

Maggots are not only difficult to remove from the ear, but cause very great suffering, because, as Blake has pointed out, they attach themselves, by an apparatus provided for the purpose, to the walls of the meatus, and feed upon the inflamed integument. It is frequently necessary to seize and extract them with forceps, as the syringe will not always bring them out.* They survive for some time in oil, live only five or ten minutes in alcohol, and are killed instantaneously by chloroform (Burnett). Alcohol, however, is not a desirable thing to pour into an inflamed and excoriated meatus, and to use chloroform in this way is, of course, out of the question. Dr. Roosa recommends chloroform vapor and also Labarraque's solution of chlorinated soda to destroy them with, when it becomes necessary to do this before removing them from the ear.

In the removal of foreign bodies from the ear, especially if the walls of the meatus have been lacerated or there is a probability that the tympanic membrane has been injured, antiseptic precautions should be employed. Sterile water should be used in syringing the ear; all the instruments used should be sterilized, preferably by boiling, and the hands of the operator should be surgically clean. After the intruding substance has been removed, it will be well to syringe the ear gently with a sterile, saturated solution of boric acid, and, as a further precaution, to close the orifice of the meatus, but not too tightly, with a plug of sterile cotton.

To relieve the pain and inflammation caused by a foreign body in the ear, or by the efforts to remove it, the writer has found useful the French anodyne oil, known as *oleum compositum* or *baume tranquille*,† of which eight or ten drops may be warmed and dropped into the ear three or four times a day. Perhaps, a still more efficacious remedy is the solution of atropine and cocaine (atropine alk., gr. i.; cocaine alk., gr. ij.; ol. amygd. dulc., ʒ ij.) which the writer has recommended in the treatment of otitis media, and of which six or eight drops may be poured into the ear as often as may be thought desirable.

To facilitate the removal of foreign bodies from the ear the anesthetic action of cocaine (ten-per-cent. solution) or holocaine (two-per-cent. solution) may be availed of; but, as might be anticipated, the effect obtained is not very satisfactory. With nervous children, it is necessary, in many cases, to administer a general anesthetic, not so much to lessen the pain of the operation (which in uncomplicated cases should not be considerable), but to overcome the fear and quiet the resistance of the patient.

II. TYMPANUM.—Foreign bodies occasionally find lodgment in the tympanic cavity. They commonly enter through the external auditory canal, but exceptionally reach the cavity by way of the Eustachian tube. When the tympanic membrane has been destroyed by pre-existent disease, a foreign body which has entered the auditory meatus may easily find its way into the tympanum. Usually, this happens, however, in consequence of awkward efforts to extract it. When the ear previous to the entrance of the foreign body is in normal condition, rupture of the drumhead must, of course, take place before it can pass into the cavity beyond. This, again, happens commonly through persistent and unskilful attempts to remove the body from its original point of lodgment. It may occur also when the foreign body has entered the ear with such force as to drive it at once through the membrane, as, for example, might happen with small shot fired from a gun. Again, the destruction of the membrane and the passage of the body beyond it may be due to the caustic action of the latter, or to its being so lodged as to cause continuous pressure upon the membrane, leading in time to ulceration.

*The writer once removed from the ear of a woman a live tick, which had been there for about a fortnight. It was firmly attached to the wall of the meatus, and when it was seized with forceps considerable traction was required to break its hold. A black granular material (its excrement) had been coming from the ear for some days, at times a sound "like broiling" had been heard, and pain was beginning to be experienced.

†For formula see French Codex, and National Dispensatory, 5th edition, 1894, p. 854.

As might be supposed, by the other route of entrance—the Eustachian tube—substances other than fluids very rarely find their way into the tympanum. Still, instances of this character have occurred. Urbantschitsch has reported a case in which a fragment of an oat stalk entered the tympanum in this way, and another case is on record in which a broken bit of a hard-rubber syringe passed from the nose into the drum cavity by way of the Eustachian tube. Ascarides have also been known to enter the tympanum in this manner. (Cf. also p. 591.)

The passage of irritant fluids from the nasal cavity into the middle ear is a misadventure of comparatively frequent occurrence, and often gives rise to unfortunate results. It usually happens as a consequence of employing a nasal douche, and formerly, when this practice was more in vogue than it is at present, severe cases of otitis media brought about in this way were constantly coming into the hands of the aural surgeon.

