

sides and generally fluctuating. Incision may evacuate pus, while probing may show a carious condition of the cartilage, which may be partially gone. Sometimes cartilaginous sequestra of considerable size come away under this manoeuvre. The especial danger of the condition is that it may lead to a marked depression of the contour of the nose just at the junction of the bones and cartilages.

Thus far, the condition has been practically that of a septal abscess with a maximum destruction of tissue, but there are cases in which incision evacuates only clear serum, which is odorless, and hence a separate classification is given by some authors to the lesion, which is often called serous cyst or the septum. Treatment is the same as for abscess.

(5) ACUTE RHINITIS DUE TO OCCUPATION OR TRAUMA.—Certain occupations lead to acute rhinitis; this is especially true of those which are attended with the giving off of dust—*e.g.*, milling, weaving, stone-cutting, cement grinding, etc., or of those which are associated with the giving off of noxious fumes—occupations, for example, which require the handling of ammonia, chlorine, arsenic, mercury, bichromate of potash, etc. Workers in phosphorus often have a coryza from the constitutional effects of the remedy, as do patients who take the iodides. Laboratory workers may be thus affected by the fumes of osmic acid. Burns, scalds, smoke, steam, foreign bodies, and operations on the nose must also be included in the list of causes. The arsenic eaters of Styria frequently show septal perforations which have originated in a similar way.

Pathology.—There are no special features in the earlier stages of an attack. In fact the affection often runs a subacute rather than an acute course. The changes are generally accentuated on the anterior part of the septum, which soon becomes irritated and, in dusty surroundings, covered with a scab of dirt and secretion. The patient rubs this off and takes some of the epithelium along with it. The deposit reforms, is again removed, and a vicious circle is thereby inaugurated. As a result there are hemorrhage, ulceration, and often perforation. After perforation has taken place the edges generally heal, and curiously enough these patients afterward seem quite immune to the ordinary causes of acute catarrh.

Symptoms.—These are the same as in acute coryza from any cause. Deformity never arises from the perforation.

Treatment.—Obviously the first thing to do is to remove the patient from the source of irritation. Workers in bad atmospheres should wear respirators. Thorough local and general cleanliness should be maintained, with application of stimulating remedies, such as camphor-menthol, to ulcerated surfaces. Healing may be assisted by astringents, such as alumol and weak zinc chloride. Tincture of benzoin and boroglyceride may be used as local sedatives. *James E. Newcomb.*

NASAL CAVITIES, DISEASES OF: CHRONIC RHINITIS.—(Synonyms: Rhinitis chronica, Chronic catarrh, Chronic coryza, and Hydrorrhœa.) This affection consists of a chronic inflammation of the nasal mucous membrane, characterized by excessive secretion (rhinorrhœa) with discharge from the anterior or posterior nares, or by dryness of the nose with the formation of crusts. It occurs in all climates and among all classes of people, but is more frequent where the atmosphere is often damp and chilly, as beside large bodies of water; however, it is also found in the arid regions of the West, particularly at high altitudes where there is much dust, and it also occurs inland, in localities far removed from bodies of water and free from any unusual amount of dust. The symptoms are most common in the winter, spring, and fall months, and are usually aggravated by damp chilly weather. Persons who are much out of doors are less likely to be affected by it than those whose occupations confine them to the house. Although all are subject to the disease, it is more common in chil-

dren and young adults, but it is not infrequent even among infants and those past middle life. According to the various manifestations of the disease it may be convenient to divide it for the sake of description into four varieties: (1) Simple chronic rhinitis, (2) intumescent rhinitis, (3) hypertrophic rhinitis, and (4) atrophic rhinitis. The first is characterized by inflammation with considerable secretion, but with little or no swelling and obstruction of the nares. The second is marked by intermittent swelling, occurring usually when a person is lying down and especially in the latter part of the night, by much aggravation of the symptoms on slight exposure to cold, by frequent clearing of the throat, often by hoarseness, and sometimes by excessive discharge. The third variety is characterized by more or less constant obstruction of the nares with hypertrophy of the soft tissues over the turbinated bones, and sometimes of the bones themselves, and also by hypertrophy of the soft tissues over the septum. The fourth variety is characterized by wasting of all of the tissues within the nares and a corresponding enlargement of the cavity, with the collection of mucous crusts, which decompose and cause a foul odor from the nose. In the majority of cases all of these varieties originate in much the same way, though there are individual instances in which neither variety can be traced to any previous affection.

