In conclusion, I would urge the systematic examination of the eyes of children, both for motor and visual symptoms, in all conditions simulating meningitis, especially in those cases where there has been a long standing middle ear suppuration, in cases of pneumonia, pyemia, empyema, septicemia, etc., and cases giving tubercular history and with glandular complications. At times in these cases the eye conditions are the only symptoms pointing conclusively to brain complication.

IMPAIRED VENTILATION AND DRAINAGE OF THE NOSE THE MOST COMMON CAUSES OF NASAL CATARRH.

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The physiology of the nose was, until recent years, but imperfectly understood. Text-books on physiology, of but little more than a quarter of a century ago, taught that the nose was the organ of smell and the passage through which respiration was conducted and nothing more. No hint was given that any effect upon the air was derived from its passage through the nose. No mention was made of the sounding-board influence of a patent nose upon the voice. In those days the pathology of nasal catarrh was quite in keeping with the meager knowledge extant as to the physiologic uses of the nose. The good old family physician then regarded nasal catarrh as being practically incurable and largely dependent on mal-condition of the stomach, or else a result of general poor health, and believed that the only treatment which would give promise of improvement or cure was vigorous internal medication of a powerful alterative and tonic character. Hence, as might be readily inferred, with such a faulty pathology, associated with such an imperfect idea as to the physiology of the nose, the treatment of nasal catarrh was so unsatisfactory that it became the opprobrium of the practice of medicine.

At last a change came in medicine as regards the nose, and its anatomy was more carefully studied. Advances were also made in the study of nasal physiology, and it was learned that the nasal fossæ were something more than simply two "blow holes" for convenience in respiration. Different investigators have independently made a careful study of the nose and, as their several results have in the main agreed, we now know approximately the form and character of a perfect nose, which, if even seldom met with, we should always keep in our mind's eye as an ideal standard. Our ideas of nasal physiology are also crystallized into a rational form.

In an ideal nose the two fossæ are identical in size. The septum is vertical and its walls nearly plane. It is not deformed by bony, cartilaginous or soft growths of exuberant tissue, rhinologically known as exostoses, enchondromata, etc. The turbinated bodies are of symmetrical shape, and in no case at any point should they touch the septum. Through the tortuous convolutions of these bodies the area of the nasal mucous membrane is materially increased. The inferior meatus should be clear and the inferior turbinal should never touch the floor of the nasal passage. The middle meatus should also be clear, meaning that at no point should the inferior and middle turbinals touch each other. The superior meatus should likewise be free and there should be enough free space for the so-called superior turbinal, and even for a fourth turbinal if such anomaly be present. This upper portion of the nose may be called the nasal attic and its proper shape and condition is of more importance in the consideration of nasal catarrh than has been generally appreciated.

Finally, as a result of the combination of the requirements noted, we find that in an ideal nose no two adjacent or opposing surfaces should ever touch each other at any point or at any time. The amount of free space required about the turbinal varies with its location. The turbinals may be regarded as erectile structures, the inferior possessing the power of distention to a marked degree, and hence requires more free space about it than does the middle turbinal, the most erectile portions of which are the inferior surface and posterior end. By anterior rhinoscopy a normal inferior turbinal is found to have about it, when most shrunken, a space of not less than one-eighth to three-sixteenths of an inch, while the space between the septum and the middle turbinal is about one-sixteenth of an inch. Such free space about the turbinals is required in order that they may have sufficient room in which to swell. When owing to growths upon the septum or to a deflection thereof, or any other cause or causes, such space is not given, contact, even if not continuous, occurs periodically or whenever swelling of the turbinals takes place. In this way is explained the great susceptibility of many patients to frequent attacks of coryza and also why stoppage of the nose is so often complained of when the patient is in the recumbent posture, which position tends to increase turbinal congestion. Contact in one nostril generally means contact at some point in the other nostril, hence alternating stenosis is frequently noted. When the nasal spaces are materially increased in size beyond the normal it causes the disadvantages of atrophy and is even a greater defect than is stenosis. When the two nares are unequal in size, one being stenosed, the other is compelled to do the greater part of the work and may be so overworked that it can not properly fulfill its physiologic functions. While secreting only enough nasal fluid to properly humidify one-half of the air inspired, it is giving entrance to much more than half of the air required; hence this air is not sufficiently humidified and, as it enters in a larger column, it is likewise not so well warmed. Furthermore the increased volume of air entering tends to dry the mucous membrane to an abnormal degree and is therefore harmful.

