REPORT OF THE COMMITTEE

ON

OPHTHALMOLOGY AND OTOLOGY

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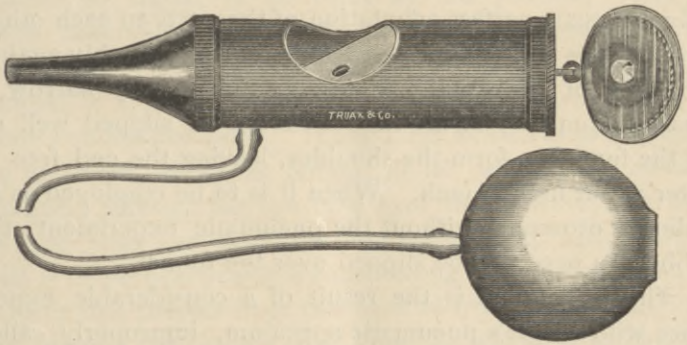
OTOLOGY.

A New Otoscope (Pneumatic) for the Diagnosis and Treatment of Middle-Ear Affections under Passive Motion.

Preliminary to a discussion of pneumatic experiments upon the ear, it will be a natural proceeding to describe the instrument by means of which we may produce and observe the effects of passive motion in the drum.



The pneumatic otoscope, which I have devised for the purpose named, consists of a small milled cylinder, with an ear-funnel of the most serviceable pattern at one end; and an eye-piece, containing a lens, around which revolves an adjustable mirror, at the other end. In the side of the cylinder, a spacious aperture admits the light to the illuminating surface beneath. At the funnel end of the instrument, is a pneumatic chamber provided with a flexible tube,

ending in a rubber bulb, or a diminutive syringe, or a lip piece, as one may prefer. Objection might be made to using the lip piece for producing suction, for fear that the air from the external auditory meatus might enter one's mouth, but it cannot do so if the funnel is properly adjusted to the canal, for the air chamber of the otoscope represents many times the volume of the column of air contained in that part of the meatus that lies between the end of the funnel and the drum. It is necessary to exert only slight suction force to cause excursions of the drum membrane sufficient for our purpose. The tip of the funnel should be covered with a section of the thinnest, soft rubber tube, nearly an inch in length, to insure an air-tight fit into the meatus. If the opening of the canal is very large, the rubber tube should be rolled back upon itself, so as to form a shoulder on that part of the funnel which closes up the mouth of the meatus when the otoscope is inserted. The rubber not only secures a perfect adaptation of the parts to each other, but prevents the funnel from pressing uncomfortably against the walls of the canal. If the meatus is very narrow, a small section only of the rubber should be slipped well up on the funnel to form the shoulder, leaving the end free to enter about half an inch. When it is to be employed as an ordinary otoscope, without the pneumatic experiment, the rubber tip need not be slipped over the funnel.

This instrument is the result of a considerable experience with Siegle's pneumatic speculum, improperly called an otoscope. The advantages of the pneumatic otoscope over the speculum are: First, it is self-illuminating, not requiring the aid of a hand mirror, or forehead mirror, the light being accurately focused on the drum; secondly, it affords a magnified view of the drum; thirdly, the object mirror presents a perfect picture of the interior of the ear, and without the necessity of looking through a lens; fourthly, it can be operated in a smaller canal than will

admit the speculum; fifthly, the bright reflection of light into your eyes by the glass of the speculum, the black background of which converts the glass into a mirror, can be avoided in the otoscope, by the proper and unvarying relations and the color of its various parts.