SIMPLE CHRONIC RHINITIS.

Simple chronic rhinitis is characterized by catarrhal congestion and inflammation of the mucous membrane with but little swelling. It is usually attended by a good deal of irritability of the Schneiderian membrane and excessive discharge of a thin watery fluid which, under the influence of the frequent exacerbations caused by cold, becomes muco-purulent in character.

ETIOLOGY.—Chronic rhinitis in many cases appears to result from debility, due to digestive disorders or improper food, or to confinement within doors and lack of exercise. In some cases it is clearly of nervous origin and is occasionally one of the manifestations of neurasthenia, but most commonly it appears to be caused by frequent colds, improper clothing, and exposure to dust-laden or damp and chilly atmosphere. In numerous cases an inherited predisposition may be detected.

ANATOMICAL AND PATHOLOGICAL CHARACTERISTICS.—The mucous membrane is usually evenly congested and moderately swollen, but at times the swelling is limited to the turbinated bodies or upper part of the septum. Erosions particularly of the cartilaginous septum may be present, but ulceration is not a feature of the disease unless it has been caused by frequent removal of crusts by the finger nail. The epithelium and the subepithelial tissues are found infiltrated with round cells, especially about the glands and vessels. The layers of the epithelial cells become increased and the upper cells are flattened, with here and there patches of normal ciliated epithelium remaining. The conditions, it will be seen, are not very different from those of inflammation of the mucous membranes in other parts of the body, the pathology of which is described elsewhere, and therefore need not be considered in this article.

SYMPTOMATOLOGY.—The patient usually gives a history of often recurring colds in the head, which have become more frequent and persistent until the symptoms are present the greater part of the time. Itching, burning, and tickling sensations are experienced in the nose, and sneezing may occur upon the slightest provocation, as upon exposure to a slight draught or slightly irritating vapor. Weakness of the eyes with pain and headaches is frequent, and often there are partial anemia and defective hearing. Occasionally the sense of taste is also obtunded. Lachrymation is easily excited, and commonly there is an excessive watery discharge from the nose which, with the progress of each recurring inflammatory attack, becomes muco-purulent and acquires a more or less offensive odor. The nose is commonly obstructed

for a few days during the recurring colds, but at other times nasal respiration is free excepting when it is impeded by the profuse secretion. The general health is usually good, but slight derangement of the digestive organs is common. In some cases cobweb-like shreds of mucus are seen stretching from one side to the other of the nasal cavity with but little secretion. In others the surfaces may be dry, and in still others watery or mucopurulent secretions may be found in abundance, especially in the lower part of the nasal cavity. In most cases the naso-pharyngeal mucous membrane is also congested and more or less covered with secretion similar to that in the nose, but generally less watery in character. This causes frequent hawking and attempts to clear the throat. The nares are usually somewhat obstructed by swelling of the mucous membrane, especially during the acute exacerbations, but in some cases it is difficult to draw a distinct line of demarcation between this condition and true hypertrophy of the mucous membrane.

DIAGNOSIS.—The diagnosis is usually easily made by inspection, and there are no diseases excepting hyperæsthetic rhinitis or autumnal catarrh and diseases of the accessory sinuses that are apt to be mistaken for simple chronic rhinitis, provided intumescent rhinitis be excluded by a careful study of the history. In simple chronic rhinitis the prolonged duration with gradually increasing susceptibility to cold, the nearly normal size of the nares, the absence of exquisite tenderness, and the occurrence of exacerbations independently of the conditions producing hay fever will generally enable us to exclude the latter and intumescent rhinitis. The occurrence of profuse secretions upon both sides instead of one, with the history, will nearly always enable us at once to distinguish this from disease of the accessory sinuses. Sometimes, particularly in children when there is excessive purulent discharge, cleansing of the nares will be necessary before a diagnosis can be made.

PROGNOSIS.—The affection is tedious and apt to extend over several years, and may terminate in one of the other forms of rhinitis, particularly the hypertrophic or atrophic. In some instances, especially in children, owing to secondary infection with pyogenic germs, a simple watery discharge that might otherwise have continued unchanged for months or years becomes purulent and offensive in character.

