Original Articles.

ADENOID VEGETATIONS IN CHILDREN: THEIR DIAGNOSIS AND TREATMENT.¹

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IN a paper² read in February, 1886, before the Boston Society for Medical Improvement, I endeavored to give the history, symptoms, and treatment of a disease incident to childhood which has its seat in the naso-pharyngeal cavity, and to which Wilhelm Meyer, of Copenhagen, in 1868, gave the name of *adenoid vegetations*.

Our knowledge of this affection has been acquired during the few years which have elapsed since the appearance of Meyer's³ and Loewenberg's⁴ important communications; but any one who has had practical experience with it, and has witnessed the surprising improvement in certain children after its eradication, cannot fail to wonder why it should have remained so long unrecognized and untreated. It remained untreated chiefly because it was unrecognized. The naso-pharyngeal cavity of the child has always been, and is, even at the present time, a much neglected region. It is the rare exception that a posterior rhinoscopic examination can be made in little children on account of the irritability of the fauces, especially if any catarrhal trouble be present; nor can the cavity be inspected through the nostrils. Hidden from sight, this important region has been left practically unexplored. Nevertheless, the cause of obstructed nasal respiration in children, in the majority of instances, will be found to be in the naso-pharyngeal cavity, and not in front of it, in the nasal chambers, nor below it, in the pharynx. Yet how few practitioners are in the habit of interrogating this cavity, and how many students leave their medical schools and hospitals without once having passed their index-finger up behind the soft palate, and learned to recognize by digital examination the different anatomical landmarks there contained, or how to know by the sense of touch when its walls are in a healthy condition, and when they are the seat of disease. The naso-pharyngeal cavity is seldom looked into in the dissecting room or on the autopsy table, and receives, as a rule, most inadequate mention in works on general medicine and surgery. Children presenting symptoms peculiar to adenoid growths in this region are frequently discharged with the not very definite diagnosis of "catarrh," "snuffles," "winter cough," "winter cold," etc., whereas, if their naso-pharyngeal cavities were properly examined, the true source of their discomforts would be discovered. Such little children, generally regarded as difficult to examine and unsatisfactory to treat, are too apt to be classed among uninteresting cases, and to be discharged with some local wash.

When they are pale, puny, and deaf, with a constant nasal discharge, excoriated upper lip, and stuffy voice, the word "scrofula" finds a convenient application, and the children are kept indoors while cod-liver oil, iron, the iodides, or the hypophosphites are poured downward into the stomach, with but slight chance of reaching the seat of the trouble, which is upward, in the naso-pharynx.

In looking back upon my own special practice of a few years ago, I now feel that although typical examples of this complaint must have been seen, they were not properly observed, and certainly not properly treated. We need only reflect upon the importance of the naso-pharyngeal cavity to speech, its intimate relation with the organ of hearing, and, above all, its respiratory function, to be alive to the necessity of having it in a healthy condition. Imperfect nasal respiration in the child means imperfect health and imperfect development, with danger of permanent structural changes being excited in the middle ear or in other parts of the body.

The immediate and remote effects of adenoid vegetations depend chiefly upon the mechanical obstacle which they offer to the passage of air through the natural respiratory channels; namely, the nostrils and the naso-pharyngeal cavity. Hence the first symptom to attract attention in a child with this complaint is its difficult breathing, especially at night. This, in four of my cases, was noticed from birth, as well as difficulty in nursing, yet the cause was unsuspected, and it is doubtful if the diagnosis has ever been established in early infancy. One of these children had reached the age of six years when it first came to me through Dr. Clarence J. Blake, to whom she had been referred for deafness. It had, indeed, been under treatment at various times since infancy for symptoms shortly to be mentioned, and the diagnosis of "catarrh" had been pronounced; the prognosis being that the child would "grow out of it." Finally, a purulent discharge from the ears appearing, and the deafness increasing, the aurist was consulted and the true nature of the train of symptoms explained.

Such, briefly, is the story of numbers of these children. General practitioners are first brought into contact with them much oftener than specialists, and it cannot be too strongly urged that these obstructing growths, the removal of which marks an era in the life of the child, should be recognized and treated by them, or, at least, by the general surgeon. With a tithe of the attention paid to the naso-pharyngeal cavity which is given to other less important regions of the body, there would be no necessity for referring such cases to the specialists for either diagnosis or treatment.