The teaching of otology is much facilitated by means of this instrument, in that the instructor may be sure that students are looking upon the field of vision which is being described. Heretofore it has been necessary to bend closely over patients to look through an otoscope while it was being adjusted, then, in rising to afford students the opportunity of inspecting the drum, the necessary movements of your body, or of the patients, would throw the drum out of the field, or darken it, and compel a re-adjustment of the instrument. These disadvantages made demonstrations uncertain, long, and tedious. The object mirror allows the teacher to stand, or sit erect by the patient, while he takes observations, then by a slight movement of his head only, or by a turn of the mirror, he may allow any number of students to pass in line, each viewing what is being commented upon. If one pays attention to the lighting up of the end of the funnel, as he can do by looking obliquely through the aperture over the reflector, he may be sure that the drum is illuminated and within sight. This is made practicable by dispensing with the large funnel fixtures that project from the sides of other otoscopes, and that prevent the teacher from knowing whether the drum is illuminated properly or not, except while he is looking through the lens. The advantage of dispensing with this attachment is not diminished in the least by sacrificing any of the brilliancy of illumination. The objection which some physicians have urged against magnifying otoscopes, that they were compelled to look through a lens, is met in this instance, for one needs only to look at a plane mirror to examine the drum and canal. Should it not be desired

to use the object mirror, except in demonstrations, it can be turned back, or removed by slipping the adjustable ring, to which it is attached, off from the cylinder.

THE PNEUMATIC TREATMENT.

The value of passive motion in the treatment of stiff joints and atrophied tissues is well recognized in general surgery. The application of the same principle to the same conditions in aural surgery is attended with equally beneficial results. But this is a neglected fact, for you rarely see or read of its use in ear treatment. So little has been written upon the subject, as compared with its importance, that no apology is needed for speaking somewhat minutely in respect to the behavior of the drum head and ossicles, under such experiments as the following:

In examining and treating the middle ear with the pneumatic otoscope, the instrument should be introduced into the auditory canal with the longitudinal axes of both corresponding, just as any otoscope should be placed. If the instrument is correctly adjusted, a slight suction on the rubber tube will cause the little column of air, which lies between the drum and the funnel, to move outward to the air chamber. The examiner is supposed to be inspecting the drum at the same time. If the drum is healthy, he will observe the membrana tympani perform an excursion toward his eye, carrying the handle of the mallet with it, while the triangular light spot changes position as the relative concavity of the membrane changes. Release the column of air and it moves inward again, allowing the drum head, manubrium and light spot to resume their former positions. Press upon the column of air and it moves inward, carrying the membrane and mallet handle with it, causing motion in the joints of the ossicles; the short process projects outward prominently, the light spot changes with the increasing concavity, and the ossicles become more prominently visible as the membrane presses around

them. By alternately rarifying and condensing the air in this manner the amount of mobility in the drum head and the chain of bones may be determined, under brilliant illumination and magnified inspection. If anchylosis of the joints of the ossicles, or if bands of adhesions between the bones and the walls of the tympanum exist, the handle of the malleus will seem to be impeded in its movements, or it may remain fixed, while the membrane about it may be quite flaccid. At this point I wish to anticipate criticism by interjecting the statement that I have never known any ill effects to follow this line of treatment. If the membrane is greatly thickened in patches, or if it contains calcareous deposits, these portions will be seen to resist the action of the vibrating column of air, while normal parts, and areas of thin cicatrical tissue that indicate the locations of former perforations, may respond readily to the experiment. In cases where the drum head is very thick, or where the ossicles are bound down by adhesions to the walls of the tympanum, no perceptible movement may be obtained at first, but decided improvement often follows a persistent use of the pneumatic treatment.

In obstinate cases, the process may be hastened by making pressure directly upon the processus brevis by means of a probe covered with a soft rubber tip. Stiffness in the joints may be overcome in this way so as to facilitate the action of the otoscope. One should press gently on the process until the handle moves, then retract the probe, until the malleus resumes its former position; press again, and so repeat the movement several times. Then the pneumatic principle of the otoscope should be applied until one is satisfied that the advantage gained will not be lost. The pressure need not cause pain, but the mallet should be moved until the patient experiences a sensation of movement or of sound. In several patients in whom I have applied passive motion in this manner during the last few