TREATMENT.—The treatment of this form of rhinitis must be tentative and symptomatic, and is therefore not very satisfactory. Attempts to cure it by local measures alone will nearly always be disappointing. It must be remembered that in many instances it is kept up by a loss of tone of the general system or by various disturbances of the digestive organs, and until these are relieved by proper hygienic and tonic measures little can be accomplished in the treatment of the nose. Whenever practicable, the patient should be removed from the sources of irritation and his mode of life should be so ordered as to prevent unnecessary exposures; and by improvement in the general health, to steel him against those which are unavoidable. Two principal objects are to be kept constantly in view in the treatment of these cases: First, to relieve irritability of the nasal mucous membrane by sedatives and protective applications; and second, to check the secretions or to prevent their collection in the nares. When the secretions are watery and profuse, nothing is needed for cleansing the nasal cavity; but when they become muco-purulent detergent washes or sprays may be necessary to clear the nose before local remedies can have any effect. Wherever practicable, watery applications should be avoided, as these tend to increase the swelling of the parts and appear to have little influence in checking secretion; furthermore, the watery applications not infrequently find their way through the Eustachian tubes to the middle ear and cause deafness. Commonly, excepting in cases in which the secretions dry and form crusts, oily applications are sufficient, aided by the patient's efforts at blowing the nose to cleanse the cavity. It is only in the most exceptional cases that these cause inconvenience by passing into the Eustachian tubes, and

the protection which they afford the mucous membrane from irritating substances or from the cold or damp atmosphere is a distinct advantage. Non-irritating disinfectant and slightly astringent powders are usually beneficial. For detergent purposes a weak solution of potassium permanganate, an alkaline solution containing about four grains of the bicarbonate and the chloride of sodium to the ounce; Dobell's solution, or a solution prepared from Rhodes' or Seiler's tablets may be employed in warm water, care being taken that it be not forced into the Eustachian tubes. These solutions cannot safely be used with the nasal douche, but ordinarily they may be snuffed from the hand or from a glass without danger. Freer's irrigating tube, which consists of a straightened Eustachian catheter perforated with three or four fine openings just back of the closed end, throws very fine streams which may be employed to wash out the nose and naso-pharynx without danger to the ear. The removal of the drying crusts is aided by treating them with oily substances applied either by the atomizer or by a medicine dropper. The sensitiveness of the mucous membrane varies greatly in different patients, and therefore it is necessary to begin the treatment with the mildest remedies, and it should be the invariable rule that the applications be not strong enough to cause discomfort for more than five minutes; this applies to those made by the patient three or four times a day; those which are made by the physician once or twice a week ought not to cause discomfort for more than half an hour. Commonly it is better that little or no irritation be caused by any application that is made. Oily sprays tend to coat the surface and protect it from irritating particles, and therefore are most advantageous in hypersensitive conditions of the mucous membrane. Those most commonly employed consist of various volatile oils in melted vaselin, or, better, in oleum petrolatum album. These should be applied by the patient four or five times daily by means of an atomizer which throws a large spray, or they may be applied by a medicine dropper or even a small oil can. Various substances may be combined with these bases for the purpose of diminishing the secretion. One of the most efficient of these is terebene in the proportion of ten or twenty minims to the ounce. Thymol half a grain to the ounce, menthol from two to five grains to the ounce, oleum pini sylvestris one-half drachm to the ounce with oleum caryophylli from three to five minims, or oleum cinnamomi from one to two minims to the ounce, have proved most satisfactory in my hands; but other similar applications may be employed with advantage if care be taken that they be not too stimulating or irritant. A watery solution of adrenalin chloride, 1 part to 5,000, containing about eight grains of boric acid to the ounce, will be found beneficial in some cases, and weak solutions of silver nitrate, copper sulphate, and zinc sulphate or chloride, from one to two grains to the ounce of distilled water, are sometimes efficient. Sedative powders are frequently more advantageous than sprays, and are commonly employed in addition to the oily applications already recommended. Boric acid, bismuth, iodol, benzoin, and various other substances may be employed for this purpose, mingled with starch and sugar of milk. A sedative powder containing ten per cent. of boric acid, twenty-five per cent. of iodol, two per cent. of starch, and enough sugar of milk to make one hundred parts, with occasionally one per cent. of cocaine, will sometimes give much relief. When there is an offensive odor, aristol may well be used in place of iodol; and various combinations may be made with other remedies, such as bismuth, oxide of zinc, and pulverized gum benzoin. It is well to use these powders after the oily spray has been applied.