The consequences likely to ensue from the presence of a foreign body in the tympanum are, as might be supposed, usually more grave than when a similar body is lodged in the external auditory canal. If it has entered by way of the Eustachian tube, the irritation provoked by it will almost certainly lead to suppurative inflammation of the middle ear with perforation of the membrane. This, indeed, is nature's method of ridding itself of the offending body, and in most instances it is likely to succeed, the foreign body escaping, with the discharge, through the external ear. If the foreign substance has been forced through the drumhead from the external canal, or has passed into the tympanum through a previously existing perforation, inflammation, attended by severe pain and probably by symptoms of cerebral irritation, is likely to supervene quickly, and still more serious consequences may ensue, unless, by surgical interference, relief is obtained.

It should be stated, however, that some ears are very tolerant of the presence of a foreign body even in the tympanic cavity, and that such serious consequences as have just been described do not invariably follow. "As illustrative of the slight degree of disturbance which may be set up by the presence of a foreign body in the drum cavity," to quote from Dr. Huntington Richards' excellent article upon this subject in the first edition of the REFERENCE HANDBOOK (p. 359), "reference may be made to certain cases related by Voltolini (*Monatschrift für Ohrenheilkunde*, 1876, No. 5) where a Politzer's eyelet, a small, smooth body made from hard rubber, lay within the drum cavity without exciting inflammation, and to a case reported by Bartscher and quoted by Gruber, where for nine months a corset ring lay impacted in the tympanum of a child previously affected with chronic otitis media purulenta, without giving rise to serious trouble."

Since nearly all that has been said in regard to dealing with foreign bodies lodged in the external ear applies to similar bodies in the tympanum, there remains but little to add as to the treatment of this class of cases. When the drumhead is intact it is difficult, and may be quite impossible, to assure one's self of the presence of a foreign body in the cavity beyond. The inflammation which is almost sure to supervene would of itself probably call for the making of a free incision in the membrane; so that, under such circumstances, one need not hesitate to resort to this measure to facilitate the escape of the body, because of uncertainty as to its presence. On the other hand, if symptoms of inflammation have not manifested themselves, such a step would hardly be warranted, though there might be no room for doubt as to the presence of the foreign substance. When the body has entered through a perforation in the tympanic membrane, or has been forced through the membrane, it will sometimes be necessary to enlarge the opening to facilitate its removal, whether this be attempted with the syringe, with slender forceps, with some form of traction instrument, or with a polypus snare, as von Troeltsch has recommended. The possibility of driving the foreign body from the tympanum by forcing air or a non-irritating, sterile liquid—such as normal salt solution—through the

Eustachian tube, by means of the air bag and catheter, should not be lost sight of. Finally, it may be added that if the operation of displacement of the auricle and cartilaginous meatus is ever indicated for the removal of a foreign body from the ear, it is in cases in which such body is impacted in the tympanic cavity. Among others who, under such circumstances, have resorted to this procedure with success may be mentioned Israel, Moldenhaur, Bezold, Huber, Politzer, Buck, Roosa, and Bishop.

Samuel Theobald.

EAR DISEASES: GENERAL THERAPEUTICS.—In writing upon general aural therapeutics a practical division of the subject has seemed to me one of the great difficulties. That previous writers have experienced the same difficulty seems shown by the fact that scarcely two of them have written along parallel lines. Almost every one has divided this chapter in a different manner from all the others. At first it seemed to me as if the rational plan would be to take general symptomatology as a basis; the objection to this, however, is the fact that each symptom is, or may be, produced by many of the individual diseases, and that general therapy along this line would resolve itself more or less into a consideration of what could be done for these individual diseases, which seems without the scope of such a chapter as this one.

Considerable deliberation on the subject has resulted in the determination to pursue the following line of thought: First. To consider briefly some prophylactic measures whereby those having sound ears may avoid and overcome conditions which are prone to originate ear diseases, and whereby those already the subject of such conditions, or already having some ear trouble, may take such precautions as will tend to prevent those conditions from growing worse.

Second. To take up the subject of local remedies, under which heading will be considered those procedures in more or less frequent use, such as blood-letting, heat, cold, inflation by the various methods, massage, electricity, etc., and to assign to them in a general way their various values and uses; and finally,

Third. To consider very briefly general remedies—*i. e.*, the treatment of the ear by means of constitutional measures.