The symptoms of this complaint vary in degree, according to the length of time the air-tract has been obstructed. In a child two years old, which, in my experience, is about the average age when trouble first begins, little else than difficulty of breathing, especially at night, and a dull, heavy look about the eyes, is noticed. An ordinary cold may have been the initial cause; the child soon shows a tendency to repeated attacks of "cold in the head," which increase in frequency and duration. These are accompanied by considerable nasal discharge, which, however, may be entirely absent when the child is free from the acute attacks. During the summer months there is comparative immunity from all the symptoms, yet with the return of fall and winter the colds recommence with renewed severity. Deafness, in the majority of cases, is soon added to the list of discomforts, and by the time the child has reached the age of six, eight, or ten years, the characteristics of a typical example of adenoid vegetations are as follows: The child is a mouth-breather. Its facial expression is dull and stupid; oftentimes idiotic. The open or half-

¹ Read before the Boston Society for Medical Observation, February 6, 1888.

² Boston Medical and Surgical Journal, March 4, 1886.

³ Trans. Med.-Chir. Soc., London, 1870, Vol. III.

⁴ Tumeurs adénoïdes du Pharynx nasal, Paris, 1879.

open mouth is one of the most constant symptoms. Nasal breathing is interfered with during the day, but it is at night that this symptom displays itself with the greatest prominence. The child never sleeps soundly; it assumes unnatural positions in bed, and the slightest noise will awaken it. The labored breathing, especially when it has a fresh cold, is distressing to hear, and causes great alarm to the members of the family, who imagine the child is in danger of suffocation. The respirations will occasionally cease for a few seconds, and then re-commence with the same noisy, suffocative character as before, or the child may wake suddenly, bathed in perspiration, screaming and frightened. In the morning the cavity of the mouth is dry, and the lips may be parched. During the day the child is languid or irritable. The majority of the children are deaf, and their voices stuffy and thick. At school they are scolded by their teachers for inattention, and laughed at by their playmates. Yet the vacuous expression, open mouth, deafness, dead voice, nightmare, irritability of temper and lack of energy, all have a mechanical origin in the growths which are blocking up the naso-pharyngeal cavity and preventing nasal breathing.

The permanent condition of these children may be compared to the temporary discomfort of an adult in the congestive stage of a severe attack of coryza. And any one who has once experienced the relief afforded under such circumstances by the application of a spray of a four per cent solution of cocaine to the interior of the nostrils, may form a correct appreciation of the change which takes place in the dispositions and intellects of these little children after their naso-pharyngeal cavities have been made permeable to air. Moreover, when the growths are removed at one sitting, in the manner presently to be described, the improvement in the child will be immediate, especially as regards the character of the breathing, the quality of the voice, and oftentimes the hearing. And it is not long before their characters and facial expression undergo a complete change. It is true, as Prof. B. Fraenkel,⁵ of Berlin, says, "that the impairment of intellect and want of energy manifested by these children is real, and not merely in the expression of the countenance, is made evident after watching these same children after the growths have been removed. To the gratification and astonishment of the parents and teachers, the children hitherto sluggish and dull of comprehension now make rapid progress, and their comrades soon cease to make a laughing-stock of them. It seems, in fact, as if, through the removal of the obstructing vegetations in the naso-pharynx, they had become different beings."

Again, speaking of the nervous symptoms sometimes associated with this disease, such as abnormal sensations in the head, a feeling of weight and pressure in the upper and back part of the cranial cavity, melancholia, headache, etc., Professor Fraenkel continues: "The children come from school complaining of pain in the head, with a desire to lie down, and occasionally vomit, yet on the next day they have sufficiently recovered to go again to school. Slight fever sometimes accompanies these attacks. In many cases the parents and physician content themselves with the diagnosis of 'migraine' in explanation of these oft-recurring attacks. The children pass their holidays in the country or at some health resort, where

they are comparatively free from such attacks, yet they return home, bringing their old trouble with them. Then it is said, 'the child cannot bear the air of the school-room.' Finally, the adenoid vegetations are detected and removed, and the child is restored to perfect health."