In cases in which there is marked hyperæsthesia of the nasal mucous membrane, the greatest good will be obtained by superficial cauterization of the sensitive spot. The spot should be searched for with a flat probe lightly rubbed over the surface; when found, and after it has been anesthetized with cocaine, it should be cauterized with a flat guarded electrode with sufficient thorough-

ness to whiten the mucous membrane over an area about a centimetre in diameter, but the cauterization should not be carried far enough to destroy this tissue. The effect of this treatment is to destroy the terminal fibres of the hypersensitive nerve and thus the cause of the disagreeable symptoms is removed. The sedative sprays and powders should be used in the intervals between the cauterizations, and the latter should not be repeated oftener than once in five or ten days.

INTUMESCENT RHINITIS.

This affection is often spoken of merely as chronic catarrh, and is sometimes classed as hypertrophic rhinitis; but on account of the pathological condition it might well be called coryza vasomotoria chronica. It is characterized by swelling of the Schneiderian mucous membrane, especially of the inferior turbinated bodies, but also of the middle turbinals and sometimes of the tuberculum septi. This swelling causes obstruction to respiration through the occluded naris. It often involves only one side at a time, though it changes frequently from side to side, and both nares may be obstructed at once. One of the characteristic features of the disease is the swelling which occurs upon one side while the patient is lying upon that side, and which may be transferred to the other side within a few moments when the position is changed. These sudden changes in the seat of swelling are also noticeable even when the patient is erect, and sudden disappearance of swelling upon exercise is a common symptom.

ANATOMICAL AND PATHOLOGICAL CHARACTERISTICS.—The pathology of inflammation of mucous membranes is described elsewhere; but we should note that in this condition, although congestion is usual, the membrane is not infrequently paler than normal. The swelling occurs most frequently over the inferior turbinated body, but may involve other parts, as already mentioned; it results from a paretic state of the muscular elements of these structures and of the muscular walls of their cavernous vessels. The inflammatory changes are the same as those in the variety known as chronic rhinitis and hypertrophic rhinitis, though less extensive than in the latter. The naso-pharynx and pharynx are nearly always involved, and not infrequently the inflammation extends to the larynx and trachea. In consequence of extension of the inflammation along the Eustachian tubes, partial deafness is present in many cases, and this is usually aggravated by exposure.

ETIOLOGY.—The causes are the same as those of simple chronic rhinitis.

SYMPTOMATOLOGY.—Patients suffering with this disease usually give a history of unusual susceptibility to colds which are present during the large part of the changeable weather in the spring and fall, though in some cases they are also present in the winter and even in the warmer summer months. The disease gradually increases until eventually the patient is annoyed much of the time, especially at night, by obstruction of the nasal cavities. This occlusion causes mouth breathing, and sooner or later in most instances sets up inflammation of the naso-pharynx, the pharynx, and even the larynx and trachea. Indeed, the great majority of cases of chronic mild laryngitis are due to intumescent rhinitis, the effect of the intermittent swellings appearing to be even more disastrous to the larynx than is the more persistent obstruction due to hypertrophic rhinitis or nasal mucous polypi. As a result of disturbed sleep, the patient is apt to awaken unrefreshed and with a headache. In most of these cases the nasal mucous membrane is hypersensitive, and the paroxysms of sneezing may be excited by breathing cold air or the inhalation of dust, and in some cases even by stepping into a bright light. Sudden changes of temperature, whether from heat to cold or the reverse, are very apt to bring on attacks of sneezing with occlusion of the nares. Sometimes the obstruction is brought on quickly by exposure to cold; but usually the reverse is true, and it is only in the temperate

