MOUTH-BREATHING

CLINTON WAGNER, M. D.

With the compliments
of the Author.

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HABITUAL

MOUTH-BREATHING

Its Causes, Effects, and Treatment

BY

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"*Shut your mouth . . . .*
And stretch the nostrils wide."
SHAKESPEARE.

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The following pages have been elaborated from a paper read before the New York County Medical Society, April 25, 1881.

A careful perusal will, it is hoped, serve to direct attention to the serious disturbances of health, which follow in the train of a very common, but perverted method of breathing.

C. W.

35 WEST 38TH STREET,
June, 1881.

HABITUAL MOUTH-BREATHING.

HABITUAL mouth-breathing, and the long train of evils consequent thereon, have attracted my attention for many years past; but since I have been engaged in special practice — more than ten years — my opportunities and facilities for making observations have greatly increased. The public seem to be wholly ignorant of the perniciousness of the practice: and physicians rarely appreciate how powerful a factor is the habit in the causation of numerous pathological conditions; and for this indifference, if I may so term it, they are not altogether culpable, as the literature upon the subject is so exceedingly meagre.

Dr. Cassells of Glasgow[1] has written a most

[1] Edinburgh Medical Journal, February, 1877.

interesting paper on the subject; but its scope is extremely limited, being confined to a consideration of the habit as a cause of aural troubles only. A small monograph appeared some years ago, which I have no doubt is familiar to many of you, by Mr. George Catlin,[1] well known as the portrayer of American Indian life and customs. He discussed the subject from a purely general sanitary standpoint, and not in a scientific or medical way; and therefore I am compelled to give chiefly, in the following pages, the results of mine own experience and observations.

Nature has provided all living creatures with separate and distinct passages or canals for breathing and the taking of food.

In fish, breathing is performed by the gills, with the exception of the myxinoides, in which the cavities of the nose and mouth communicate. In the batrachians and reptiles, all of which breathe more or less by the lungs, the

[1] The Breath of Life.

nose and mouth communicate. In birds the nostrils open on the back of the bill, generally nearest the base, and the orifices are frequently covered by short, bristly feathers. Man is by nature a nose-breather; and the practice of mouth-breathing, as I shall endeavor to prove, is acquired either through carelessness, ignorance, or a local nasal or mouth trouble, which renders difficult or impossible nasal breathing.

For those who may desire the authority of Holy Writ to establish the fact of man's having been intended for a nose-breather, I can refer to Gen. ii. 7, in which we are told that "He breathed into his nostrils the breath of life." Again, in Isa. ii. 22, "Man, whose breath is in his nostrils."

The infant, from birth, always breathes through its nose: unless it did, the act of sucking could not be performed; and a prolonged effort on the part of the child to retain hold of the breast with closure of the nose

would cause suffocation. During sleep, the infant always keeps its mouth closed, provided there is no local obstacle to nasal respiration.

From observations made by Honsell,[1] in the Freiburg clinic, it appears that in healthy infants the mouth is almost always closed during sleep, the tongue lies in contact with the hard palate, and the mouth takes no part as an air-passage. This he found to be the case in two hundred and ninety-six out of three hundred and twenty-eight observations.

The nose is the most prominent feature of the face, and, according to some physiognomists, indicates more strongly than any other organ the peculiar character-traits of the wearer.

It consists of a cartilaginous and bony framework, covered by integument, and lined by a very sensitive mucous membrane. It has two elliptical openings, called nostrils, separated anteriorly by cartilage, and posteriorly by a

[1] Ziemssen's Cyclopædia, vol. iv., p. 105.

thin plate of bone known as the vomer, from its supposed resemblance to a ploughshare. On each side of this partition, or septum, are three irregularly-shapen, soft, spongy bodies, — the turbinated bones.

The nose serves several important functions in the economy. 1st, As a channel through which atmospheric air passes into and from the lungs. 2d, As the organ of the special sense of smell. 3d, As a resonator, or sounding-board, for the voice. 4th, As the channel through which the secretions of the lachrymal gland find an exit after moistening or lubricating the inner surface of the eyelids.

We shall only consider in these pages the relation it bears to the function of respiration.

The air, in its passage through the tortuous channels of the nose, is raised to the temperature of the body before it reaches the larynx: this can easily be demonstrated. On a cold day, let one breathe through his mouth in the

open air: the sensation of cold will at once be felt as far down at least as the larynx, and an irritating cough be induced. No matter how low the temperature may be, the sense of cold is never experienced below the border of the soft palate, so long as breathing is carried on through the nose with closed mouth.

The air is moistened by the natural secretions which cover the turbinated bones in a condition of health; and the short, bristly hairs at the orifices of the nostrils act as a filter or sieve to arrest the impurities, such as dust, etc., which it may contain, and which, if taken by the mouth, may act as an exciting cause in developing laryngeal, bronchial, or pulmonary trouble.