The diagnosis of this complaint can be established with tolerable accuracy, even without direct examination of the naso-pharynx, from the train of symptoms already referred to, especially if the nostrils in front are free from obstruction, and if there are no enlarged faucial tonsils. Inspection of the cavity of the mouth will reveal almost invariably a high palatine arch, so marked in many cases as to be a deformity. The soft palate looks thick, and often seems to be bulged forward and immovable. Enlarged follicles are often seen on the posterior pharyngeal wall, and occasionally the uvula is relaxed. The faucial tonsils, similar in structure to adenoid growths (being, in fact, part of the lymphatic ring of the pharynx described by Waldeyer), are very apt to be simultaneously hypertrophied. Symptoms peculiar to adenoid vegetations have in former days been graphically described, but attributed wrongly to enlarged faucial tonsils. Dr. Henri Chatellier, of Paris, has called attention to this point in his recent interesting monograph.⁶ Adenoid growths in the naso-pharynx were unknown when Dupuytren (1824) and Alphonse Robert (1843) wrote their accurate descriptions of the evils which the pernicious habit of mouth-breathing entail, and which they considered to be due to enlarged faucial tonsils. Their account of the series of changes in mouth-breathers, such as impairment of hearing, alterations in the facial expression and in the quality of the voice, agitated sleep, obstinate cough, deformities of the bones of the face, nose, hard palate, dental arches, and of the chest-walls was exact and complete; but, as Dr. Chatellier observes, they mistook the real cause. The tonsil up behind the soft palate, which was not seen, was the real offender, and when it is removed, although the two lower tonsils may be enlarged, they will not impede respiration, and will, moreover, diminish in size after the naso-pharynx has been freed. Of the three tonsils, the third, or the pharyngeal tonsil, is the one that is causing the damage, and is the one to remove. Dupuytren himself remarked that excision of the faucial tonsils did not always relieve patients of their difficult breathing.

The change in the shape of the chest-walls in consequence of obstructed nasal breathing was strikingly shown in one of my cases, a boy nine years of age. He had suffered from his birth with labored breathing, difficulty in nursing when an infant having been one of the symptoms. When first seen by me, although his appetite was good, he looked ill-nourished and frail. His family history was good, and his three sisters healthy and robust. The appearance of this boy was brought about entirely through an insufficient quantity and a vitiated quality of air entering his lungs. His chest was thin and flat, the deep depressions of the intercostal spaces making the ribs appear unusually prominent, and, as his mother expressed it, in bathing the child it was like washing over a wash-board. At the lower end of the sternum there was a deep concavity. This boy's chest corresponded so perfectly with Alphonse Robert's description of this form of thoracic deformity, that I shall translate his

⁵ *Deutschen Med. Wochenschr.*, No. 41, 1884.

⁶ *Des Tumeurs adénoïdes du Pharynx*, Paris, 1886.

own words.⁷ He says: "The lateral walls of the chest, instead of being round and regular, are, on the contrary, depressed, flat, sometimes even concave, as if at the period when the ribs were soft and concave they had been laterally compressed. This depression is more pronounced towards the middle of the thorax than at its summit or base. It is also more marked near the middle of the ribs than at their extremities. The vertebral column is but slightly altered; the costal cartilages form a projecting angle at the point of their attachment to the ribs. The sternum, in extreme cases, presents at its lower portion a deep depression." Dr. Chatellier offers the correct explanation of this deformity in considering it to be the result of prolonged indrawing of the chest-walls, due to an insufficient supply of air. It is an exaggeration of what is seen in cases of acute laryngeal stenosis in children, the picture of which is familiar to all.

To be certain of the presence of adenoid growths, in cases where posterior rhinoscopy is not practicable, the forefinger should be passed gently up behind the soft palate. Although not painful, the procedure is disagreeable, and as the child is apt to rebel against a second trial, it is important that the first attempt should succeed. To accomplish this, the child is not to be made to anticipate pain by being coaxed or cajoled; but without any unnecessary preliminaries, it is asked to open its mouth, which it will almost invariably do. The examiner, steadying the head by placing his right hand behind it, now passes his left forefinger rapidly, gently, but firmly up behind the soft palate. The information gained by digital examination is very characteristic. The growths will be felt as soft, velvety masses, which bleed readily, and on withdrawing the finger it is commonly covered with blood. The growths may not bleed, however, if the finger is not moved about much in the cavity, or kept there but a moment.

