three methods may render the chief service, and each may in other cases be of little value. Usually, they should be used together: each supplements the other.

It seems well to repeat again, that even *fear* of burns in the use of x-ray examinations is unnecessary. I have made more than 2,000 of these examinations and no patient has received any burn or even inconvenience from them. Simple precautions, which may easily and should always be taken, prevent any *risk* even of injury.

FOREIGN BODIES IN THE LARYNX IN CHILDREN.¹

BY J. PAYSON CLARK, M.D., BOSTON.

FOREIGN bodies, as one would naturally expect, enter the air-passages in children much more frequently than in adults, the proportion being nearly two to one. Anything which causes a sudden strong inspiration, such as laughter, cough, fright or a blow on the back, while an object is in the mouth, favors its passage into the glottis. A foreign body entering the glottis may be arrested there or may pass on into the trachea or a bronchus. Objects are arrested in the larynx either because they are too large in one or more diameters to pass through it or because they have some peculiarity of shape or some prominent point or edge which causes them to be caught in one of the ventricles or to stick in the mucous membrane somewhere. Articles which most commonly enter the air-passages are bones, beans, fruit-stones, coins, needles, pins, seeds and grain. Smooth objects, like beans and fruit-stones, generally pass the larynx, while irregular objects, like pieces of bone, are more often arrested there. Coins are apt to remain in the larynx.

In a thorough and exhaustive article on foreign bodies in the air-passages Preobraschensky gives some valuable statistics, which I shall quote freely. He has collected 193 cases (adults and children) in which the foreign body was in the larynx, 105 in the trachea and 166 in the bronchi. His figures show that the mortality from foreign bodies in the air-passages up to 1866 (prelaryngoscopic period) was 41.2 per cent., while from 1866 to 1893 (when his paper was written) it was scarcely 30 per cent. Intralaryngeal removal was practised only once before 1866 and 54 times between that date and 1893; so that it seems fair to assume that the introduction of the laryngoscope is largely responsible for the improvement in the death-rate. The mortality of such accidents in children is less than in adults. Of 218 children operated on only 60 (27 per cent.) died, while of 63 adults operated on 30 (about 50 per cent.) died. Of 140 children treated without operation 64 (45 per cent. about) died, and of 136 adults without operation 69 (50 per cent.) died. Preobraschensky found the percentage of deaths in laryngeal cases somewhat larger (39.8 per cent.) than in tracheal cases (33 per cent.), but much smaller than in bronchial cases (55 per cent.). In some cases death comes so immediately on the entrance of the foreign body into the larynx that it must be due to shock (reflex paralysis of the respiratory centre following irritation of the laryngeal nerves). In other cases large objects may cause death quickly but not instantly, by mechanical obstruction of the object itself, or of

sudden edema of the larynx or trachea caused by its presence. Omitting these cases, which obviously would rarely be seen soon enough to admit of treatment, the mortality in laryngeal cases would be reduced to about 25 per cent. It should be borne in mind, moreover, in studying these figures, that a foreign body in the trachea is in constant danger of becoming impacted in a bronchus, thus falling at once into the most dangerous class of cases. If, therefore, we can prevent laryngeal cases from becoming either tracheal or bronchial by removing the foreign body *per vias naturales*, with the aid of the laryngoscope and suitable forceps, we shall obviously save more patients.

As intralaryngeal manipulation offers special difficulties in children, and as among them by far the largest number of cases occurs, it may not be unprofitable to study this class of case more closely. Preobraschensky's tables show that in 39 cases of foreign body in the larynx in children in which laryngotomy or tracheotomy was done 13 died. On the other hand, in 13 cases the foreign body was removed from the larynx by instrumental means through the mouth, with 13 recoveries. He reports, further, 2 cases in which the foreign body was successfully removed by reversing the child, in one of which it was in the larynx; 6 cases of expulsion by means of emetics, with 1 death by suffocation, the object being arrested in the larynx; 65 cases cured by spontaneous discharge of the foreign body without medical aid, 7 of which were laryngeal, and 77 cases which died without medical treatment, 20 of which were laryngeal.

