jected. During those two months she did not eat any bread. She had been confined to the bed most of the time for over a month. She expectorated considerable mucus but had no cough. The bowels were costive, and a small amount of urine was passed.

Physical Examination.—The patient was a medium-sized woman, with good color but poor nutrition; no cachexia or emaciation. She was unable to keep her false teeth in her mouth on account of the nausea. Heart beat was 110 per minute, but regular; the aortic second sound was increased; the radial arteries were atheromatous. The tongue was dry, red and fissured. The lungs were negative. The liver was palpable below the costal border. There was abdominal distention, pulsation and moderate tenderness of the aorta in the epigastrium. The stomach was normal in size and position; no mass was felt and no peristaltic waves were visible. The kidneys and spleen were not palpable. The patient had a chronic pharyngitis which was the cause of the nausea and expectoration. The physical examination was otherwise negative. The urine did not show any abnormalities.

Analysis of Gastric Contents.—After some difficulty I persuaded the patient to take an Ewald test breakfast; she protested that she could not swallow it, nor could she retain it. She did, however, take the breakfast and retained it. The gastric contents were aspirated in forty-five minutes and 70 c.c. of well-digested contents were obtained. An analysis of the same showed some pharyngeal mucus; total acidity 51; free hydrochloric acid 12; reaction to Congo positive; no occult blood and no Oppler-Boas bacilli found. This analysis showed the gastric motility and secretion to be normal.

Diagnosis.—Arteriosclerosis and chronic pharyngitis.

Treatment.—This was similar to that in the other cases, except that local applications were made to the pharynx, etc. The patient's diet was rapidly increased and I received a letter from Dr. Grim the last of October stating that he had not seen the patient in thirty days; that she considered herself well and had been doing her own work as usual.

CASE 5.—Patient.—K. M., female, aged 61, married, white, born in the United States, a housewife by occupation, was seen on Sept. 2, 1908, having been referred to me by Dr. Joseph A. Moore, of Philadelphia. One brother died of tuberculosis at 51 years. One sister died at 67 of cancer of the gall bladder and liver. Another sister died of apoplexy at 70. The patient had had an attack of bronchitis in February, 1908.

Present Condition.—The patient was well up to July 4, 1908, when indigestion followed indiscretion in diet, and she had not been free from trouble with her stomach. afterward. There was a burning sensation in the abdomen, fullness and distress, no vomiting, belching and a large amount of flatus. She had slight vertigo at times. There was progressive loss of weight.

Physical Examination.—She had a faint mitral murmur and abdominal arteriosclerosis. The Ewald test breakfast showed gastric hypermotility, total acidity of 60; no free hydrochloric acid; no lactic acid.

Treatment.—This was similar to that given to the other patients. She improved nicely, and at the time of this writing Dr. Moore tells me that his patient has gained in weight and is enjoying good health.

The conditions of the gastric functions in four of those cases were: motility increased in three; normal in one; free hydrochloric acid, a trace in one, absent in two and normal in one; absence of lactic acid in all four, and no Oppler-Boas bacilli found. Peptic digestion was not determined in those cases; but I made an analysis in one other case recently and found peptic digestion to be normal, although hydrochloric acid was absent. In one (Case 3) no gastric analysis was made. Weakness and loss of weight are prominent symptoms in some cases. The abdominal aorta was tender in all the cases. The association of pharyngitis in two cases is of interest, as its symptoms had been misleading. Gastropnoia or visceropnoia was present in only one case. In some of the cases nitroglycerin or the other

nitrites give relief when other remedies are of no benefit. All of these patients had been dieted and drugged for dyspepsia without relief.

Arteriosclerosis is frequently a cause of gastrointestinal symptoms in elderly people and the treatment usually gives gratifying results.

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LOCAL AND SYSTEMIC CONDITIONS DUE TO NASAL OBSTRUCTION *

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There is a disposition on the part of many physicians to attribute throat affections to the moist, changeable climate of our northern states. We often hear it stated that every one has "catarrh" in Michigan. As a matter of fact, catarrhal affections are no more frequent in Michigan than in most sections of the country. It is true that certain forms of catarrh are better in the dry, warm climate of the southwest, or in the steady cold of the northwest, but the study of climate alone does not offer a sufficient explanation of the prevalence of throat affections. It is also true that many individuals are comparatively free in any climate. Even if we admit that climate is an important factor we must face the practical problem of how best to adapt ourselves to the climate in which we are compelled to live.