Simple as this procedure is, it requires some practice, and the examiner should also know how the normal, unobstructed naso-pharynx feels. The difference between the smooth walls of the normal cavity and one blocked up with vegetations is so marked as to leave little chance for error. But there is one source of self-deception for beginners which may be mentioned. Some children are naturally much more difficult to examine than others. Some contract their soft palate against the examining finger with such force as to impede its movements, and the contraction of the muscular fibres of the palate itself feels oftentimes like a circumscribed swelling; but it is merely necessary to remember that it is the posterior wall and vault of the pharynx that are to be examined, and not the posterior surface of the palatal curtain.

Given, then, a child with this affection, the question is: how are the growths to be removed? Removed they must be, for it is a useless expenditure of time to attempt to reduce the growths when they are of large size by local applications. Moreover, long-continued local treatment of the naso-pharyngeal cavity of little children is not feasible. Certain phenomenal children, it is true, are occasionally met with who are tractable and submit to whatever is done to them, but they are obliged to come to the physician again and again, and always do so with fear and dread.

Yet most little children it is impossible to treat at

all. I have, therefore, long since abandoned all attempts to treat this affection unless the child is anæsthetized. There are no contra-indications to the administration of ether for operations in the naso-pharyngeal cavity, and when adenoid growths are present in large masses their complete removal is too painful for children without anæsthesia, as well as unsatisfactory for the operator.

In advocating the method for the removal of these growths, which has become my routine practice, I shall bear in mind Sir William Dalby's admonition, who, in writing⁸ on this subject, says: "If one thing more than another stands out in relation to what is written, said, and done in connection with this matter, it is the necessity of tolerance for other methods while advocating our own, and for the following reason: That it is characteristic of the complaint that if the growths are removed in any way, so long as they are completely removed, the patients get well both as to nasal breathing and hearing."

There are so many gradations in the size, toughness, and quantity of these growths, that I am inclined to believe that different operators, in extolling some particular method for their removal, have in mind only one form of the complaint; and while their particular procedure is applicable for certain cases, it is entirely impracticable for others.

The method I consider the best for a child when there is a large mass to be removed, and which I have carried out with great satisfaction in 104 children of ages ranging from twenty months to fourteen years, is as follows: The child is thoroughly etherized. It is then placed in a good light, and seated upright in the lap of an assistant, the operator being seated opposite to it. The child's mouth is held open by a small-sized mouth-gag inserted between the teeth on the right side. Any accumulation of mucus in the pharynx is to be wiped out. The operator should now pass his index-finger up behind the soft palate and assure himself of the quantity and situation of the growths. Then gently pulling the soft palate forwards and upwards by means of a palate-hook held in the left hand, a pair of post-nasal forceps, held in the right hand, is introduced, closed, into the naso-pharyngeal cavity. One soon learns to feel the growths with the closed end of the forceps. The blades are then opened, the mass grasped, and pulled off either by direct traction or by a slight twisting movement of the forceps, but under no circumstances is force to be exerted. If the growth comes away with difficulty, release the blades of the forceps and begin over again, taking hold of a smaller portion of the growth. Force, as well as hurry, is to be avoided. The rapidity with which the operation is completed depends upon the amount of the hæmorrhage. If there is much bleeding after a portion of the mass has been removed, wait until it has ceased, and then proceed with the operation. This it is usually necessary to do from three to six times or more before the cavity is cleared out. The finger is to be inserted in the cavity from time to time, until it is found that it is practically free. When it is considered that enough has been accomplished with the forceps, I hold the child's head well forward, so that the blood may flow out of the nose, and with the ball of the index-finger of the left hand and the finger-nail, attempt to smooth down the remaining ragged edges by passing the

⁷ *Bulletin général de Thérapeutique*, t. xxiv, 1843, p. 343.