I. PROPHYLAXIS.—"To prevent disease is better than to cure disease" has become a trite saying, and to-day, more than ever before, do we very properly follow out the principles of prophylaxis, both in general medicine and in our own limited specialty of otology. Much can be accomplished in many cases by the carrying out of simple, yet important, hygienic measures, in other cases through a practical and timely resort to medication or to operative procedures.

In order to a wise prevention a moment's consideration must be given to the manner in which the ear becomes involved as a result of general or local disease elsewhere. We know that under normal conditions, and in perfect health, we carry about in our mouths a large number of pathogenic germs, whose possibilities for harm are beyond question. We remain in health so long as the normal protective factors retain their functional activity; but when they suffer injury, then these pathogenic factors become capable of harm to the health. One of the most important factors in protection—a factor which varies in efficiency according to the locality—is the unbroken continuity of the epithelial layer; another is the fact that some germs and their products are antagonistic to others.

Inflammatory processes in the ear may develop from within and also from without. By far the most frequent point of origin is the naso-pharynx. Given a "cold" or a surface chill, a congestion of the naso-pharyngeal mucous membrane is sure to develop, and soon thereafter there will be a decrease or cessation of the ciliary activity of the tubal epithelium; and with this will be associated an interference with the normal ventilation of the tympanic cavity, which is thereby rendered much more accessible to pathogenic germs.

From without arise injuries and inflammatory processes of the auricle and external canal which may extend from there to the parotid region, the side of the neck, or the mastoid process, or which may set up some general disease, *e. g.*, erysipelas, or may reach the tympanic cavity. These paths, or methods, of infection point the way for prophylaxis, or for treatment in the early stages.

Preventive measures should begin then with the naso-pharynx, and first of all may be mentioned some of the simple means that should be employed when a condition of health exists. An important matter is the hygiene of the mouth and naso-pharynx, where may at any time be found a list of germs that is already astoundingly large, but is still growing. The care of the teeth, even among those who give them care, is, as a rule, insufficient; they should at least be thoroughly cleansed on retiring and on rising; I believe, too, with Dio Lewis, in the proper use of the toothpick after each meal, and, if this is supplemented by a mouthful of water forced rapidly to and fro between the teeth to as far as possible wash out any remaining fragments of food, certainly the condition of most mouths would be much improved. Gargling may also, in my judgment, be made a more valuable cleansing means than is ordinarily the case. The noisy process with which we are most familiar accomplishes but little, the fluid employed not reaching as a rule beyond the anterior pillars.

The following procedure, described by Haug, is, I believe, much better: "Take a medium-sized mouthful of some good antiseptic mouth wash, throw the head partially, not too far, backward, allow the fluid to run by gravity slowly and quietly downward until the reflex irritation causes a contraction of the muscles of deglutition, when the head is thrown slightly forward, and the contents expelled through the mouth." By this means certainly the tonsils and much of the pharynx, possibly also some of the naso-pharynx, are influenced by the cleansing process.

In acute catarrhal inflammation of the naso-pharynx and nose, whether in the form of a simple angina or as a symptom of measles, scarlatina, etc., the middle ear is threatened; and here we may properly say a word or two in relation to the various procedures which may compress the air in the naso-pharynx, and as to which prophylaxis requires a warning. First of all, as regards blowing the nose—a homely subject, but one of decided importance. So far as is possible this should be avoided during the first few days of such an acute coryza, and, when it must be done, let it be done with both nostrils open, and as gently as possible; for, as a matter of fact, it accomplishes but little good, whereas the tendency is distinctly toward an increase of the congestion, which in turn increases the desire to again blow the nose. Again, snuffs which cause sneezing are, as a rule, irritating, and sneezing itself, especially if it be a person's habit more or less to suppress it, may forcibly open the Eustachian tubes with bad results. Adopting the same line of reasoning we should say a word against the use—certainly the general and indiscriminate use, without previous cleansing of the nose and naso-pharynx—of the various therapeutic measures (Valsalva, Politzer bag, and Eustachian catheter) which cause compression of the air in the naso-pharynx and tympanic cavity. This precaution is advisable, not only so long as the acute naso-pharyngeal irritation remains, but also during the continuance of pain and deafness in the ear, with exudate in the tympanic cavity. The danger to be feared is that fluid, and with it the agents of infection, may be forced back into the mastoid antrum and cells.

During many of the acute illnesses of infants and children, or even of adults, especially if attended by symptoms not easily accounted for,—*e. g.*, coma, gastro-intestinal disturbances, etc.—a daily inspection of the tympanic membranes may wisely be made, so that, if occasion arises, prompt incision may be made, and thereby certain dangers and unnecessary destruction of tissues be avoided.