Catlin asserts that it is a "known fact that man can inhale through his nose, for a certain time, *mephitic* air, in the bottom of a well, without harm; but, if he opens his mouth to answer a question, or calls for help, in that position, his lungs are closed, and he expires."

Civilized man, who is endowed with a supe-

rior intelligence, is the only animal who breathes through his mouth: the horse, dog, cat, cow, and all other domestic and wild animals breathe through the nose.

The wide, dilated, expanding nostrils are regarded as points of beauty and value in a horse, as well as an evidence of his capability for physical endurance.

Athletes fully appreciate the importance of nasal respiration. Professional trainers always insist upon those under their charge keeping the mouth closed while exerting their physical powers. Especially is this the case in boat-rowing, and also in the popular but much-abused walking-matches. The individual in the ring, who with lowered head, open mouth, and curved spine, with shoulders inclining forwards and inwards, preventing the free action of the chest muscles, will never win a walking-match, —he has not the stamina to carry him successfully to the goal ahead of him who practises normal respiration through the nose.

The savage races being more nearly allied to the brute creation, accustomed like them to sleep and live for the most part in the open air, breathe through the nose from birth from instinct, and keep their mouths closed during sleep.

Of the Indian, Catlin says, "I have seen a poor Indian woman, in the wilderness, lowering her infant from the breast, and pressing its lips together as it falls asleep in its cradle in the open air." They rigidly enforce Nature's law in this manner, until the habit of breathing through the nose becomes fixed for life, of the importance of which they seem to be perfectly well aware.

In one hundred and fifty tribes visited by Catlin, living in their primitive condition, and containing over two millions of people, cases of deafness, dumbness, spinal curvature, and deaths from teething and diseases of the respiratory passages, were almost unknown. He attributes this exemption from these ail-

ments, so very common in civilized communities, solely to the habit of breathing through the nose.

My own more limited but very practical experience among the Indians sustains fully the statements of Catlin. During my service as surgeon in the United States Army, I was stationed for a number of years in the Territory of Idaho. Near the post was an Indian village of about seven hundred inhabitants: they were nominally under my professional charge, and whenever their own medical men failed to give satisfaction I was called in. I had frequent opportunities of observing their exemption from nose, throat, and ear affections, although their surroundings and circumstances were such as to favor the development of that class of diseases: they were poorly fed, insufficiently clad, and badly housed, living through the extreme cold of Idaho winters in "wickiups" or wigwams, made of the boughs of trees, and covered with pieces of blanket, canvas, or the

skins of animals. At other places on our frontiers, I have observed the infrequency of that class of diseases among the Indians, which I attribute to the universal practice of nose-breathing.

There is no natural narrowness of the left nasal passages, as asserted by Cassells. In the cases he examined he probably found a deviation or bending of the nasal septum towards the left side, hence his conclusion: had he pushed his investigations farther, he would have discovered that in an almost equal number of cases the deviation would have been towards the opposite side; had he gone still farther in his examinations, he would have learned that in the majority of cases the septum is straight, and that there is very little, if any, difference in the calibre of the two sides; therefore what he terms "left-ear deafness" — if it exist at all — cannot be accounted for by nasal stenosis.

The causes which lead to habitual mouth-breathing are to be looked for in the nose,

mouth, or throat. Until quite a recent period, the methods of examining the nose were so imperfect that a correct diagnosis, in many cases, was impossible; but now, with the aid of the rhinoscope for the posterior nares, and by means of a strong reflected light thrown up through the nostrils, dilated by a proper speculum, we need never fail to recognize any obstruction to the passage of air through the nose.

Nasal Causes. — Complete or partial closure of the passages, especially the inferior meatus, which is the one chiefly concerned in breathing. This occlusion may arise from deviation or bending of the septum, which may be congenital, or the result of accident; it may be well forward and above the inferior meatus, causing incomplete closing of one side only, or it may be twisted or bent upon itself, somewhat in the form of the letter S, thus producing a stenosis on both sides.

Nasal polypi of the mucous or gelatinous

variety, usually attached to the turbinated bones, may, from their size and number, effectually prevent the passage of air.

A single large vascular myxoma may form on the septum, and fill the entire cavity of the nostril. Such a case occurred in my practice several years ago, and was reported by me at the time. A fibroma, or malignant growth, attached to the base of the skull may close the posterior nares; a large adenoma in the vault of the pharynx, or an exostosis upon the vomer or cartilaginous septum; false membrane, resulting from syphilitic or strumous ulceration, may form between the turbinated bones, vomer, and floor of the nostrils.