⁸ *The Lancet*, October 2, 1886, p. 618.

finger first into one choana, then into the other, and then backwards and downwards along the posterior wall of the naso-pharynx; also, when necessary, along the lateral wall of the cavity, the Eustachian prominence, and in the fossa of Rosenmüller. This manipulation with the finger causes the blood to flow more freely than the previous evulsions with the forceps. Occasionally, also, after the larger portion of the growths has been plucked off with the forceps, a post-nasal curette may be introduced behind the soft palate and the remaining ragged masses scraped away. The steel finger-nail fixed to the finger and used as recommended by Sir William Dalby, is also serviceable for this purpose. In certain cases, Meyer's ring-knife introduced through the nostril is of use to scrape around the Eustachian orifices, the end of the instrument being guided by the forefinger behind the soft palate, as practised by Mr. Butlin,⁹ of London, whose method, in fact, of dealing with these growths, with the exception of the position of the patient and the management of the soft palate, does not differ very materially from the one described. But, as a rule, the happiest results may be accomplished with the forceps and the forefinger alone. With proper care and assistance there is no danger for the child, and in one sitting, occupying from ten to twenty minutes, it is practically cured of a complaint which may have existed for years.

The removal of the growths, however, is not accomplished in all cases with equal satisfaction. The conditions which make the operation difficult are an excessive amount of mucus in the throat, a large, thick tongue, enlarged faucial tonsils, a long distance from the lips to the posterior pharyngeal wall, a small space between the free border of the palatal curtain and the pharynx, and a deep naso-pharyngeal cavity. In no case has it been necessary to repeat the operation, though in two children, where the operation was prolonged, owing to some complication, it was thought at the time that a second sitting would be needed. Yet these children did perfectly well, which leads me to think that we need not be too energetic, or imagine that every particle of the growths must necessarily be brought away. The principal object of the operation is to establish free nasal respiration. If this be effected, a small amount of adenoid growth left behind may not do harm. The vitality of the remaining tissue is probably destroyed, and it will atrophy.

The growths do not recur after removal. In operating, as I invariably do, with the child in the upright position, it will be urged that there is danger of blood being sucked into the larynx. In speaking with practical surgeons concerning the operation this criticism has almost always been advanced. But the objection is theoretical, and with care and prudence no accident of this nature need be feared. There are no large bloodvessels in the naso-pharyngeal cavity to be wounded, and it is characteristic of the bleeding from the growths that it ceases completely in a few moments. The blood does not come with a gush, but will be seen to be trickling slowly down the posterior wall of the pharynx. That which is not sponged out flows into the stomach, and will be vomited later. Liquids naturally flow down the œsophagus, and not down the windpipe. The danger in operations about the mouth is from a clot of blood becoming wedged in the glottis, and it is easy to guard against its for-

mation in this operation. The bleeding varies greatly in different cases, and, as far as I am aware, there is no way of foretelling in any given case how profuse the hæmorrhage may be. The vascularity of the growths does not seem to be proportionate to their size, for some of the largest masses have bled insignificantly. In beginning the operation, go slowly and watch. When a portion of the growth has been removed, wait until the bleeding has ceased, and then proceed with the operation. These children with obstructed noses, especially if they happen to have enlarged faucial tonsils, are usually bad etherizers, and in many the accumulation of mucus in the lower pharynx is excessive, all of which is calculated to make the operator feel anxious; but no annoyance in any case has been caused by blood in the windpipe, and no surgeon who has been present at the operations, either at the Massachusetts General or the Boston City Hospital, or in my private practice, has seen cause for alarm on this score. There is more to be feared from vomited food lodging in the larynx than from a clot of blood. The ether, therefore, should be administered on an empty stomach. The degree of etherization must be sufficiently profound to abolish reflex action of the soft palate, so that it will yield to being held forward by the palate hook without resistance. It is important to keep the palate out of the way of the forceps, and no effort should be made to grasp the growths when it is contracted. For should its posterior surface or other healthy wall of the cavity be nipped, an obstinate and annoying hæmorrhage may take place. It will be an advantage for the operator to have a small index-finger; also a light hand and a delicate touch. It need hardly be said that he should possess a perfect familiarity with the situation of the different anatomical structures in the naso-pharyngeal cavity, and know the difference when feeling with the finger or with the forceps between the parts in a normal state and when covered by adenoid growths. In selecting a pair of post-nasal forceps for the operation, it will not do to take the first pair that comes to hand. The average instrument in the shops is unnecessarily cumbersome, and unnecessarily long. For children, the curve of the cutting end of the forceps should be small, and the length of the handles as short as possible and perfectly firm, so that when the cutting ends are in contact there will be no "give" at the handles. The ease and success with which these growths are removed under ether, where the sense of touch plays such an important part, depends very much upon the proper selection of instruments. The accompanying drawing shows the exact size of forceps¹⁰ which have been found to be the most serviceable for the average child up to the age of fourteen. The conventional hard-rubber palate-hook is also shown, as well as the mouth-gag preferred, which is easy to adjust, easy to remove, easy to keep clean, and never out of order.