In the case of people, whether children or adults, who are the subjects of frequently recurring or chronic colds

or catarrhs, the hearing is at all times more or less threatened. The cause of such catarrhal manifestations needs to be carefully looked for and removed, and consists usually in some form of nasal obstruction or intranasal pressure. Under this general designation comes adenoid hypertrophy, by far the most important single item to be mentioned under the heading of "prophylaxis of ear diseases." The presence of these glandular masses must be looked upon as a distinct threat to the hearing not only of children, but—and upon this point I wish to lay special emphasis—of adults as well, even those who may not necessarily in childhood have had the ear symptoms attributable to adenoids. I say this because I am thoroughly convinced of the need, from the aurist's standpoint, for removal of adenoids when present in any considerable amount, even though the ear symptoms at the time be slight or nil. The faucial tonsils, while not exerting by any means the same harmful influence upon the ears as does the enlarged third tonsil, may still, when much enlarged, and especially if the seat of frequently recurring acute inflammatory attacks, do considerable harm. They should therefore be removed, both in the interest of the ears and in that of the general health.

The nasal douche, when considered from the viewpoint of the ear, must, on the whole, receive our condemnation, since occasionally, even when used with much care, it is the source of violent middle-ear and mastoid inflammations.

Inflammations of the auricle, external canal, and middle ear, arising from external causes, are many of them capable of easy prevention. Eczema, erysipelas, tumors, inoculation tuberculosis, and abscesses of the lobule, are all of them conditions which may, and do, arise from piercing the lobe of the ear for the wearing of earrings, and may all of them, therefore, be prevented if people can be reasoned, or shamed, out of that form of vanity which is especially an inheritance from our heathen ancestry.

Improper methods of cleansing the external canal are accountable for many ear troubles, e.g., for simple impaction of cerumen, for localized and diffuse inflammations of the canal walls, and even for serious middle-ear troubles, all of which are largely or entirely preventable. I refer to the various ear spoons of wood, hard rubber, ivory, or metal, ear sponges, penholders, tooth-picks, matches, hairpins, the twisting of the corner of a towel into shape for use as a boring machine, etc. I would include here also the frequent syringing of healthy ears, and the senseless use of oily and other drops, such, e.g., as are applied to the ear for the relief of toothache. All the evils attending these various manipulations may be avoided if we, the members of the medical profession, will instruct our patients that wax is a normal secretion, that an all-wise Providence has provided natural methods for its removal, and that, finally, ears in health can be cleansed, and *should* be cleansed, by means of a moist cloth stretched over the end of the index finger.

Injury to the ear as a result of foreign bodies is so slight, and that due to unwise and unskilful efforts to remove them is so great and so easily preventable, that I cannot avoid the mention of the one means—a suitable syringe and warm water—whereby a very large proportion of them can be harmlessly removed, and relentlessly to condemn the almost universal early resort to forceps and such injury-working measures.

The principles underlying prophylaxis impel me also to say a word relative to another condition, often simple in itself, viz., traumatic perforation of the tympanic membrane. A majority of such cases, if left alone,—the canal being gently wiped out with cotton moistened with some antiseptic, and then plugged with a little sterile cotton,—recover without serious results; while, on the other hand, they may be seriously complicated by even such seemingly harmless measures as syringing, etc.

The general question of sea-bathing seems of sufficient importance to warrant us in devoting a few lines to its consideration. For this purpose it is necessary to divide people into two large classes—those who have, and those

who have not, a perforation of the tympanic membrane. In the former class sea-bathing is attended with very considerable danger, because in them the harm arises through the water reaching the middle ear by way of the external auditory canal; for this class the safe course is to avoid bathing of any kind, especially sea-bathing, without taking the utmost precautions against "getting water in the ear." This danger can be warded off to a large extent, although not entirely, by tightly plugging the affected ear with "non-absorbent" cotton. In the second class, injury, when it arises, is due to the water reaching the tympanic cavity through the nose or mouth, the nasopharynx, and the Eustachian tube. The danger to this class is far less than to those with perforated membranes, but that danger exists is shown by the very considerable increase of acute middle-ear affections which is observed during each bathing season. However, the risk is, on the whole, so slight that, offsetting against it the benefit to be gained, we cannot in a general way advise against sea-bathing.