Congenital bony closure of the posterior nares may occur, though such cases are very rare. Emmert reported a case in a boy seven years old, who had never, from his birth, been able to breathe through his nose. He was successfully operated on. Cases of congenital imperforate nostrils have been reported; the

same condition may also be caused by the cicatricial contraction from syphilis, scalds, or burns: foreign bodies, such as buttons, seed, stones, etc., or necrosed bone, may lodge in the inferior meatus, and produce complete or partial closure. General thickening or hypertrophy of the mucous membrane covering the turbinated bones, septum, vomer, and alæ, as is found in chronic nasal catarrh, will produce stenosis, and, in some cases, complete closure of one or both meati. It is not necessary in these cases that there should be complete closure of both sides: a slight congestion from an ordinary acute cold may so nearly close the unaffected side that breathing through the nose becomes, for the time, very difficult, the mouth is resorted to, and thus the pernicious habit is unconsciously acquired through a succession of colds or attacks of sub-acute rhinitis. Paralysis of the dilators of the nostrils may effectually prevent the passage of air through the nose; the nostrils are flaccid, and the alæ fall inwards

towards the septum on attempts at inspiration through it. Cohen relates a very interesting case of mouth-breathing from this cause.

Mouth Causes. — Enlarged tonsils are the most common of the mouth causes which interfere with proper nasal respiration. The glands press the velum upwards and backwards against the posterior wall of the pharynx, thus preventing the passing of air from the nose to the larynx. Tumors of the soft palate or pharynx may act in the same manner. Lingual or sublingual tumors, by preventing closure of the mouth, may induce the habit of mouth-breathing. I have known an elongated uvula to act as a cause. When the mouth is closed, the velum is relaxed, and inclines downwards and forwards, the uvula comes into actual contact with the epiglottis, and excites a short, hacking, irritating cough, accompanied with an unpleasant tickling sensation. If the mouth is opened, retraction or raising of the soft palate takes place, and the uvula is drawn upwards

and backwards from contact with the epiglottis: the patient, observing the relief which follows opening the mouth, acquires gradually the habit of mouth-breathing.

Adhesions of the soft palate to the posterior wall of the pharynx from cicatricial contraction, following syphilitic or strumous ulcerations, scalds, or burns, may prevent effectually respiration through the nose.

Irregular, uneven, or protruding teeth, by preventing perfect closure of the mouth, may also give rise to the practice of mouth-breathing.

Effects or Consequences. — The habitual mouth-breathers can be at once recognized: there is no mistaking them, as the practice stamps itself indelibly upon the physiognomy. The retracted lips, open mouth, receding gums, protruding teeth, — especially the upper ones, — shrunken alæ, diminished size of the orifices of the nostrils, the wrinkles at the outer angles of the eyes, and the lines extending from the

alæ of the nose to the angles of the mouth, give the wearer an idiotic and silly expression which is by no means agreeable to look upon.

Of the appearance of mouth-breathers, Catlin says, "In all of these instances there is a derangement and deformity of the teeth, and disfigurement of the mouth and the whole face, which is not natural, carrying the proof of a long practice of the baneful habit, with its lasting consequences, and producing that unfortunate and pitiable and oftentimes disgusting expression which none but civilized communities can present.

"Even the brute creations furnish nothing so abominable as these, which justly demand our sympathy instead of our derision. The faces and mouths of the wolf, the tiger, and even the hyena and donkey, are agreeable, and even handsome, by the side of them."

The law of compensation does not apply to the nose as to other organs of the body. The loss of hearing on one side frequently results

in improved hearing in the other ear; so with the eye in regard to vision.

In the loss of an arm or any other member of which there are two, the remaining one becomes strengthened by the performance of double duty.

In the nose, closure of the meati, from any cause whatever, on one side, sufficiently to prevent the passage of air, does not have the effect of causing the opposite side to dilate or expand: on the contrary, frequent attacks of congestion of the nasal mucous membrane render nasal respiration difficult, the habit of mouth-breathing is contracted, and obliteration of the passages may follow from disuse and tissue changes; or, as Catlin vigorously expresses it, "the nasal ducts, being vacated, like vacated roads that grow up to grass and weeds, become the seat of polypus and other diseases;" the sense of smell is greatly impaired or altogether lost; the alæ become shrunken, lose their elasticity, and fall in towards the septum; the con-

tour of the nose is changed, and its general appearance has an undeveloped or atrophic air.

The sense of hearing may be affected, ranging from slight impairment to total deafness, through habitual mouth-breathing, caused by the closure of the nasal meati. During the contraction of the constrictor muscles of the pharynx in the act of swallowing, the muscles which preside over the Eustachian canals also contract, and the tubes are more or less opened, and the tympana are ventilated by the passing of air to and fro, and the intra-tympanic tension maintained. According to Cassells, the air must pass through the nose, otherwise it cannot reach the tympanic cavity.

Mouth-breathing, from closure of the nasal passages, is unquestionably a cause of impaired hearing, and, in many cases, of deafness; but I maintain that non-nasal respiration is not necessarily, *per se*, a cause of this condition. We have abundant proof that air can freely

enter the tympanic cavity, even when the nasal passages are effectually closed. The method of inflation known as Valsava's illustrates this; causing the smoke of tobacco to pass out through the ears, where there is rupture of the membrana tympani, also illustrates it.