With regard to the amount of this over-growth of glandular tissue which may be contained in the naso-pharyngeal cavity, it can only be said that it varies according to the size of the cavity; and this is subject to as wide variation in the child as in the adult. Children of the same age, therefore, having the same amount of adenoid hypertrophy, may present different symptoms of the complaint, owing to the relative capacity of their cavities, and consequently to the de-

⁹ St. Bartholomew's Hospital Reports, 1885.

¹⁰ Made by Codman & Shurtleff, Boston.

Actual Size of the Three Instruments.

gree with which nasal respiration is obstructed. In one case the clinical picture would be complete, while in another deafness might be the only prominent symptom, owing to the situation of growths around the Eustachian orifices and at the pharyngeal vault, the large size of the space giving sufficient breathway.

The two cuts on the next page, photographed from the original specimens, and showing the exact size of the bottles, will give an idea of the quantity which may be taken out of a child's naso-pharynx.

Specimen No. 1 shows the largest amount removed at one sitting in any case, while No. 2 represents an average amount in typical cases about the age of eight years. Specimen No. 1 came from a negro fourteen

years of age, yet who had the appearance of a puny boy of nine. His breathing had been obstructed from his birth, and from the age of nine months there had been practically no nasal respiration. Apart from the color of this lad he had none of the facial characteristics of the black race. His nose was small and pinched; his face long and undeveloped. His mouth, day and night, was wide open, and each breath noisy. At night his struggle for air, from the description of his parents, must have been terrible. He was etherized and operated upon in the manner described. The naso-pharynx was literally packed with adenoid growths. The bleeding, however, was surprisingly slight, the growths being very soft and coming away with ease, hanging in large pieces between the blades of the forceps. As the operation progressed the breathing became better and better, and when the cavity had been completely freed, the change in

the character of the respiration was most striking to all present. From being noisy and labored it had become free and peaceful. But this improvement in the breathing led to a new cause for alarm. The first night after the operation the boy slept so quietly that his parents could not persuade themselves that he was not dead, and went repeatedly to his bed to reassure themselves. They were actually kept awake by the absence of the noise which had disturbed them so many years. This is the only instance of the disease which I have met in the black race, and I was inclined to attribute the amusing account given by the parents of their experiences on the night in question to the mental peculiarities of the negro, and that it was based on ig-

norance and exaggeration. But another case, belonging to an entirely different station in life, recently operated upon, gave rise to the same kind of alarm to a near relative of the patient.

The patient was a girl nine years of age, and had always been under the special care of an older sister. Although the child had been a mouth-breather for five years her hearing was unaffected. Her breathing at night, according to her sister, who always occupied the same room, was distressing to hear. She was restless and liable to awake at the slightest noise. When taken with a cold she became feverish and slightly delirious. At such times she had to be propped up in bed with pillows, her breathing being of such a character that the sister feared the child was in danger of suffocation, and she often lay awake in anticipation of some accident, her chief guide being the noisy respirations. The sole cause of this child's trouble was a large adenoid growth completely obstructing the respiratory channel. After its removal her sleep became immediately so calm, sound and natural that the sister, not being able to accustom herself so rapidly to the change, found difficulty in convincing herself that the child was breathing at all, and was considerably exercised for three nights after the operation.

The treatment of a child in this condition is followed, not only by the cure of the patient, but by the restoration of peace to the whole household. Another good effect of the operation which may be noticed at once is the change in the quality of the voice. The first words the child speaks, in certain cases, are clearer, the resonating properties of the cavity being restored through the removal of the growths. This improvement is especially prominent in the singing voices of some children.