Since 1893 I have been able to collect from medical literature reports of 34 cases of foreign body in the air-passages of children, of which only 3 died (less than 10 per cent.) — a very low mortality. In 12 of these cases the foreign body was in the larynx, with 2 deaths. In 1 case death was immediate, from complete obstruction to respiration. In the other a shoe-nail had been in the larynx of a child ten months old for thirteen weeks, during which time the child had great difficulty in getting nourishment. After removal of the nail by tracheotomy the child died from inanition and probably broncho-pneumonia.

From the Massachusetts General Hospital records since 1872 I have collected 18 cases of foreign body in the air-passages in children, with 3 deaths. Four of these cases were classed as laryngeal, with no deaths. In none of these latter was it possible to remove the foreign body *per vias naturales*. Following are brief reports of these four cases:

CASE I. Service of Dr. Bigelow, November 24, 1884. An infant girl, age seven months, was thought to have a piece of apple stuck in her throat. The breathing became labored and stridulous. The mother, failing to get the piece of apple out, which she said she felt with her finger, pushed it down. Tracheotomy was done but nothing found. Laryngeal examination had been unsuccessful. Two weeks after discharge from the hospital the patient coughed up a thin but tough piece of apple-pip.

CASE II. Service of Dr. Cabot, August 12, 1885. A girl of nine years had a fragment of plum-stone in the larynx for two months, causing dyspnea and dysphonia. After tracheotomy the fragment was found just below the vocal cords, rather firmly embedded. It was about half the stone and had jagged edges. It would probably have been impossible to remove this object intralaryngeally, even had it been possible to

¹ Read before the Boston Society for Medical Improvement, February 27, 1899.

see it by means of the laryngoscope, on account of its firm position below the vocal cords.

CASE III. Dr. Mixter, August 30, 1889. A boy (age not given) got a piece of apple in the larynx; there was extreme dyspnea, laryngeal wheezing, and supraclavicular spaces retracted on inspiration. There is no record of a laryngeal examination. Tracheotomy was performed and no foreign body found. The patient was discharged well.

CASE IV. Service of Dr. Homans, March 28, 1894. A boy, age three years, got a safety-pin in his throat, which was probably pushed into the larynx by the mother's attempt to reach it. It remained a week. Laryngeal examination revealed it, situated clasp down and the other end just above the vocal cords. Attempts at removal were unsuccessful. The thyroid and cricoid cartilages and upper ring of the trachea were then divided, but the pin had disappeared. It was removed from the right primary bronchus by means of a pair of long forceps; recovery.

These cases illustrate some of the difficulties which one is likely to encounter. In Case I the very small size of the larynx offered, probably, the greatest obstacle to a satisfactory laryngeal examination.

The case which I have to report is as follows:

Alice C., age five, was thought to have gotten a small tin tobacco tag into the throat three days before coming to the hospital (Massachusetts General), where she was brought on June 26, 1895. Breathing had been gradually getting more difficult and the child had been able to take little or no food. There had been no cyanosis at any time and the color was good. Breathing was harsh and evidently obstructed. Ether was administered carefully, then the patient was held by an assistant, as I shall describe later. The illumination was obtained from sunlight reflected into the throat from the head-mirror. The tag was located in the larynx on the left side, about one-half being below the glottis, and held in place, as was discovered on removal, by the lower point sticking in the mucous membrane. After one or two attempts it was seized by forceps and removed, the lower point tearing off a minute piece of mucous membrane. The patient took the ether well and there was no cyanosis. Considerable mucus had to be wiped from the throat before a successful view could be obtained. Atropine sulphate $\frac{1}{16}$ grain was given soon after the operation. In the evening the breathing was still a little harsh, but the child swallowed easily, taking milk from a cup. The subsequent history is uneventful. Breathing became quiet on the following day and the hoarseness was almost gone. The patient was discharged on the third day well and with practically no hoarseness.