So long as the Eustachian orifices and tubes are open, the intra-tympanic tension will be maintained, perhaps not perfectly, but hearing will not be seriously impaired, even although the nasal passages are quite closed; but tissue changes will follow sooner or later nasal obstruction, a congestion from continuity ensues, the secretions will collect in the tubes, closure of the orifices or the tubes themselves takes place, the intra-tympanic tension is wholly disturbed, and deafness results.

The effects of habitual mouth-breathing upon the pharynx are readily recognized. The almost constant inhaling of cold air, which is generally charged with impurities, acts as a direct irritant upon the mucous membrane. A congestion or

engorgement of the blood-vessels takes place, which becomes chronic, and permanent dilatation of the vessels is produced; the inflammation, in time, will attack the follicles, and what is known as follicular pharyngitis will be developed; or the follicles may ulcerate, and we will then have ulcerative follicular pharyngitis, commonly, but improperly, known as clergyman's sore-throat.

Pharyngitis sicca, or dry sore throat, is one of the most distressing forms of trouble which result from mouth-breathing. It is especially this variety in which the subjective annoyance or symptom known as "hawking" is present. We in this climate know too well the individual who is a victim to the disgusting practice of hawking. Go where we may, in our street-cars, coaches, hotels, theatres, or any place of public resort, we never fail to meet this unfortunate individual: his clarion note is heard above the most powerful soprano of the opera, or the noise and din of Broadway. The hawker is always a mouth-

breather; and the sound is made in the effort to dislodge the hard, dry, and tenacious mucus from the follicles of the pharynx or the posterior wall of the velum palati. E. Wagner, in his exhaustive monograph on the Diseases of the Soft Palate, "Ziemssen's Cyclopædia," vol. vi., thus explains the *rationale* of "hawking:"—

"A frequent symptom of affections of the palate consists in a prompt and powerful current of air driven from the lungs into the pharynx and posterior portion of the mouth. In its performance, there is a trembling of the walls of these parts, especially of the soft palate, by means of which the well-known sound is produced, and mucus, etc., removed from the surface and propelled outward."

Chronic catarrhal laryngitis is also a frequent consequence of habitual mouth-breathing; and, where there is a strumous diathesis, tubercular laryngitis will almost certainly be developed. There is in all cases voice disturbance, if the habit is caused by nasal obstruction, an im-

perfect resonance from the air or tone passing upwards into the nasal cavities: finding no outlet it returns, and escapes through the mouth; the individual is said then to speak through his nose, the voice being very harsh and discordant.

The disagreeable habit of snoring is caused by sleeping with the mouth open, as the nose-breather never snores. The effects of mouth-breathing upon the general constitution, especially in children, are well marked.

In infancy, childhood, and early youth, when the bones of the thorax are soft and flexible, the condition known as *pigeon-breast* may be brought about. This deformity was formerly regarded as a result of mollities ossium, or rickets; but Shaw,[1] in an able paper on the subject, has proved conclusively that any cause in children that obstructs the entrance of the air into the lungs may lead to the changes in its figure recognized as this breast deformity. Dupuytren observed the condition frequently in children suffering from enlarged tonsils.

[1] Holmes's Surgery, vol. v.

Lambron[1] describes the malformation as a "circular depression of the walls of the chest, at about the junction of the lower and middle third. The thorax seems as if it had been confined by an unyielding ring, which, while contracting its growth in this situation, gives an appearance of abnormal bulging to the upper part of the cavity. This circular depression corresponds with the attachment of the diaphragm internally to the osseous framework of the chest, and is evidently due to the constant energetic contractions of that muscle to overcome the obstacle to free respiration. In childhood the bones yield easily to such influences; and any one who has witnessed the difficulty of breathing which occurs, especially during sleep, where there is any considerable hypertrophy of the tonsils, will readily understand how pernicious may be its effects on the respiratory apparatus.

These cases also suffer from imperfect oxy-

[1] Mackenzie, Diseases of the Throat and Nose, vol. 1.

genation of the blood and malnutrition: as a consequence development is interfered with, and they grow up into weak, sickly, and undersized adults.

Asthma may be caused by complete nasal obstruction necessitating mouth-breathing. Voltolini and Haenisch have reported cases of nasal polypi producing asthma. I have had three cases in my own practice, two of polypi, and one of stenosis, or rather complete closure of the nasal passages from hypertrophied mucous membrane. Recovery followed the removal of the cause in each case.

Nurslings suffering from acute coryza are liable to asthmatic attacks during sleep. The child is accustomed to keeping its tongue in contact with the hard palate, and, with it in that position, breathing through the mouth is almost impossible: hence the spasmodic seizures of dyspnœa during sleep.

According to Kussmaul, attacks of acute hyperæmia of the lungs may follow these

vigorous attempts at inspiration. The tongue may be swallowed during these attacks, producing fatal result, as sometimes occurs during surgical operations while the patient is under the influence of an anæsthetic.

Treatment. — In the treatment of habitual mouth-breathing, the local cause, if any, should first be carefully ascertained, and the surgical operation performed which may be called for by any special conditions, or the topical medication carried out applicable to the particular case.