It is also surprising how soon the whole expression of the countenance changes. The mouth generally remains closed as soon as the nasal air-tract is made free, and the lines which have been formed at the angles of the mouth, nose, and corners of the eyes by the weight of the hanging lower jaw disappear very rapidly. In some of the children operated on more than a year ago, the improvement in their physique is most remarkable. The subjoined pictures will show the changes in three instances which have taken place after operation, and it is no exaggeration to say that the dispositions of these children undergo as important a change for the better as is manifested in their personal appearance.

Among the most gratifying results of the operation is its influence upon the restoration of the hearing. Of the 104 children operated upon, 47 have been in private practice. Out of these 47, 39 have been deaf. The majority of them have come to me through the advice of Dr. Blake, who has kindly consented to review this branch of the subject, and whose paper on the "Relation of Adenoid Growths in the Nasopharynx to the Production of Middle Ear Disease in Children" will be found in this issue of the JOURNAL.

The after-treatment is very simple, and, as a rule, there is nothing to be done beyond taking precautions

Actual Size of the Bottles.

to keep the child from catching cold. In winter, or in stormy seasons, the children should be kept indoors for a week, but in summer they may be allowed to go out and lead their natural lives as soon as they have fully recovered from the effects of the ether, or from any weakness due to the loss of blood. These points must be determined by the peculiarities of the individual children. Of my 104 cases, three, who had had previous trouble with the ears, developed an acute attack of inflammation of the middle ear; and one, on the sudden restoration of the hearing, suffered for weeks with a severe form of chorea. With these exceptions, there has been no accident to record due to the operation, nor is it followed by any shock. It is usually necessary to administer a large quantity of ether, and as soon as its effects have passed off, the patient may be said to be practically well. As a rule, the children breathe, sleep, and feel better than they have ever felt in their lives, and it is often difficult to restrain them and keep them in the house. Their regular diet may be taken, for, except in rare instances, there is absolutely no pain on swallowing in consequence of the operation. In fact, the children do not know that anything has been done to them. The absence of pain on eating after an operation on the "throat" where such large masses are removed, and attended occasionally by so much hæmorrhage, makes a great impression upon those who are not acquainted with the situation of the growths, or with the physiology of deglutition. If any after-treatment is needed, it will consist of tonics and a detergent wash locally for the nose.

The foregoing remarks have intentionally been confined to the practical side of this complaint; namely, to the importance of its early recognition in children and its treatment. The removal of these growths, however, is not alone essential to the good health and personal appearance of children, for their indelible traces are often seen in adults. Although this glandular tissue tends to disappear after the age of puberty, it may be

M. M., age two years and seven months.

M. M., three months after operation.

E. A., age seven years.

E. A., six weeks after operation.

M. B., age twelve years.

M. B., three months after operation.

present in such large quantity as to lead to permanent damage before that period arrives, and its marks will be carried through life. Dr. Chatellier (*loc. cit.*) has called attention to the deformities of the bones of the head and face which result from neglected adenoid growths. He points out that the air-cavities, as the frontal, sphenoidal, and ethmoidal sinuses, and the antrum of Highmore, being normally in communication with the air, cease to develop when the circulation of air through the nose is interfered with, and hence the dimensions of the face are altered. The lower jaw, which follows its normal development, often protrudes over the upper jaw, which is contracted in front, the upper lip is drawn up, while the hard palate, from the constant atmospheric pressure within the mouth, is pushed upwards, terminating in a sharp angle, like the Gothic arch. It does not seem at all unlikely that the many cases of deafness in adults due to ankylosis of the ossicles, or other structural changes in the middle ear, and which are associated with the V-shaped palatine arch and contracted upper jaw, are the remains of these adenoid growths which accomplished their destructive work in early life undiscovered and unsuspected. The relation of this complaint to certain cases of deaf-mutism must be for future observation and experience to determine.