Through the mobility of the alæ nasi, in combination with those slight growths upon the cartilaginous septum which are so frequently met with, a certain degree of anterior stenosis is as often observed, being usually more pronounced during inspiration than during expiration. Anterior nasal stenosis tends to produce posterior congestion, for, when present, the air in the postnasal space during respiration is alternately rarified and condensed, the same as though it were being operated on by an air-pump, hence a hyperemia is kept up, which in time may result in posterior turbinal hypertrophies or posterior enlargements on the vomer. Varying air pressure in the postnasal space has long been recognized as being a frequent cause of Eustachian tubal congestion and catarrh. A stenosis of one nostril will frequently

cause a hyperemia of the other nostril, even though it be free from structural defect.

Connected with the nose by suitable openings are several accessory cavities, the perfect drainage of which is dependent on proper patency of the nasal meatuses and in fact of the entire nasal fossa. Physiologic research has established the fact that the most important function of the nose is to warm and humidify the air inspired. By being warmed the air is also slightly rarified. Of course it is additionally known that large particles of floating matter are caught by the hairs located near the external meatuses; that small particles of dust become attached to the mucous membrane through the tenacity of the nasal secretion and are in due time blown into the handkerchief; also that noxious vapors and gases cause sudden swelling of the turbinals, increase the flow of nasal secretion and often provoke protective sneezing.

In a healthy adult nose the quantity of the nasal secretion approximates one pint each twenty-four hours, being watery in character and of a specific gravity of about 1015°. The quantity mentioned, one pint, is none too great to properly humidify the large quantity of air inspired. Taking for an average eighteen respirations per minute we have 1,080 per hour, 25,920 per day, 9,467,280 per year, and so on through life, and, as at each breath in the adult male there is taken into the lungs on an average one pint or twenty cubic inches of air, we have twelve and one-half cubic feet per hour, 300 cubic feet per day and 109,575 cubic feet per annum, or enough to fill a cistern sixty feet square and over thirty feet in depth.

In order that this vast quantity of air may easily pass through the nose and be properly prepared for the lungs, it is essential that the nasal fossæ be free and unobstructed by deformities. If the requirements as previously given are fulfilled, viz., there being in every case a sufficient space between apposing surfaces, and in no case two apposing surfaces touching each other, the entering air will freely pass through all parts of the nasal fossa, including the deep recesses of the meatuses, so that every part thereof will be thoroughly and perfectly ventilated and, as a result, the nasal secretion will be continuously evaporated so there will be no opportunity for it to thicken and become a catarrhal discharge.

In addition to the prevention of evaporation through contact of two apposing surfaces, drainage is likewise at the same time impaired. Growths upon the septum, even when no contact exists, by destroying the symmetry of the passage interfere with drainage, particularly when the patient is in a recumbent posture, and in this way cause, through the accumulation of secretions at such points, a thickening thereof, which in turn prevents the required evaporation.

A second result of the touching of parts in the nasal passages is the production of a condition of inflammation of the membrane which in time becomes chronic, and which changes the character of the secretion, rendering the evaporation thereof more difficult, and thus increasing the tendency to catarrhal decomposition and discharge.

Through the increased sensitiveness associated with such inflammation we often have an explanation for the manifestations of hay-fever, asthma, etc., which, regardless of any concomitant uric acid condition, are best relieved by such surgical steps as will insure perfect intranasal ventilation and drainage.