atmosphere within doors that the patient experiences the greatest annoyance. A patient who may get along comfortably with the temperature at 72° F. will frequently find the nasal passages obstructed when the mercury rises three or four degrees higher. Occasionally such patients are annoyed by attacks of redness and inflammation of the end of the nose; and not infrequently they are troubled with itching or tickling of the nose, or by similar sensations in the mouth associated with dryness. A stuffy sensation in the nares or one of pressure with actual pain is not infrequent, and these patients are often the victims of a temperal or occipital neuralgia or hemicrania due to the pressure. It should be understood, however, that these are not common symptoms. Mental hebetude, loss of memory, and inability to concentrate the thoughts are due to this disease in rare cases. Among other nervous phenomena that sometimes result from intumescent rhinitis may be mentioned paroxysmal cough, spasm of the larynx, and even spasmodic asthma, which may occasionally be removed by curing the catarrhal condition. Excessive lachrymation and photophobia are also sometimes caused by this form of catarrh. In a considerable number of these patients the secretions from the nares are increased, but in the majority the patient does not have to use a handkerchief excessively, and the greatest complaint is of the desire to hawk and clear the throat, especially in the early morning or after eating. The secretions are essentially the same as those of simple chronic rhinitis, though usually they are not so abundant. However, the amount of discharge may vary much from time to time, and exacerbations are frequent from slight colds in the head. Many patients who present the usual symptoms of intumescent rhinitis deny the existence of obstruction of the nares, even though upon examination the cavities may be found more than half closed. The reason for this is that they have become so accustomed to breathing through the narrow orifice and to existing upon a minimum amount of air that they have no realization of the comfort of normal respiration. In intumescent rhinitis the tongue is so commonly coated and the digestive organs are so frequently disturbed that the suspicion arises that, in some cases at least, gastric disturbance is the primary disease. Upon inspection of the nares the mucous membrane may or may not be seen to be congested, or it may be even paler than normal. Usually it is swollen upon one side or the other, although frequently at the first examination one must rely largely upon the history in making the diagnosis, for both nares may be perfectly free. If the membrane upon the turbinals or the tuberculum septi be swollen it may be made to contract speedily by the application of a small quantity of cocaine, or it may be readily compressed by a probe. Sometimes, indeed, the mere dread of an examination will cause rapid retraction of a swollen membrane. The normal width of the nares in an adult is about one-eighth of an inch, and the color of the mucous membrane is a few shades deeper than that of the gum. Probably in four-fifths of all cases of intumescent rhinitis the congestion is considerably greater than this, and the constriction of one or other or both of the cavities may be from thirty to seventy-five per cent. The swollen membrane over the tuberculum septi is generally a few shades darker in color than the normal tissues; but the swollen membrane at the back part of the septum, when brightly illuminated either from the front or by posterior rhinoscopy, is apt to appear of a grayish color. The posterior ends of the turbinated bodies may also, when swollen, appear grayish in color, and may somewhat resemble mucous polypi; but these changes are more apt to be found in hypertrophic rhinitis. The mucous membrane of the naso-pharynx is often congested and bathed in secretion, and commonly more or less follicular inflammation of the pharynx is present.

DIAGNOSIS.—Intumescent rhinitis is to be distinguished from simple chronic rhinitis, hypertrophic rhinitis, hay fever, and nasal mucous polypi. It is distinguished from simple chronic rhinitis by the absence of swelling in the latter. If at the first examination the history in-

dicates that the patient is troubled by frequent obstruction of the nares, although the cavities may appear free, he must be sent away and directed to keep watch of the symptoms and report specifically at another visit. At a second visit it is probable that swelling of one side will be present. Intumescent rhinitis is distinguished from hypertrophic rhinitis by the history, which indicates intermittent swelling, and usually by the presence of swelling in the intumescent form only upon one side at the examination, by the yielding of the tissues before slight pressure of the probe and their retraction under the influence of cocaine. In hypertrophic rhinitis, although the tissues retract under cocaine, they do not to so great an extent as in the intumescent variety. Hay fever is distinguished from intumescent rhinitis by the history of repeated attacks at a certain time year after year, by the excessive sneezing, and by the irritation of the eyes and throat which usually attend hay fever. Nasal mucous polypi can hardly be confounded with intumescent rhinitis excepting by the tyro. Their color a light grayish, their position as a rule in the upper part of the nasal fossa, their mobility as indicated by the probe, and the fact that a probe may be passed on both sides of them should be sufficient to establish the diagnosis in any case.

PROGNOSIS.—Left to itself, intumescent rhinitis occasionally subsides spontaneously, but it commonly extends over a long period of time; and eventually true tissue hyperplasias occur and hypertrophic rhinitis is the result. In rare cases, however, this form appears to pass directly into atrophic rhinitis. The frequent obstruction of the nares, occurring chiefly at night in this affection, leads to chronic pharyngitis and laryngitis, and often the Eustachian tubes and middle ear become involved and throat deafness follows. In singers the voice is likely to be ruined by persistence of this affection. The general health suffers from imperfect oxygenation; and, although to the casual observer the patients may appear robust, they have little endurance. By proper treatment the obstruction may be entirely removed, and as a rule the hypersensitiveness of the mucous membrane will disappear with it. Most of the other symptoms speedily subside soon after the nasal cavities are made free, and a final cure may be predicted in nearly all cases. The effects upon the general health of the cure of the local trouble are most gratifying. Sleep is no longer disturbed, the nasal respiration is restored, and the patient becomes more vigorous mentally and physically. There is some liability to recurrence; nevertheless it is best to relieve only the obstruction that is apparent, rather than to make the nasal cavities abnormally large. The treatment may be resumed at some future time if found necessary, but usually the symptoms do not recur for several years at the worst, and in the majority of cases the patient is completely cured.