For diagnosis in these cases the history of the accident is important. It is also of importance to know the nature of the object suspected to have entered the larynx. A hoarse or otherwise impaired voice does not point necessarily to the presence of the foreign body in the larynx. The voice may be much affected when the body is in the trachea or in a bronchus, probably as a result of the violent paroxysms of cough in the effort to expel it, but also, at times, to the local injury caused by the passage of some rough or irregular object through the glottis. If, on the other hand, the voice is clear one may feel reasonably sure that the foreign body is not in the larynx. Persistent pain and discomfort in swallowing are positive symptoms of a foreign body in the region of the

larynx, but points to its presence in the entrance to the esophagus, or above the arytenoids, rather than in the glottis. Partial obstruction to breathing is a symptom of no diagnostic value, since it is as likely to be caused by an object below the larynx as in it. Sudden and complete obstruction would, of course, suggest the glottis as the part affected. Cough is rather more constant in laryngeal cases. A laryngeal examination should always be made with ether if not possible without. Exploration with the finger, if attempted at all, should be done with the greatest care, for fear of dislodging the foreign body, if one be there, and pushing it farther into the air-passages.

Treatment.—Much harm is often done, before the doctor arrives, by violent coughing, putting finger in the throat, vomiting, and swallowing hard crusts of bread. The use of emetics in these cases is mentioned only to be rejected. Such remedies have rarely been successful, and death has followed the sudden forcing of a foreign body from the trachea into the larynx. Inversion is of value only when the body has weight enough to be affected by gravitation, as, for instance, a coin, and is not too firmly held by muscular contraction. In an adult a foreign body in the larynx can generally be removed under cocaine anesthesia with comparatively little difficulty. In small children such a procedure is another matter. Even an examination of the larynx is impossible in the large majority of these cases without a general anesthetic. While under ether the filling up of the larynx with mucus and saliva, the constant respiratory movements of the larynx and epiglottis, and the small size of the glottis make the introduction of an instrument and the seizure of the foreign body often very difficult; in fact a procedure calling for all the patience and skill of the operator. Under chloroform there would be less irritation of the mucous membrane and consequently less filling of the throat with mucus and saliva, but the fact that the patient must be held in a sitting posture during the operation contraindicates its use. I have found sulphate of atropia ($\frac{1}{20}$ grains or less) by the mouth before etherization useful in preventing increased activity of the mucous and salivary glands. Tracheotomy instruments should be ready in case of emergency. A bright light is indispensable for the operation. Where it can be obtained, direct sunlight is most desirable. One assistant holds the patient, another gives the ether, steadies the head and holds the mouth-gag, while a third, kneeling on the floor, grasps and holds out the tongue with a napkin. It is possible to get along with two assistants, but three are preferable. The forceps which, as a rule, I use and find most convenient are the Schrötter tube forceps. In cases which call for immediate tracheotomy, on account of the severity of the dyspnea, the laryngeal examination can be made afterwards. It is better, however, where the dyspnea is not too urgent, to attempt the laryngeal examination first, as it is more easy to see the glottis when the air is passing through it. Besides which, if it is possible to remove the foreign body by the way in which it entered, a cutting operation is avoided, which is always desirable. Bonan says that tracheotomy puts into complete repose the larynx and neighboring muscles, relieving the spasmodic contraction, which may hold the foreign body firmly fixed. It also, as has already been said, makes the larynx more difficult to see. This relaxation of the muscles is obtained as well by general anesthesia.

Thyrotomy is especially to be avoided, owing to the possibility of permanent injury of the voice by the operation.

Summary. — Foreign bodies in the air-passages are more frequent in children than in adults, but the mortality is lower in the former. Leaving out cases in which death is immediate or almost so from shock or mechanical obstruction, cases of foreign bodies in the larynx are less fatal than tracheal or bronchial cases.