It is my purpose to point out the underlying factors which render these patients particularly susceptible to repeated colds, and to suggest the proper line of treatment for their permanent relief. The unsatisfactory results which are obtained in the treatment of catarrh encourage us to search more carefully for the reason why permanent relief is obtained so seldom from the usual methods of treatment. It is a common observation that children affected with adenoids and adults with marked nasal obstruction are especially susceptible to colds, and also suffer from many general and local symptoms. This fact led me to study more closely normal nasal respiration, and to ascertain what effect, if any, a moderate degree of obstruction has on the resistance of the patient, and also to try to find out whether or not there is any relation between diseases of the respiratory tract and improper breathing.

We should determine, first, whether the nose is the organ through which the current of air normally passes in breathing, and, second, whether a moderate degree of mouth breathing is injurious to the organism. Four methods have been used to ascertain these points: first, study of the anatomy of the nose and throat of animals; second, histologic study of the organs; third, study of the effect of artificial closure of the nostrils in animals; and, fourth, clinical study on patients. In the lower animals the nasal passages are more nearly in a straight line with the larynx and trachea than in man. The larynx is placed higher in the throat, the epiglottis reaches to, or up in front of, the soft palate. The soft palate is more horizontal, and with the epiglottis it forms a curtain which closes the buccal from the nasopharyngeal cavity. These anatomic differences make mouth breathing more difficult than in man. The histologic structure of the passages in animals and man shows their use for respiratory purposes. The nasal

* Read before the Wayne County Medical Society, Nov. 23, 1908.

passages are arranged to warm, moisten and filter the air before its entrance into the lungs. The mucous membrane of the whole tract is lined by columnar, ciliated epithelium, while the buccal cavity is lined by flat epithelium; it can be seen, therefore, that the respiratory tract is specially fitted for its peculiar function, while the mouth is in no way adapted for respiratory purposes.

In laboratory research during the past year I have studied experimentally the effect of obstructed nasal breathing on about seventy-five animals—guinea-pigs, rabbits and dogs. A detailed report of the work will be published elsewhere, but the following results may be noted here: Complete closure of the nostrils of guinea-pigs is followed by death in from twenty-four to forty-eight hours. Partial closure is followed by death in from a few days to several weeks, according to the degree of obstruction, the age and the resistance of the animal. Rabbits with one nostril closed died after losing about one-half in weight. In a series of ten the average duration of life was forty-three and six-tenths days.

Partial closure of the nostrils of dogs is followed by symptoms resembling asthma and emphysema. The resistance of the younger dogs is lowered to such an extent that they die from infection, and the lungs were found to be diseased in every case examined. The changes in the hair are constant and peculiar. The hair becomes shorter, thinner and lighter in color, and a peculiar wrinkling of the skin is observed. Puppies born of a mother with obstructed nasal respiration showed lowered vitality, loss of hair, and wrinkling of the skin, and soon died. The anatomic differences between the throats of animals and man should be considered before transferring the results obtained from these experiments, but a careful study of my patients, over a number of years, has led me to the conclusion that the nose of man, as of the lower animals, is the organ through which the current of air should pass, and that even a moderate degree of obstruction to free nasal breathing is injurious.

It would be desirable, if possible, to determine the amount of nasal space necessary for normal respiration by some accurate method of measurement, but normal breathing is affected by so many factors that it is difficult to measure the current of air. In trying to ascertain the breathing space of a given individual certain facts should be borne in mind. We must remember that the total breathing space of the nose is measured by its narrowest part, that the current of air passes normally in a curved direction, upward and backward to the nasopharynx. An obstruction in the upper portion of the nose, such as an enlarged turbinal or a small adenoid mass in the nasopharynx, will obstruct normal breathing even though it does not prevent forced breathing. When patients are asked if they have free nasal breathing we often notice that they will hold one nostril and draw vigorously through the other one. This test is of no value, as the current of air is forcibly drawn through the inferior meatus, a portion of the nose not used in normal breathing. Seldom are the lower passages obstructed.

I insist that the test of nasal breathing be made while the individual is breathing quietly. The respiratory function is under the influence of the will and is affected by so many conditions that it is not always easy

to determine the normal breathing for a given individual.