II. LOCAL REMEDIES.—1. *Blood-letting.*—Local blood-letting is of use almost exclusively in acute inflammatory processes of either the external or the middle ear, and especially in their early stages. Its effect in such cases is, as a general rule, amelioration, in a fair proportion, cessation, of the pain. In the chronic hyperemias not much effect is to be looked for. The abstraction of blood is usually accomplished by means of either the natural or the artificial leech. The number of the former used varies from about one to three in young children to three to six in adults. When the inflammation is located in the external canal, membrana tympani, or tympanic cavity, the leech should be placed close in front of the tragus. The surface of the mastoid should be selected in case of inflammation within that process. When the application of leeches is left to the patient's own management, it is advisable to mark with ink the exact spots upon which it is desired that they be placed. At the same time provision should be made for rendering the skin of this region, before the leeches are applied, as nearly as possible aseptic. The canal is also to be closed with cotton, and careful directions should be given as to how the after-bleeding may be controlled. For the latter purpose the following measures will be found useful: Apply a pleglet of absorbent cotton to the wound, and keep up pressure upon it for several minutes; apply styptic in the place of absorbent cotton; or, finally, make pressure by means of adhesive plaster or by an application of iodoform colloid. Whatever material may have been used, it should not be removed for several hours after the bleeding ceases.

The field of usefulness of the artificial leech is somewhat limited, owing to the frequent tenderness existing at the spot where it would naturally be placed. Its special advantages are, that it can be had and used in localities where the natural leech is not procurable, and that in the shortest possible time a considerable quantity of blood can be removed.

The quantity of blood to be taken will of course depend upon the needs of the case; from 30 to 100 gm. being the usual limits. The time when the blood should be abstracted seems to be of some importance; Schwartz's rule is to do the operation in the evening and then to insist on absolute rest and quiet the following day. If after a second abstraction of blood relief is not obtained, other measures should be employed. Scarification of the canal walls has been much used, and is recommended as an efficacious means of blood-letting in inflammation of the soft parts of the canal. Of all the forms of artificial leech, Bacon's is perhaps the most practical.

2. *Heat and Cold.*—(a) *Heat:* From time immemorial heat in some form or other has been a much-used means of quieting pain in the ear. As a home remedy it has been applied in almost every conceivable way, and to the charge of having used heat in many objectionable forms the medical profession too must plead guilty. Heat has been applied to the ear in the form of a roasted onion, of flaxseed and bread-and-milk poultices, of warm oil, glycerin or vaseline, of warm milk, and even of warm urine,

etc.; and among the objectionable ways of using heat I would include the introduction of hot sweet oil and laudanum, hot almond oil, hot cocaine solutions, etc., which are still extensively recommended by druggists and others. At present we speak of using heat in either the moist or the dry form. As sources of dry heat may be mentioned the hot-water bag, a hot brick, an electric-light bulb, a "Japanese stove," Leiter's coil, etc. Moist heat too may be used in various ways: the hot-water ear bath of von Troeltsch, consisting of the frequent filling of the external canal with hot water from a spoon; the ear douche from a special apparatus or from the fountain syringe, or Fayette's ear douche, by means of which a constant stream of continually renewed water of proper temperature flows through the canal and over the face of the membrana tympani.

It is my belief that most, if not all, of the virtue claimed for the various forms of ear drops in relieving earache is due to the fact that they are put in the ear warm. If this be so, then more virtue can be obtained from hot water, because with it a nearly continuous heat can be secured, with the additional advantage that, when we cease using it, the ear after simple drying is left clean. As between dry and moist heat, it is generally believed that moist heat rather favors suppuration; therefore, if in a given case it is thought that suppuration may still be avoided, the choice should favor dry heat.

(b) *Cold:* The use of cold as an antiphlogistic measure in inflammatory ear affections is of much more recent date, and, even before the general prejudice against cold in these conditions has been entirely overcome, already the pendulum of professional opinion is beginning to swing back toward heat as the preferable measure. During recent years, however, cold has been much used, especially for the pain accompanying acute mastoid involvement. It can be conveniently employed by allowing a continuous stream of ice-cold water to flow through a Leiter's coil surrounding the ear; or by means of the aural ice-bag; or, in accordance with the plan of Winternitz for bringing about a contraction of the carotid artery,

by the use, in the antero-lateral region of the neck, of a cold compress or its equivalent, whereby, it is asserted, the temperature in the external auditory canal can be distinctly lowered. To sum up, as to heat and cold: in pain due to inflammations of the external canal and of the tympanic cavity, heat is almost universally approved—in the moist form, when it is desired to favor suppuration, in the dry, in cases in which there is still a chance of avoiding it. When the mastoid process is involved, heat and cold both have their adherents, while some are beginning to oppose both because of the fact that they may obscure a condition already in many cases difficult of recognition. All agree, however, that if either heat or cold is employed in this class of cases, it should not as a rule be used for more than from twenty-four to forty-eight hours.