In all cases of supposed foreign body in the larynx in children a laryngoscopic examination should be made, unless the child is unusually tractable, under ether anesthesia. If dyspnea is urgent tracheotomy may be done first. If a foreign body is visible in the larynx, an attempt should be made to remove it through the mouth before resorting to any cutting operation for its removal.

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MASSAGE AND GALVANISM IN GOUT.

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The position which massage should hold in the treatment of gout has not yet been clearly defined. This will doubtless prove an interesting and fertile field to cultivate for those who have the opportunity, the time and the inclination to do so. At present, as in many other affections, patients suffering with gout are often consigned to the hands of the *masseur* to follow their own discretion or indiscretion.

On the 26th of March, 1895, the Hon. H. D. H. sent for me. He was then fifty-one years of age, and his usual weight had been 325 pounds, but at that time it was only about 200 pounds, showing how much the poor man had been pulled down. For three weeks before I saw him he had been confined to his room with gout. The outer aspect of the left ankle was swollen, hot, tender and indurated, so that he could only hobble around on crutches. On the back of the left wrist there was also a good deal of indurated deposit, hot, and sensitive to pressure, and both ankles

and wrists were painful all the time, worse at night, so that he was wakeful and restless, seldom getting any sleep before two o'clock in the morning. Foot and hand were both edematous and there was much pain in the great-toe joint, though there were no other symptoms here during this attack. His previous attacks, extending over a period of twenty-eight years, with the exception of the first, have all been characterized by heat, pain and swelling of the metatarsophalangeal joint of the great toe of the left foot, and these have all disappeared, leaving no trace in the intervals when he was perfectly well. On the back of the right hand there was a deposit half the size of a hen's egg, and seemingly as hard as bone. These swellings were so much worse than usual that his physician called a surgeon to see if they had better be operated upon. It was decided not to do so.

I gave this patient general massage in the morning, and special massage of the affected joints late in the afternoon, every day for five days, when it was evident that he was improving. I also banded the left ankle and wrist, which afforded much comfort and support in the day. On the afternoon of the fifth day, immediately after massage to the swollen places, I gave each of them galvanism, five to ten milliampères, with the negative pole over the affected region for a few minutes. The effect of this was evident at once in lessening the induration and dispelling the surrounding edema and congestion. Followed by a few minutes of massage to push along the circulation and to hasten absorption, the result was much better than from either alone. This was continued every day for a while, with rapid improvement, so that on the seventh day, two days after the galvanism was begun, he was taking some steps without crutches, and two days later was walking well and attending to his profession — that of law — for half a day at a time. Under galvanism preceded and followed by massage the indurations and swellings disappeared like snow before the sun, so that in six days of this combined treatment there was scarcely anything left of them. In four weeks he got completely over one of his worst attacks and required no more treatment of any kind. Milder attacks usually lasted about the same length of time.

There were several other interesting features in this case. When I began with him he had exhausted the orthodox anti-gouty and anti-rheumatic remedies, and was *quacking it on his own hook*. At my suggestion, he stopped this and took an alkaline chalybeate water from Blue Hill Spring, Me., of gentle aperient and diuretic properties, much like that of Schwalbach, and this alone took good care of the internal organs.

He could always tell when an attack of the gout was coming, by his increased mental activity and facility of pursuing difficult legal cases successfully. His attacks were more frequent in strawberry and peach time, of which fruits he was very fond. When I first learned of the use of the negative pole of the galvanic current for aiding in the removal of deposits and indurations about joints I confess I was somewhat sceptical; inasmuch as it was also recommended that the electricity should be preceded and followed by a good massage. It seemed to me that the electro-therapists wanted to borrow some honor and glory from massage. But having used galvanism in a variety of these cases from different causes I no longer doubt its value when employed in this way. Whether it acts by attracting alkaline fluids to the negative pole and thus dissolving