In deviations of the septum I have operated successfully by removing the projecting portion with the knife: the cutting burr worked by a lathe, such as is used by dentists for excavating teeth for the reception of gold or other filling, has been made serviceable in these operations.

Dr. Goodwillie of this city has devised a most excellent instrument of this kind, with which he has had very good results. In exostoses upon which no impression can be made by the ordinary knife, it is especially useful.

I have recently operated at the Metropolitan Throat Hospital with the cutting burr in several cases of complete nasal obstruction from exostosis and other causes: the results were very gratifying.

Nasal polypi should be removed by the snare, forceps, or galvano-cautery loop: local applications for the removal of this variety of growth are quite useless.

For other forms of growths and tumors, such as the adenomata, fibromata, or malignant varieties, the operation should be performed which the location and size of the tumor may suggest to the surgeon.

In stenosis, or closure of the lower meati, from hypertrophy of the mucous membrane, I have for some years past practised dilatation by metallic sounds. Dilatation has always been, and still is, a favorite method of treatment for overcoming strictures of the urethra, rectum, and œsophagus; and, in adopting it in the treatment of nasal stenosis, I have simply carried

out the suggestions which my experience as a general surgeon had furnished me.

My plan is to introduce through the lower meatus, on each side if necessary, a metallic sound, slightly curved at the end, and olive-pointed, carrying it through to the soft palate, and retaining it in that position for several minutes. The pain at first, in some cases, is intense, but no greater than that caused in sensitive persons upon the first introduction of a sound into the bladder, from which I have known men to faint.

But, as with the urethra, this hyperæsthesia passes away after two or three days, or rather a few introductions, and the patient no longer dreads the operation. Beginning with a sound scarcely larger than an ordinary pocket-probe, I eventually succeed in passing one equal in calibre to a No. 6 or 8 urethral sound; to accomplish this, weeks, or even several months may be required: the cure will depend upon the frequency with which the patient will report for

treatment; for the first week a daily introduction is advisable, after which three times a week, and then twice a week, depending upon the progress which is being made in overcoming the stenosis. When patients cannot conveniently continue to be treated as often as may be necessary, in some cases I instruct them in passing the instrument, and direct them to do it at home, night and morning.

In addition to the passing of sounds, I introduce, upon a holder which I have had constructed for the purpose, cotton charged with alterative or astringent solutions.

Of those which I have found most useful are the following: —

℞

Iodini	grs. ii.
Potass. Iodid.	grs. iv.
Zinci Iodidi	grs. x.
Aquæ	℥ i.

M

Or zinc. chlor., grs. v. to aq. ℥ i., or the Ext. Pinus Canadensis.

The iodine mixture should not be applied oftener than twice a week. The chloride of zinc will cause attacks of sneezing and pain in the frontal sinus, if used stronger than five grains to the ounce, as a general application.

In those cases in which the mucous membrane covering the inferior turbinated bones is much relaxed, œdematous, and presents the appearance of a gelatinous or mucous polypus, I employ the galvano-cautery to destroy it; the operation is not very painful if the platinum can be brought to a white heat instantaneously. I have operated in such cases quite a number of times, and with satisfactory results.

If the mouth-breathing is caused by enlarged tonsils, excision should be performed at an early day. This, my experience has taught me, is the only remedy. I have long since ceased to employ local treatment with the expectation of reducing the glands in size. If it is insisted upon by the parents, I adopt it reluctantly, and with the understanding that

it is against my better judgment. The results upon the general health of the child, the improvement in its nutrition, as shown in its rapid increase in weight, chest development, and disappearance of the pharyngitis, which nearly always is present, have made me a strong advocate in favor of an operation so simple of performance, and so wholly devoid of danger. I have performed it very many times, and have never had excessive hemorrhage, nor ill result of any kind, to follow.

I use the guillotine known as Mackenzie's, a modification of Physick's. With this instrument the veriest tyro in surgery could do no harm: it is safer than the bistoury for the inexperienced, and it has the advantage of enabling the operator to depress the tongue with the index finger of his disengaged hand.

I have operated upon children under three years of age, and would not hesitate to perform it upon younger subjects if I considered it necessary: valuable time may be lost by wait-

ing for the child to "outgrow" the enlargement.

Infants or very young children who habitually keep the mouth open should be examined for the cause of so doing. If the child has the snuffles, and struma or hereditary syphilis suspected, the proper constitutional treatment should be carried out; but the local treatment must be applied to prevent the habit of mouth-breathing becoming confirmed.

Mothers and nurses who are most scrupulous in carefully washing children, frequently wholly neglect the nose: the ears, eyes, and all other parts of the body, are submitted to soap and water at regular intervals; but, chiefly through ignorance, the nose is untouched.