TREATMENT.—All sources of irritation should be shunned, and special care should be taken to avoid cold. Exposure to draughts, cold, or even undue heat, especially in badly ventilated rooms, or the inhalation of irritating dust or vapors is especially liable to cause this variety of inflammation. Much may be done to guard against rhinitis by care as to clothing. The daily cold bath with vigorous friction and regular exercise do much to prevent the nervous exhaustion and the loss of tone of the vascular system, which are often responsible for this affection. The condition of the digestive organs should always be carefully attended to. Local treatment of a sedative character is important during the early stages, and will often be sufficient to prevent further development of the disease. The various oily preparations mentioned in the treatment of chronic rhinitis will be found beneficial at this stage of the disease, and sedatives and mildly astringent powders may do much to lessen the discharge and will sometimes give considerable relief to the obstructed respiration. Adrenalin chloride in solution or in powder, of a strength of about 1 to 4,000 or 5,000, may in some cases be used four or five times a day with great advantage. Cocaine gives the greatest relief, but unfortunately its continued use causes a paretic state

of the muscular coats of the veins of the cavernous tissue of the turbinals; and after a few weeks or months the patient's condition is much worse than it was in the beginning. There is reason to believe also that the cocaine favors hypertrophy. Aside from this, its pernicious effects upon the nervous system and the great danger of the formation of the cocaine habit render it absolutely unsafe excepting for very short periods of time. The physician should never give a prescription containing cocaine lest the patient have it repeated and so form a cocaine habit; and even while the patient is under the physician's observation he should not be allowed to use more than from an eighth to a quarter of a grain daily, and this should be discontinued as quickly as possible. When it is necessary to employ it, a one- or two-per-cent. solution in a saturated solution of boric acid in distilled water may be employed, or a similar amount may be rubbed up with one per cent. each of sodium bicarbonate and sodium baborate, two per cent. of the light carbonate of magnesium, and sufficient sugar of milk to make the required quantity. These sprays may be applied with any good atomizer, but the No. 50 Davidson is the best in my opinion for oily applications. The powders are most conveniently applied by a simple insufflator with a glass tube and rubber handball and tube. For personal use the patient may have a short glass tube, about four inches in length, to which is attached a rubber tube, about ten inches in length; one end of the glass tube should be flattened. The powder is placed in the round end, the rubber is slipped over this end, and then the flat end of the tube is placed in the nostril; the other end of the rubber tube is taken in the mouth, and the patient gives a quick puff which throws the powder well through the naris. Oily applications may also be made to the nose with a medicine dropper or a small oil can when the patient finds this more convenient. More stimulating applications may be made to the nares once or twice a week.

The applications made by the physician should never cause discomfort for more than ten or fifteen minutes, and those made by the patient should not cause irritation or smarting for more than a minute, and should not be sufficiently strong to give a feeling of stuffiness in the nares afterward. Of the aqueous solutions recommended for personal use by the patient three or four times daily, some of the best are boric acid, eight grains to one ounce, sodium bicarbonate and sodium baborate, of each two grains to one ounce, listerine forty to sixty minims to one ounce, or distilled extract of hamamelis or of pinus canadensis thirty to fifty minims to the ounce. The saturated solution of boric acid in camphor water is also recommended. For personal use an excellent application consists of one-third grain of thymol with three minims of the oil of cloves to the ounce of oleum petrolatum album, or its strength may be increased by the addition of various substances, combined or singly, which should seldom exceed the following amounts to each ounce: Menthol, gr. ij.; terebene, ℥ xv.; oil of cassia, ℥ ij.; camphor, gr. i.; ol. pini sylvestris, 3 ss. Some prefer the use of heavier oils, and many employ vaseline, which is melted each time before the application, the theory being that it remains longer in contact with the mucous membrane than would the lighter oil. When the secretions are free, the nose should be cleansed in the same manner as recommended for simple chronic rhinitis. Indeed, most of the remedies applicable to that disease may be used at times with advantage in this affection.