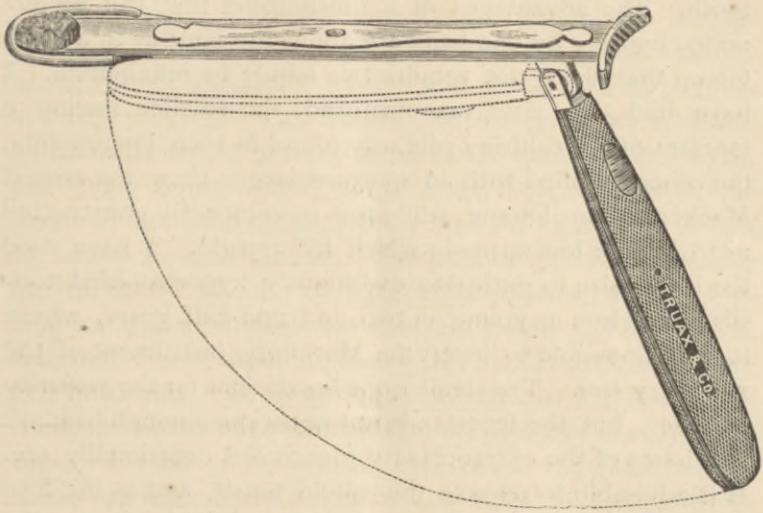
months, I have increased the hearing distance for my watch, from contact, to three, twelve, twenty and thirty-two inches, or one-half the normal distance.

The otoscope may reveal an opaque membrana tympani, so hypertrophied and stiff that it does not yield to the pneumatic treatment. In such a case it is nothing less than a barrier to the admission of sound waves to the perceptive apparatus, and would seem to justify the complete removal of this barrier, when the auditory nerve is not diseased. For if the perceptive apparatus is in condition to do its work, while the conducting apparatus is a hindrance instead of a help, the sooner the obstruction is removed, and sound admitted, the better. It should be understood that this statement is made on the supposition that the condition referred to has proved intractable under the usual treatment. Thus it will be seen that the pneumatic otoscope becomes an indispensable factor in determining the precise condition of an organ, so hidden away by nature in a deep recess of the head, that any auxilary to our present helps in diagnosis and treatment ought to be welcome. We are not able without it to judge intelligently when so delicate and important an operation as resection of the drum head may be necessary as a last resort. And, while I am conscious of the strong sentiment of opposition to such operations, I venture to improve this opportunity to urge the occasional necessity, and the justifiableness of such an operation, and to invite the most searching criticism of the logic of this procedure.

AN IMPROVED TONSILOTOME.

Any physician who has had a considerable experience in tonsilotomy with the various tonsilotomes will not be likely to deny that these instruments are generally too complicated. They are armed with needles, barbs or sharp toothed forceps for piercing the tonsil and dragging it

through the fenestra before any cutting is done by the blades. A tonsilotome constructed after the pattern I have



made, renders the barbs unnecessary. It reduces the painfulness of the operation by one-half; it divests the procedure of any danger of an accident to the operator or patient; it makes a skillful and easy operation possible with a minimum amount of experience; it resembles a large folding tongue depressor so closely that children usually offer no opposition to its introduction for the removal of the first tonsil; and it combines strength and compactness with simplicity of construction. It is made on the principle of a guillotine, the blade of which is propelled by the thumb of the same hand that grasps the handle. The latter is set at such an angle to the shaft as will permit the most perfect co-ordinate action of the muscles of the hand and arm of the operator. All the work may be done with one hand. This advantage is not a small one, for two reasons: The powers of co-ordination and antagonism of muscles are far more perfectly under control in operating an instrument which requires but one hand, than they are when both hands must co-operate;

and one hand of the operator is left free to hold the head of the patient, if necessary, as the dentist does in extracting a tooth. The advantages of a tonsilotome that can be operated entirely by one hand are about the same as in a tooth forcep that does not require two hands to manipulate. I have had two sizes manufactured, the smaller having a fenestra of the calibre ordinarily found in such instruments, the other supplied with an aperture larger than the largest Mackenzie tonsilotome, while it is so compactly constructed as to require less space in which to operate. I have used the larger size to extirpate enormously hypertrophied tonsils in children as young as two and one-half years, where it was impossible to insert the Mackenzie instrument of the necessary size. The smaller one is sufficient for the majority of cases, but the fenestra is not capacious enough to admit the bases of the extraordinary glands we occasionally see. It is advisable to remove the whole tonsil, and as the tops only of the largest tonsils can be severed with the smaller instruments, it may be better to have the larger size, if but one is to be kept.