A small syringe of warm water, to which has been added a little borax, will serve to soften and detach the hardened secretions covering the turbinated bones, septum, and filling the lower meati; or a small brush of camel's hair, moistened with the solution, and gently carried

up the nostrils, will have the same effect, or it may excite sneezing, by which the collected secretions may be expelled. The application, at night, of vaseline, upon a small brush, will prevent the secretions becoming dry, hard, and adherent. This method of cleansing should be daily practised until the child has learned — and it should be taught at a very early age — to BLOW ITS NOSE, and is capable of washing it out by snuffing water from the hand every morning when performing its ablutions. This they will soon learn to do, if properly taught; and so great will be the feeling of relief, especially in cases in which there is a catarrhal tendency, that they will not neglect its daily performance.

Children should also be taught to use the mouth for eating and speaking only, and during sleep those in charge of them should adopt the practice of the Indian squaws, of closing the mouth, if open, by gently pressing the lips together.

Those of more mature age must be impressed with the necessity of persistency in the practice of nose-breathing. It is extremely difficult for one to break himself of the habit of mouth-breathing who has been addicted to it for any great length of time; but determination will eventually conquer the evil, and air forcibly driven through the nose has almost as much dilating power upon the passages as that from the Politzer bag used by aurists has upon the Eustachian tubes. For those who are addicted to the practice of keeping the mouth open for breathing during sleep only, forcible closure may be successfully carried out by means of a linen or leather support for the lower jaw, adjusted to the top of the head.

Those cases which depend upon a feebleness or paralysis of the muscles which dilate the nostrils, and in which the alæ or cartilaginous wings of the nose fall or incline inwards toward the septum, or in which the nostrils are abnormally small, as sometimes occurs,

will be greatly relieved by wearing a little instrument I have devised for that purpose. It can be introduced without difficulty into the nose, is concealed from view, and gives rise to no irritation or annoyance: especially is it useful to those who are addicted to mouth-breathing during sleep.

Plate I. represents a lad fifteen years of age, from whom I removed enlarged tonsils, the cause of mouth-breathing in his case.

PLATE I.

Plates II. and III. are women over fifty years of age. The habit of mouth-breathing has become confirmed, the nasal passages are almost entirely obliterated, and the facial expression is typical of the practice.

PLATE II. 41

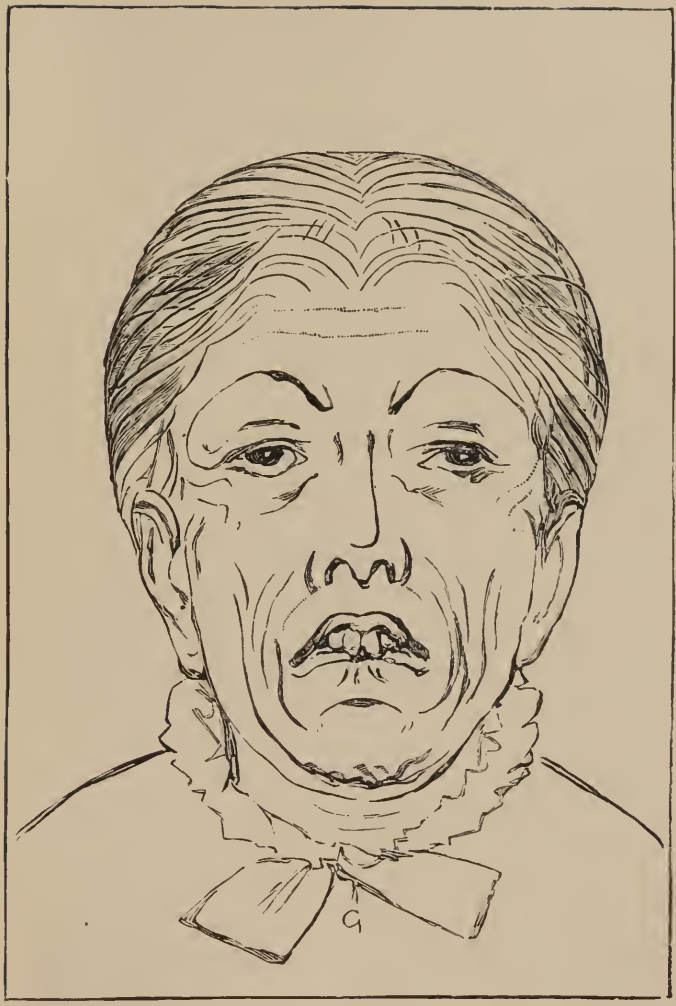

PLATE III. 43

APPENDIX.

THE following interesting discussion took place after the reading of the paper by the author: —

Dr. ANDREW H. SMITH, while accepting much that Dr. Wagner had so clearly stated, took issue with him on the statement that "pigeon-breast" is produced by mouth-breathing. He regarded it as always the result of obstruction of the nasal passages, the result of the same cause which leads to mouth-breathing. It is the result, either of some form of nasal disease, the most frequent being hypertrophy of the mucous membrane covering the inferior turbinated bones, or natural narrowness of the nostrils without pathological conditions. Dr. Smith thought that ablation of the tonsils was not so entirely simple and devoid of danger as Dr. Wagner had stated. Of all the simple operations, he thought it was the one very liable to be attended with hemorrhage or other trouble. He then referred to a case in which alarming hemorrhage followed extirpation of the tonsils with the guillotine.