The excitation of cold, or of dust, or any other irritating quality of the air being inspired, causes a swelling of the turbinals through a congestion of the capillaries of the same, which capillaries are larger than those in other parts. By being so congested the increased supply of blood gives increased heat and, furthermore, through the swelling the lumen of the passages is reduced in size, causing the air to pass through under great pressure and in a thinner column, so that it may be more thoroughly exposed to the heated turbinals. Simultaneously with the swelling of the turbinals, the nasal secretion becomes greater in quantity, so as to better humidify the air and attract the dust or cause its precipitation. Furthermore, evaporation of this secretion is more rapid, owing to the increased rapidity of the air current.

The ophthalmologist ever has in his mind the emmetropic eye, though such eyes are rarely to be met with. The refracting of abnormal eyes, and the surgical, or gymnastic correction by prisms, of muscle inequality or strain, are merely efforts to cause the defective eye to more nearly resemble the emmetropic standard. In the same way the duty of the rhinologist is, on the same principle, to cause the defective nose, as nearly as possible, to become patterned after the ideal standard, and in this way we have the key to the cure of nasal catarrh.

Chronic nasal catarrh is chiefly a structural disease and its cure generally consists in the removal of hypertrophied or pathologic tissue.

Meyer was one of the first to make a decided advance, and one of great import, when he published the result of his studies of adenoid hypertrophy, showing its causative effect in the production of both postnasal catarrh and trouble of the ears.

In a small percentage of cases, nasal catarrh is due to a catarrhal or empyemic condition of some one or other of the accessory cavities, though in my experience such conditions are invariably associated with other nasal defects wherein either some degree of hypertrophy impairs the ventilation and drainage of the fossa, or else a condition of atrophy is present, and therefore, in either event, presenting a structural change.

Atrophic degeneration, if not a sequela of the hypertrophic condition, is frequently found associated therewith, so often in fact that it would seem to be ample proof that atrophy is frequently a late stage of that which began as a hypertrophy. A frequent cause of atrophy is the presence of septum growths, against which unyielding points the opposing turbinal is caused to press each time it becomes distended until, after years of such restraint, its normal contractile elasticity is impaired and, through the irritation long kept up, hypertrophy follows, which in time is succeeded by pressure atrophy. Thus we see the result of nature's awkward effort to remedy the hypertrophy and stenosis. While nature is ever trying to correct defects, her aims should be anticipated and her footsteps guided, else she may go astray. As the condition of atrophy advances, the nostril gradually increases in caliber until it becomes abnormally large, and hence there is lost, to a corresponding degree, the physiologic property of moistening and warming the inspired air. Such secretions as are present, being too dense to evaporate, become incrusted and decomposed and frequently are instrumental in causing the breath to be offensive. In the treatment of atrophic rhinitis, while a return to normal structural form is seldom attained, the condition is greatly benefited by

following out the line of practice recommended in this paper, viz., the correction of all hypertrophic conditions existing so that all parts of the nasal fossa, meaning in this case particularly the attic, shall be thoroughly ventilated and drained.

Perforation of the nasal septum, even though the turbinals remain normal, produces the equivalent of atrophic rhinitis to the extent of the size of the perforation, and is an unfortunate structural deformity, which in the present state of the art is incurable.

It is not within the scope of this paper to attempt the consideration of the remote or primary causes of deformities of the bony or cartilaginous tissues of the nose. Some of the causes of hypertrophy of the soft tissues have already been touched upon, and among others may be mentioned recurrent attacks of coryza, induced by climatic changes generally, and particularly by those frequent and sudden changes from heat to cold and from dryness to humidity, so continuously made by going in and out of our modern overheated and too often poorly ventilated residences and public buildings. Additionally, dietetic irregularities, the wearing of cotton instead of woolen underwear, and many other customs of latter-day civilization may be cited as predisposing causes.

In this paper only the present condition of chronic nasal catarrh is being considered, coupled with nothing more specific than the general principles of treatment.

The correcting of nasal deformities is much like the remodeling of an old house. With a sufficient amount of patience and perseverance on the part of the patient, and of careful and systematic work on the part of the surgeon, results satisfactory to both will in a very large percentage of cases be obtained. It is far better that nasal defects be corrected early in life, and as soon as recognized, for in this way the kindly help of nature will be secured, and at a time before she, through misguided efforts to improve, has unfortunately done damage which will be difficult to remedy.