3. *Syringing the Ear.*—Under this heading may be considered both syringing of the external auditory canal, and syringing of the tympanic cavity—the latter, either through a tympanic-cavity cannula, or, more rarely, through the Eustachian tube. The immediate purpose of all ear syringing is to remove either foreign bodies or pathological secretions. It may also, however, prove to be directly curative of the pathological processes themselves; i.e.,

while it removes the foreign bodies or the impacted cerumen, it cures at the same time the associate inflam-

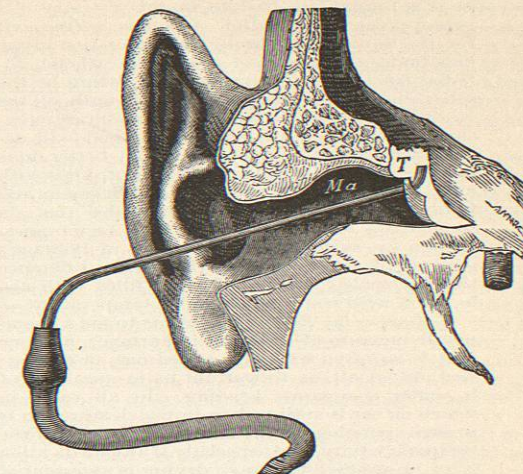


FIG. 1781.—Diagram Showing Hartmann's Cannula in Position.

matory disturbance. Syringing, however, is commonly employed as the first preparatory step in an examination of the ear or in instituting treatment.

As to syringes, they may be constructed of hard-rubber, metal, or glass. They should have a capacity of from two to four ounces. The tip may vary according to individual preference; the one shown in the cut has given me better results than any other, though I recognize its possibilities for harm if carelessly used. On the other hand, an olive-shaped tip may be dangerous through its interference with the return flow. For convenience of manipulation there should be attached to the barrel, at the proximal end of the syringe, two rings, and to the plunger, one ring. It is of great importance, from the view-point of cleanliness, to have the syringe fitted with an asbestos plunger, so that the whole thing can be regularly sterilized by boiling. For use by the patient, although as a rule patients use no syringe efficiently, probably the best and safest is either an irrigator or aural douche (fountain syringe), or a hard-rubber syringe of one-ounce capacity; for children perhaps the rubber ball with soft-rubber tip will answer the purpose best.

Water that has been sterilized by boiling, and cooled to a temperature of from 100° to 115° F. (the best general rule is to use it as hot as the patient can comfortably bear it), is the best fluid to use in the syringe or douche. If desired, and especially if the solution is for use in the tympanic cavity, boric acid may be added to the point of saturation, or table salt to the extent of a 0.75-per-cent. solution. The temperature is important, since if the fluid used is too cool, very disagreeable symptoms may result, such as vertigo, nausea, vomiting, syncope, and even prolonged unconsciousness. The same symptoms may develop if too much force is used, the rule being to begin with the least possible force and gradually to increase until the object of the syringing is accomplished, provided threatening symptoms do not sooner develop. At the same time the canal should be straightened with the left hand, and the thumb and index finger should be used as a support for the nozzle end of the syringe, in order that all danger of injuring the canal walls may be avoided.

For washing out the tympanic cavity through a perforation in the drum membrane, specially bent tips attached directly to a small syringe, or to a bulb syringe, or to a simple rubber cap (Fig. 1782), are useful. Of

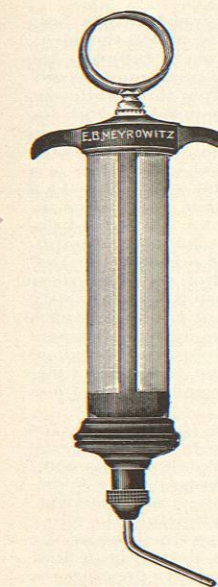


FIG. 1780.—Metal Ear Syringe with Glass Barrel.