Dr. E. S. PECK stated that it was a remarkable fact, that so little had been written upon this important as well as novel subject of mouth-breathing. Since his attention had been

called to the subject by the author of the paper, he had found but three short articles having direct reference to it. Dr. Wagner had so thoroughly alluded to the clinical bearings of this anomaly of respiration, that little was left to be said. Dr. Peck wished to speak of the disturbances due to mouth-breathing which were not confined to the respiratory tract. The vault of the pharynx, mouth of the Eustachian tube, and the tube itself, the cavity of the middle ear, and even the membrana tympani, he had found to be fields of serious disturbances due to this bad habit. The same hypertrophic and hyperplastic changes which transpire in the unused nares with this kind of respiration, are found to obtain in the mouth of the Eustachian tube. This portion of the naso-pharynx is richly supplied with vascular and glandular tissue, and its submucosa is very lax. Non-use of these parts invites a thickening of tissue due to infiltration; this he has seen in the rhinoscopic mirror, and it is fair to presume that erosions of the basal cartilage and of the pale mucous membrane of the mouth of the tube may result in confirmed habituation of mouth-breathing. True chronic catarrh of the tube and middle ear may be the product. If the disease is confined to the ostium tubæ, its resulting deafness is at first mechanical, and due to stoppage; later, the membrana tympani becomes indrawn on account of changes on its own mucous (internal) layer and rarefaction of air, and the patient becomes chronically deaf. The paper calls attention to the acquired habit of infants with "snuffles" to contract mouth-breathing. Within four months he has had repeated occasion to observe this in very young persons who have applied for relief from deafness at the North-western Dispensary, and

from whom persistent inquiry has elicited a story of mouth-breathing. He has also found, with great satisfaction, that such young persons were usually amenable to treatment. Chronic tubal, and especially chronic middle-ear catarrh of the adult, is well known to be the bugbear of the aurist. In these young patients, however, suitable metallic astringents applied with the post-nasal brush, or bent cotton-probe, to the ostium tubæ, and a thorough inflation of the tube and middle ear, have usually restored normal hearing. He has carefully examined the drumhead of such persons, and found it more intracted, duller in color, and sometimes immovable to Valsalva; the cone of light either gone, or broken into a single dot at the position of the apex and a trapezoid at the base, or so diminished in size as to be changed into an amorphous light-spot in the anterior-inferior quadrant, while Schrapnell's membrane usually remains movable. The changes have not materially differed from those of a mild variety of middle-ear catarrh. In none of these cases of mouth-breathing deafness, has he found the drumhead immovable to Siegel's otoscope. It is important to emphasize this fact, as it must largely determine the prognosis in these young persons. It would be culpable to dismiss such persons without having united persistent inquiry of the etiological factors with every clinical means of treatment. To consign a young patient to perpetual and increasing deafness, is a very serious matter. He has now under treatment a private patient, a lad of fourteen years, with chronic deafness, *limited to the Eustachian tube*, with the drumheads in perfect order, whose only cause seems to be mouth-breathing.

Dr. Peck stated that there were two physiological points

worthy of notice in this connection. The first, which is a pertinent question for the medical jurist, is this: Air is found in the intra-tympanic cavity of the still-born child, who has never breathed in the legal sense; that is, whose lungs contain no hydrostatic air. The other is a physiological experiment, illustrating the effects of mouth-breathing upon the aural apparatus. Let the nostrils be firmly closed, and respiration be carried on by the mouth. The buccal mucous membrane will gradually become dry and leathery, and some of the saliva at the posterior portions will find its way into the larynx, which will be thrown into spasmodic efforts of coughing. Every such effort, as well as every normal act of swallowing, will produce a sense of constriction and tightness in the ears, with, possibly, deep aural pain and vertigo. There will be continued deafness, gradually progressive, and the patient will feel as if the head were enclosed in an air-receiver and separated from the external world by a dense medium.

Dr. Peck emphasized the necessity of instructing mothers and nurses in the early training of children to breathe with the shut mouth, and alluded to the methods of Indian squaws of closing the mouth of the infant, and to the fact that the common dog and rabbit, with a more profuse scrolling and a larger number of turbinated bones than in the human species, always breathe with the closed mouth.

Dr. Thomas R. Pooley, referring to Cassels' statement concerning narrowing of the nostrils, gave the statistics furnished by his own cases of unilateral deafness, 89 in number. Of these the deafness was on the *right side*, and due to acute purulent inflammation in 16, chronic purulent inflam-

mation in 12, acute catarrhal inflammation in 9, and chronic catarrhal inflammation in 9; total, 46. The deafness was on the *left side*, and due to acute purulent inflammation in 16, chronic purulent inflammation in 15, acute catarrhal inflammation in 4, and chronic catarrhal inflammation in 8; total, 43.