When the laity, as well as the rank and file of the profession, fully recognize the great import of nasal deformity, it will be quite as customary to have the rhinologist examine and correct the defects of the nose as it is now to make annual visits to the dentist in order that the teeth may be kept in perfect repair.

Conclusions:

1. That chronic nasal catarrh is chiefly a structural disease.

2. That impairment of ventilation and drainage of the nasal fossæ are the most important causative elements.

3. That the touching of apposing surfaces is one of the most important pathologic factors.

4. That the line of treatment is largely surgical and the chief object aimed at is to cause the defective nose to conform, as nearly as possible, to the shape of the ideal standard.

Columbus Memorial Building.

Paracentesis of the Tympanic Membrane.—Prof. J. Gruber incises for a collection of pus or serous fluid in the tympanum as for any abscess, and recommends his incision as the best, for several reasons. He commences in the upper posterior square of the tympanic membrane and carries the incision forward around to and through the lower posterior square, following the arc of a circle, about 1 to 1.25 mm. from the edge of the auditory canal, with the convexity turned toward the rear.—*Wien. Klin. Rundschau*, October 17.

SURGERY ONE HUNDRED YEARS AGO.

AN HISTORICAL STUDY

BY DR. GEORGE FISCHER.

DEDICATED TO THE GERMAN SURGICAL ASSOCIATION.

TRANSLATED FOR THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

BY CARL H. VON KLEIN, A.M., M.D.

XVIII.—DISEASES OF THE THROAT, CHEST AND ABDOMEN.

(*Continued from page 1165.*)

Foreign bodies in the esophagus were oftener pushed into the stomach than removed. If the first attempts failed a pause was allowed to ensue, during which antiphlogistic methods, means for allaying spasms and enemas were applied. The old folk's way of dealing a strong blow with the fist between the two shoulder-blades was also used by surgeons. For the removal of foreign bodies a curved hook made of strong wire sufficed (J. L. Petit), or a sponge for needles and (fish) bones. The sponge drawn with strong threads against the end of a tube was inserted in a dry condition, then water was injected through the tube, the tension of the threads relaxed a little so that the sponge expanded and then pulled against the sides of the tube so as to securely grasp the impediment. The old so-called stomach-brush was in use then (Heister). This, a soft brush fastened to a wire, was originally intended for freeing the stomach from mucus; it was moved upward and downward until no more mucus appeared. For propelling foreign substances downward, a whalebone to which a sponge was attached (J. L. Petit), and oil injections were used. Forcibly thrusting down the obstruction Lentin considered utterly inadmissible and recommended large pills of butter, dumplings and oil. An infinite number of forceps and ligatures were invented; Eckoldt constructed a whole instrumentarium of throat protectors, throat cages, throat sacks and throat buttons. That Habicot on account of great spasms of suffocation in connection with a foreign substance impacted in the esophagus was compelled to employ tracheotomy has been mentioned before. The last remedial agent that remained was the operation known as esophagotomy. First recommended by Verduc (1611), it seems then to have been used by Stenosen (Taranguet, Monnod). For the removal of a foreign body, Goursault (1738) made the first artificial opening of a man who had swallowed a bone by an incision into the most prominent part of the neck. Only once more during the past century was the operation of esophagotomy performed, by Roland for a similar purpose. Theoretically surgeons gave much time to it. Guattani in 1772 furnished the first complete description of it, designated the proper place for incising, made several operations on animals and saw that the wound healed easily. He advised an incision from the trachea to the sternum a little toward the left side, pulled the edges of the wound apart with dull hooks, then thrust his instrument into the interior on the left beside the trachea between the muscles, and so exposed the esophagus. If the foreign substance could be felt, the incision was made in that spot, otherwise the esophagus was carefully opened and with the aid of scissors on a hollow probe distended upward. In order to obtain a larger aperture and to prevent an injury to the nervus recurrens and the arteria thyroidea inferior, Eckoldt (1799) proposed an opening between the lower parts of the sterno-mastoid and thence to penetrate into the interior.