This point seems so important to me that an outline of the method of examination will be given. The breathing of the patient should be carefully watched before making an examination of the nose. To have the observation of any value the patient should be quiet and perfectly unconscious that he is being watched. If the lips are parted one can be reasonably certain that some air is inspired through the mouth. It is not necessary that the mouth be widely opened. Sometimes it will be noticed that the individual will breathe through the nose a portion of the time, but will occasionally open his mouth for an extra supply of air. In other instances, after a few shallow inspirations, the patient will take a deeper, sighing inspiration to supply the lack of air felt by the organism. The condition of true "air hunger" exists in these individuals, and is relieved by breathing partially through the mouth. In the majority of instances these patients are unconscious of the fact that they are breathing through the mouth.

It is always wise to try to convince the patient himself that he is a mouth breather. This can usually be done by giving him the following directions: Ask him to notice when he is reading or working if he can not catch himself breathing more or less through the mouth; also whether he notices occasionally that he takes in an extra breath through the mouth. Have him observe whether when walking along the street and breathing with the lips closed he does not find it necessary, or at least comfortable, to open his lips occasionally to draw in an extra supply of air. In a large majority of instances one or two days' observation on the part of the patient will convince him that he breathes more through the mouth than he has suspected.

The condensation test is of some value in estimating the amount of breathing space. The test is as follows: A polished, nickeled plate is used. It is more convenient if the surface be divided into inch squares. The plate is held perpendicularly in front of the patient's face, about an inch from his lips. He is directed to close his lips and breathe naturally through his nose. The moisture condenses on the cold surface and quickly evaporates. By noting the condensation from the nostrils the relative space in each nostril can be determined, and the amount of condensation is a rough test of the total breathing capacity. In order to have this test of any value the respirations should be as nearly normal as possible. An ordinary mirror can be used in the same way.

The examination of the nose should be carried on in a systematic and definite manner. Observe whether the alæ collapse with each inspiration, then whether there is an unusually heavy growth of vibrissæ at the entrance of the nostrils. By tilting the tip of the nose upward, the vestibule and the anterior portion of the nose can be observed, and the condition of the cartilaginous septum and the anterior ends of the inferior turbinates can be studied. Afterward the same structures can be better observed with the aid of the speculum. The application of a 4 per cent. solution of cocaine in adrenalin, on a pledget of cotton, to the forward portion of the nose will give further information. If the inferior turbinal is swollen a shrinking will take place, but if there is hypertrophy of the structures the little shrinking that will follow will simply be the

action on the vessels, as the hypertrophied tissue will be but little affected.

After the effects of the cocain and the adrenalin on the forward portion of the nose have been noted, the middle turbinal and the bony septum can be inspected. The condensation test can then be used to ascertain whether or not there is any gain in the breathing space. As the middle turbinal often narrows the space it should be carefully studied. It will often be found that it touches, or nearly touches, the septum. Cocain applied to this portion will usually not cause sufficient shrinking to give free breathing. With the rhinoscopic mirror the posterior ends of the turbinals can be observed and the nasopharynx studied. After a routine examination, as outlined above, it is usually possible to decide whether or not a given individual has proper breathing space.

The next point to determine is the effect of a moderate degree of obstruction on the health of the individual. Two methods are open to us: first, deductions from experiments on animals; second, clinical study of the symptoms of patients and the relief experienced after the obstruction is corrected.

From the study of artificially induced nasal obstruction in a large number of animals, I feel justified in concluding that the resistance of the animal is lowered and the respiratory tract becomes more susceptible to acute infections. Even partial closure of the nose leads to changes in the lungs. While we are not justified in transferring the results obtained with animals to man without certain reservations, the facts are interesting, and, to a large extent, are in harmony with clinical experience, and at least these results warrant further experimentation. There is no difference of opinion as to the injurious effect on the general health and local organs of marked nasal obstruction. We see it illustrated in children with adenoids and in adults with one or both nostrils completely blocked. I wish to emphasize that in like manner, though usually to a lesser degree, a similar train of symptoms occur in individuals who have a moderate degree of obstruction.

The direct effect of nasal obstruction, both generally and locally, is best illustrated by patients with free nasal breathing, suddenly obstructed by injury, as illustrated in the following cases:

CASE 1.—A boy, aged 14, was referred to me with the following history: he was a healthy, well-developed lad, with free nasal breathing until two weeks before coming under observation, when he was struck just above the tip of the nose by a baseball. There was free bleeding and the nose at once became swollen. As the swelling subsided it was noticed that the bridge of the nose was depressed, and both nostrils badly obstructed. There at once developed husky voice and dry throat with accumulation of mucus. The obstruction was relieved by raising the bridge and replacing the dislocated parts. Within a week after the packing was removed the voice was normal and the dryness and accumulation of mucus was relieved.