Dupuytren in his "*Mémoire sur la Dépression Latérale des Parois de la Poitrine*,"¹¹ says that no disease ever presented to him a more painful spectacle than that of an infant who had the parietes of the chest pressed in laterally, enlarged tonsils and violent whooping-cough. It experienced at each crisis of the cough such oppression that instant death seemed to be threatened; it died indeed in one of the paroxysms. That adenoid growths in the naso-pharynx were at fault in this instance, there can be but little question. Provided the naso-pharyngeal space be unobstructed, enlarged faucial tonsils cannot seriously interfere with inspiration, certainly not to the extent of producing the deformity of the chest walls described by the French writers already mentioned, also by Coulson,¹² of London, and by J. Mason Warren,¹³ of Boston. The children seen by Dupuytren "suffering under depression of the sides of the chest and enlarged tonsils at the same time, and who fell, after violent but useless efforts to breathe and after cruel suffering, into the most alarming state of convulsion, or into a state of suffocation, amounting to asphyxia from which state they recovered only to fall again into the same danger at the end of a few minutes," were the victims of adenoid vegetations.

It is apparent that the ravages of scarlet fever, diphtheria and measles, are more severe in children if these growths happen to be present. The various reflex phenomena, also, which may take the form of a true chorea minor, as Dr. A. Jacobi¹⁴ has observed, and for which the naso-pharyngeal cavity is responsible, should impress upon us the influence of this region upon the well-being of the child, and the importance of paying attention to it. Its most frequent affection in children is the one we have been here considering, and I can only repeat, what I said in my first paper on this subject, that there is no other disease in the domain of him who confines himself to the upper respi-

ratory tract, the treatment of which is attended with more satisfaction to the operator, or with more permanent relief to the patient. If the results in all children are not equally good, owing to more or less permanent damage before the removal of the growths, the operator has at least the gratification of restoring to the children a permeable air-tract.

RELATION OF ADENOID GROWTHS IN THE NASO-PHARYNX TO THE PRODUCTION OF MIDDLE EAR DISEASE IN CHILDREN.¹

BY CLARENCE J. BLAKE, M.D.

THE subject of adenoid growths in the naso-pharynx and their effect upon the organ of hearing has been so well treated by Meyer,² Loewenberg,³ and others, that the present paper must, in justice to these acute observers, be regarded rather as a recapitulation, the motive for which is that, in view of the large number of cases of this class among children, attention cannot be too widely drawn to a cause of aural disease often unrecognized, and when once found easily removable.

The fact that the artist Catlin⁴ was led to classify and contrast the so-called mouth-breathers among whites with the nose-breathing American Indians among whom he lived and sketched for many years, is sufficient evidence of the recognizable existence of such a class in our community, although the local cause of what he stigmatizes as a vicious habit was not appreciated by him, or indeed by any physician even, so far as we have record, until Czermak signalized the invention of his method of rhinoscopy by the discovery of these glandular tumors.

That Catlin's artistic eye should have been offended by the distortion of the human face which he so graphically portrays is to be expected, but he also mentions impairment of hearing among the accompaniments of the "bad habit of mouth-breathing."

Since the organ of hearing is the channel through which, pre-eminently, in childhood the stimulus to mental development comes from the outer world, a fact of which we have ample evidence in the results both of physiological experiment and clinical experience, and since the enlargement of Luschka's glands is a disease of childhood particularly, though its consequences may continue through adult life, a recognition of the relation which this disease bears to the hearing power is of great importance.

The presence of adenoid growths in the naso-pharynx affects the organ of hearing and its function mainly in two ways—by interference with the ventilation and with the blood-supply of the middle ear. To clearly review the manner of this interference it is well to consider the means provided for continuing a definite supply of air in the middle ear, and for maintaining a just balance of the arterial and venous circulation in that part of the organ of hearing which suffers most immediately from the filling of the naso-pharyngeal cavity and consequent closure of the Eustachian tube. This passage, the Eustachian tube, which is both drain and ventilating shaft, is in the

¹¹ *Répertoire Général d'Anatomie et de Physiologie*. 1828, p. 110.

¹² *Deformities of the Chest*. 1837.

¹³ Enlargement of the Tonsils attended by certain Deformities of the Chest. *Medical Examiner*, May 18, 1839, p. 309.

¹⁴ *The American Journal of the Medical Sciences*. April, 1886.

¹ Read before the Boston Society for Medical Observation, February 6, 1888.

² W. Meyer. Ueber adenoiden Wucherungen in der Nase und im Rachen. *Arch. f. Ohrenheilk.*, 1873-74.

³ B. Loewenberg. Les tumeurs adénoïdes du pharynx-nasal. Paris, 1879.

⁴ Catlin. *The Breath of Life*.