In two of the left-side cases there was stenosis of the corresponding nostril. It would seem that there is only a slight preponderance of cases for the right side, and he was inclined to the belief that the statement made by Cassels had no foundation in fact.

With reference to extirpation of the tonsils, Dr. Smith had somewhat anticipated what he had to say on that point. He believed it was an especially dangerous operation in adults, and thought it should not be spoken of as an operation so entirely devoid of danger as regarded by the author of the paper.

Dr. WARD had used Mackenzie's guillotine very many times, and seen it used many more, and believed the operation of extirpation of the tonsils to be one without danger.

Dr. SAMUEL SEXTON said, that, having been unable to be present at the reading of the first part of Dr. Wagner's paper, he could not discuss the whole subject of mouth-breathing. He was inclined to believe, however, that its importance had been over-estimated by some authorities, and that, although it is a symptom that attends many diseases, there were, in his experience, very few persons who practised mouth-breathing habitually, although many did so for a portion of the time, as when exercising violently, etc. The statements of some writers respecting the breathing and other habits of the

aborigines of America were not always founded on careful and exact observations; nor were these writers experts in special work: hence their conclusions were to be accepted with some allowance. Inquiries of medical officers who had served among our North-American Indians, elicited the statement that these savages are by no means exempt from the diseases that compel mouth-breathing, and that aural diseases are very common among them.

The principal interest in mouth-breathing to him as an otologist was, of course, the influence it had upon the renewal of air in the tympanic cavity. Dr. Sexton then briefly related the histories of two cases now under his own observation, which were illustrative of the subject (drawing diagrams of the drumheads on the blackboard). The first diagram drawn represented the left drumhead of a patient: only a narrow rim of the normal membrane remained; but a loose and thin substitutive membrane had been developed, which occupied the place of the normal structure, and which was endowed with monometric functions, thus enabling the observer, by means of an aural speculum and the illumination afforded by a head-mirror, to inspect its movements during the period of varying intra-tympanic pressure. During each respiratory act, the membrane was seen to first bulge gently outward, and then instantly fall back again. During the act of swallowing, the membrane is first forced decidedly outward, and then instantly flaps back again with considerable force.

Valsalvian inflation bulges the membrane out on either side of the malleus-handle, to which it is attached. In this case the patulency of the Eustachian tubes seemed to afford

facilities for the renewal of air in the tympanum, whether the patient breathed with the mouth opened or closed. The external auditory meatus and the drum-head were very large, affording unusual opportunities for observation.

In the second case, the right membrane was found to be very much relaxed; and on each side of the short process of the malleus there was a large opacity. Valsalvian inflation wrinkled the loose membrane, and bulged it slightly outward. At nearly every act of respiration, when the mouth was closed, the patient was aware of the renewal of air in the drum; he heard the membrane move outward with a sound like the bursting of an air-bubble, or, as the patient himself described it, there was a "pop." While the membrane remained distended by the air in the tympanum, the patient heard his voice and the respiratory sounds autophonously: if, however, breathing was performed through the mouth, it was not thus heard, nor did the interchange of air in the tympanum seem to take place. The patient can voluntarily induce a vacuum in the pharynx and drum of the ear, when the membrana tympani may be seen to fall in under the external atmospheric pressure, and autophony then ceases. When the patient has a cold in the head, perhaps occluding the Eustachian tubes, the membrana tympani remains retracted, and autophonous voice is no longer experienced.

The first case seems to show that in some instances a renewal of the air in the tympanum may take place during mouth-breathing. The second case, however, seems to confirm the conclusions of most late observers: namely, that the physiological functions that insure the normal renewal of air

in the tympanum, are interfered with by mouth-breathing and most of the causes upon which that anomaly depends.

Dr. R. C. Brandeis referred to anterior curvature of the upper cervical vertebra, and also to post-pharyngeal abscess, as causes of mouth-breathing not mentioned by Dr. Wagner. An effect which he had noticed, additional to those enumerated by Dr. Wagner, was protruding of the lower jaw.

He differed with the author of the paper with reference to the efficacy of dilatation of the nostrils with nasal sounds, and thought the conditions in urethral stricture, stricture of the rectum, lachrymal duct, etc., were very different from those which obtain in the nostrils, where the mucous membrane is vascular, and is upon a bony substructure that is cavernous and vascular.

Dr. Brandeis' method of treating bending of the septum, is to fracture it, and then restore it to its normal position with catheters, which can be retained in the nasal cavity for weeks and months without being accompanied by serious inconvenience, or giving rise to evil consequences.

Dr. Goodwillie illustrated upon the blackboard various forms of deviation of the nasal septum, and believed that in the greatest number of cases the deviation occurred in the cartilaginous portion. For the relief of this condition he had found no operation which gave so good results as removal of a portion of the septum.

In closing the discussion, Dr. Wagner stated that he had removed the tonsils from over five hundred patients, and had had no accident following the operation, either in the way of hemorrhage or otherwise.