CASE 2.—A man had his nose crushed by a falling building. He was removed to a hospital where his wounds were dressed, but no attempt was made to raise his depressed nose. Four months after the injury he was referred to me. Since leaving the hospital he had lost flesh, his voice was husky, and his throat dry and he was subject to frequent colds. Several operations were necessary before the depressed bones could be raised and free nasal breathing obtained. As a result of his improved breathing he gained weight, his voice became clear and he was not subject to colds.

The symptoms in these acute cases are very evident, but when the obstruction develops gradually the patient

becomes accustomed to the impaired breathing, and, though the symptoms are similar, they do not stand out prominently, nor does the cause appear so evident.

There is a group of symptoms present in patients who have "catarrh" which is characteristic of impaired nasal breathing. A history of frequent colds starting in the nose or throat should make the physician think at once of nasal obstruction. Individuals with free nasal passages do not catch cold easily. A dry throat, more especially in the morning, or on waking in the night, is usually due to mouth breathing. Rarely it may be due to certain general conditions, as diabetes, or to that rare nervous affection, xerostomia. Impaired vocal function is common. The voice is often husky and is easily fatigued. Dropping of mucus into the nasopharynx, sighing respiration and frequent yawning are common symptoms. Bronchial asthma may be due to, or at least aggravated by, impaired nasal breathing. Besides the above group of local symptoms there are indefinite general symptoms that seem to depend partly or entirely on lack of proper breathing space. These patients are often under weight, easily fatigued, poorly nourished and may suffer from insomnia. Their breathing is shallow, and auscultation of the upper portion of the lungs show diminished breathing—the condition expressively designated "lazy lung." Dyspnea, palpitation of the heart and nervous symptoms have been noticed in my patients. These varied symptoms of air hunger are due to improper breathing. The proof lies in the fact that after the correction of the nasal obstruction the general condition will improve and many and sometimes all the symptoms will disappear. I have records of cases in which the general health greatly improved after obstructed breathing was relieved. A gain in weight of from five to twenty pounds has often been noted, and such symptoms as insomnia, dyspnea and palpitation of the heart have disappeared. All who are below par, who catch cold easily, or who have catarrhal symptoms, should have the nasal passages studied carefully. In considering the general symptoms other sources of irritation should be eliminated, and no nose should be operated on unless there exists in the nose itself reasons for such an operation. If even partial mouth breathing exists we are justified in advising such an operation, providing operative measures are feasible.

Patients naturally wish to know what they may expect from an operation. They can be assured that operations on the nose are not dangerous, can be performed under local anesthesia, at the physician's office, without much pain and with but little loss of time from daily routine duties. The patients will promptly feel the sense of comfort and well-being that comes from free nasal breathing. The dryness of the throat will be relieved in proportion as the individuals breathe with the mouth closed. The mucus in the nose and the nasopharynx will be temporarily increased, then gradually decreased. The ultimate disappearance of the catarrhal discharge will depend on several factors; in a general way it will depend on the length of time that the mucous membrane has been affected. The younger patients are usually cured sooner than the older ones. Those with sinus disease are relieved much more slowly, and some direct treatment of the sinuses may be necessary. As a rule, after the first week or ten days the only treatment necessary is daily douching of the nose, which can be done by the patient. Enlarged tonsils, adenoids and other lesions of the throat should be corrected as far as possible. If the general symptoms

are dependent on air hunger they will gradually disappear. Advice as to fresh air, proper diet and personal hygiene is always indicated.

I have tried to emphasize very strongly in this paper that the cause of many of the prevalent catarrhal conditions is improper breathing, and that we can not hope to improve our patients permanently unless we correct the manner of breathing.

There are certain individual peculiarities that make it difficult to give a patient proper breathing space. Some persons naturally have so narrow a nose that the usual operative measures are of little avail. The judicious removal of a small portion of one or both middle turbinals will sometimes gain enough room to relieve the condition to some extent. A marked convexity of the upper cervical vertebræ lessens the anteroposterior diameter of the nasopharynx. A high arched palate encroaches on the nasal cavity. Long-continued mouth breathing, especially in the young, is usually accompanied by changes in the shape of the jaws. These conditions should be considered before a prognosis is given or the proper line of treatment decided on.