The blade is so protected as to make it impossible to wound the ascending pharyngeal, or the internal carotid artery. The shaft that propels the blade is of such a width as to make the use of a gag unnecessary, for it protects the finger of the operator from the patient's teeth, if it is placed in the mouth to ascertain when the fenestra is in such position as to embrace the whole tonsil, as it is necessary for one to do when operating in children with other tonsilotomes. Since I have used this guillotine I have not had my finger bitten, while it was not an uncommon occurrence before to come off second best, so far as pain was concerned. With the shank wide enough to afford protection, it is unnecessary to introduce the finger into the mouth, for the teeth and lips cannot close enough to prevent the operator from seeing plainly the field of operation. There

is no working in the dark, or fear of damaging structures you do not wish to attack.

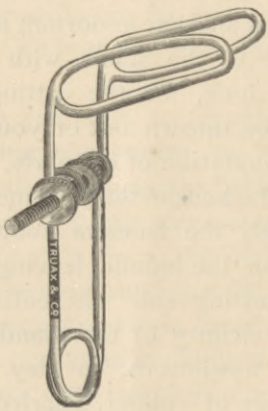
The handle is firmly fixed to the shank with a hinge joint and self-acting spring lock, so that the fenestra can be pressed down about the base of the gland with any degree of power desired. This feature dispenses with any necessity for hooks, forceps, needles or barbs for spearing the tonsil. The latter being a soft, fleshy mass, adapts itself to the shape of the fenestra, and protrudes through it the instant its base is pressed around. The pain of spearing or tearing the tonsil by toothed or barbed accessories, designed to drag the gland through the fenestra before the blade cuts, excites the most vigorous struggling and resistance on the part of a child. Even when the utmost care has been exercised, the barbs have pierced the soft palate or the surgeon's finger, instead of the tonsil. Moreover, the gland always comes out with the instrument, the same as though barbs were used. There is another important advantage in having the handle attached to the shank with a hinge, provided with an automatic lock, for the cutting extremity of the instrument cannot be thrown out of your control by a disturbance of the coaptation of its parts. The last time I operated with a Mackenzie tonsilotome, the child jumped, just as I was placing the fenestra about the tonsil. The shank revolved upon the handle, leaving the latter in my hand, while the cutting end was entirely displaced and removed from the vicinity of the gland. It is impossible for this improved tonsilotome to play you such a trick. The handle is made of rubber, gnarled so as to afford a firm grip, and it contains a concealed spring lock operated by a convenient thumb-plate. When this is moved downward, the hinge-joint is unlocked, and the instrument folds upon itself like a pocket-knife, occupying the space of about an inch and a quarter in width and thickness, by six and one-half inches in length. Another pertinent point that

should not be neglected in this age of antisepsis is the provision for cleansing and disinfecting the three pieces of which the instrument consists. By raising the proximate end of the horizontal top-spring of the shaft and swinging it 90° to either side it becomes disengaged from its lock, and it liberates the blade from the shank. This arrangement makes it as simple as possible for taking apart, cleansing and putting together again.

In amputating the apex of a relaxed and elongated uvula, the tonsilotome should be used with the handle directed upwards. It should occupy just the reverse position as a uvulatome to the one it occupies when used as a tongue depressor.

Another merit that is not too small to mention, is that its simplicity of construction renders it inexpensive.

A NASAL SPECULUM.



The nasal speculum that I have constructed will require but a moment to describe. It is made of spring-wire, is self-retaining and as simple as such a thing can be made. The surfaces that come in contact with the mucous membrane are flattened so as to relieve the pressure of its accompanying discomfort as far as possible. The amount

of pressure exerted by expansion may be accurately modified by the counter thumb-screws. When the speculum is in position, entirely within the vestibule, for examination or operation, the handle is directed at such an angle as to be out of the way of the operator. The tendency to slip out of place is overcome by its lightness, and by a nice adjustment of its set-nuts.

A nasal speculum is a disagreeable tool at best, on account of the sensitiveness of the nasal cavities, but this one carries as little discomfort with it as any efficient speculum can.

These instruments are manufactured for me by Charles Truax & Co., of Chicago.

719 W. Adams Street.