus and the distention of the empty sac when the air douche is used. Toynbee is authority for numerous instances of ulceration found post mortem; they were limited to the cutaneous or the mucous surface and were sometimes extensive. Yet they must be very rarely recognized in life, and such appear-

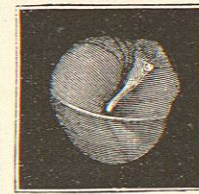


Fig. 1723.—Collection of Fluid Exudate in the Lower Part of the Tympanum, Marked by a Glistening Line Across the Membrane. From the right ear of a young man in the middle of an acute coryza. Cure by inflation. (Poltzer.)

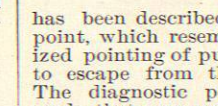


Fig. 1724.—Marked Partial Retraction of the Middle of the Right Membrana Tympani, in a Case of Chronic Catarrhal Otitis. The lower portion is in about normal position, and the manubrium and upper part are not greatly indrawn; while the middle portion is so abruptly retracted as to form a sharp "knee" overhanging the dark depressed area above it. The appearance presented to the eye is that of a glistening line running across the membrane near its middle and closely simulating the surface line of an exudate in the cavity. In front of the manubrium is visible a whitish ill-defined thickening.

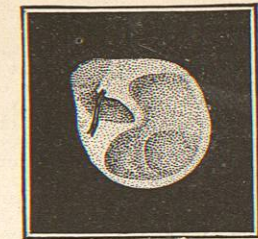


Fig. 1722.—The Left Membrana Tympani of a Man Thirty-Six Years of Age, in a great Measure Destroyed by Scarlatinal Otitis in Childhood, only a Triangular Portion Remaining Anteriorly. Its place is supplied by a thin cicatrix irregularly depressed, leaving the malleus apparently prominent, although really retracted and fast to the promontory. From the short process a blackish string, slightly bifurcated at its tip, projects forward and downward and moves but slightly under pressure.