Any condition which lowers vitality naturally makes the mucous membrane of the respiratory tract sensitive. Our artificial manner of living in close, badly-ventilated houses; the use of tobacco, alcohol and rich foods, especially if coupled with a sedentary life, aggravate catarrhal conditions. Constipation and gastrointestinal diseases are frequent complications.

If the observations which I have made are correct, the proper treatment consists in giving the patient free nasal breathing. The obstructions are usually due to deviated septa, enlarged turbinals—especially the middle—and nasal polypi. Rarer conditions are occasionally found. The above conditions are not permanently benefited by sprays or applications. Sprays are used altogether too much by the profession, as the curative value is exceedingly limited. If cleansing of the passages is desired the nasal douche is much more efficient.

Surgery offers accurate, safe and prompt relief for nasal obstruction. Under modern methods various obstructions can be corrected with a nicety unknown a score of years ago. We can hold out to the large majority of our patients the hope of permanent relief.

CONCLUSIONS

The evidence derived from the study of histology, comparative anatomy, experiments on animals and clinical observations shows that the nose is the organ through which the current of air should pass in normal breathing.

Nasal obstruction in animals is followed by dyspnea, lessened resistance and changes in the lungs.

Impaired nasal breathing, even of moderate degree, is the important etiologic factor in the causation of catarrh.

Lowered vitality, accompanied by a variety of general symptoms, is often due to nasal obstruction.

The aim of treatment is to obtain free nasal breathing. This can be accomplished in the majority of instances only by surgical measures.

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Clinical Notes

THE TECHNIC OF EXAMINATION FOR THE PALE SPIROCHETE BY DARK-FIELD ILLUMINATION

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The *Spirochæta pallida* in syphilis, despite the fact that it can not be cultivated on artificial media and hence does not fulfill all the requirements of the four rules of Koch as regards its etiologic connection with the disease, has become during the past two or three years an organism of relatively great importance in biologic and bacteriologic literature. The organism has been found so constantly by most observers in all stages of syphilis, from the primary to the tertiary lesion, that practically all authorities are convinced of its definite etiologic relationship. Its recognition by the ordinary methods in vogue has been a more or less difficult and time-consuming procedure. In so prevalent and protean a disease as syphilis any means of improved examination leading to early diagnosis should be welcomed by those whose duties frequently make it necessary for them to decide as to the specific or non-specific nature of a suspicious lesion.

The various staining methods outlined by Giemsa and by Goldhorn for secretion smears, and by Levaditi for tissues, for the most part have proven satisfactory. In some cases it may be possible to demonstrate the organism unstained by means of the oil immersion with or without compensation ocular, in hanging drop or simply on an inverted cover glass. Such a method requires much practice on the part of the observer, and is, on the whole, difficult and liable to inaccuracy because of the feeble refractive power of the organism.

The dark-field illuminating condenser for the examination of fresh unstained material from mucous patch, condyloma, indurated glands or the suspected primary lesion, leaves little to be desired in the way of convenience and for clearness of definition of the organism. The Rev. J. B. Reade of England first described in 1837 the principle of illumination involved in this condenser. By means of this apparatus ultramicroscopic particles or organisms of feeble refractive power are made visible in much the same way that particles of dust are visible against a dark background when the particles themselves are illuminated by rays of sunlight. The method was practically lost sight of until 1904-05, when Zsigmondy and Siedentopf made use of the principle in an apparatus for the demonstration of ultramicroscopic particles. Since that time various European optical firms have perfected the instrument under the name "Dunkelfeld-Spiegelkondensor."

This condenser, which in most forms can be attached to any microscopic stage, differs from the ordinary Abbe condenser in that only indirect reflected rays are admitted around a central diaphragm for the illumination of the object. The diaphragm itself serves as a dark background and it is in this contrast that the definition of the intensely illuminated object becomes more clearly outlined. The Abbe condenser, on the other hand, admits direct rays of light for the illumination of the object, the field as well as object being illuminated. In the dark-field condenser the

Hospitals for the Congo.—It is reported that the Belgian minister for the colonies has ordered the establishment of six lazarettos for patients suffering from sleeping sickness; they will be under the charge of Belgian physicians.