The foregoing measures, however, can relieve only the milder cases, and it is not proper for a physician to keep a patient under treatment more than two or three weeks before he adopts more radical measures, unless what he is doing is found to be accomplishing great good. The radical treatment of intumescent rhinitis consists in destruction of a portion of the tissues by chemical agents or by the galvano-cautery or by removal of the swollen masses by the snare, or cutting them away by knife or scissors.

Cauterization by Acids.—When satisfactory galvano-

cauteries could not be obtained, there was much reason for the employment of the chemical caustics, and these are still preferred by some physicians, although they cause much greater irritation of the parts with corresponding discomfort to the patient, and do not, commonly at least, yield such accurate results. Of the chemical agents used for the purpose chromic acid is perhaps the best. A few crystals of this may be fused on the end of a flat aluminum probe by holding it over a light for a few moments, and then the parts may be accurately touched without much danger of the chromic acid extending beyond the part to be cauterized; however, the operator should be ready to spray the parts immediately with an alkaline solution in order to neutralize any excess of the acid. A very small amount of the acid, not exceeding in bulk a pellet 2 mm. in diameter, should be employed, and the area of membrane touched at any one time should measure not more than an eighth of an inch in width and from a half to three-fourths of an inch in length.

The cauterization should not be repeated within less than from ten to fourteen days. Some prefer touching the surface at several points with the acid, and some use solutions of various strengths instead of the fused acid, and repeat the cauterization in four or five days. The principal objections to the chromic acid are the difficulty of controlling the extent of cauterization and the pain that is likely to follow the cauterization for many hours. Monochloroacetic and trichloroacetic acids are also used for the same purpose, but in my hands they have not proven satisfactory. Some operators have obtained good results from the employment of electrolysis, commonly using a bipolar electrode, the needles of which are 4 or 5 mm. apart. A current of from 2 to 10 milliampères, lasting for from three to five minutes, is employed. If the effect of this electrolysis could be confined entirely to the submucous tissue, it would prove a very attractive operation, but many times a slough forms, and often the wound thus resulting is larger than that obtained by the usual forms of cauterization.

Galvanocautery.—Cauterization by the galvanocautery should be done with a wire heated to a cherry-red color only. If heated less than this the line will not burn sufficiently deep and the heat will radiate more to other parts; and if a white heat be employed, the instrument will cut almost like a knife, and bleeding will result. I like best for the purpose a knife-like electrode, about 10 cm. in length, the blade of which consists of No. 21 platinum wire and is about 15 mm. in length. A finer wire heats much quicker and cools more rapidly so that we either get a sharp cut with bleeding or fail to burn the tissues deeply enough. The parts should be first anesthetized with cocaine, the solution of which should not ordinarily exceed a strength of four per cent.; this is best applied by a thin swab of cotton wound upon a flat aluminum probe, with which all of the part to be touched is gently rubbed about every minute and a half until from two to four applications have been made, by which time the anesthesia will be completed. This is much better than to employ a spray or a tampon of cotton, which spreads the cocaine over a large area and causes absorption of an unnecessary amount, to the detriment of the patient. A solution which has been found by long experience to be satisfactory on account of its good effects upon the parts, and the absence of constitutional symptoms excepting in the rarest cases, consists of atropine gr. $\frac{1}{10}$, strophanthin, gr. $\frac{1}{10}$, oil of cloves m.ij. , carbolic acid gr. x., cocaine muriate gr. xx., and enough water to make an ounce. When the anesthesia is complete, the soft tissues will be thoroughly affected, and then the electrode should be carried to the posterior end of the turbinated body where the platinum wire is pressed against the tissues, the current is turned on, and with a slight to-and-fro movement the electrode is drawn to the front part of the nasal cavity, burning the soft tissues down to the bone throughout the whole line. Usually two lines extending from the back to the front part of the inferior turbinated body will be necessary, one at the

junction of the upper and the other at the junction of the lower with the middle third. In sensitive persons not more than half the line can be made at one sitting, and in no case should more than a single line across the whole length of the turbinated be made. The electrode should always be lifted from the tissues before the current is cut off, otherwise it is apt to tear out the eschar and cause bleeding. After the cauterization the nose should be sprayed with a solution of about five minims of oil of cloves in an ounce of liquid albolene, and this followed by insufflation of three or four grains of iodol. The nostrils should then be closed with a pledget of cotton, and the patient should be told to wear cotton whenever out of doors, or in any position where he is liable to take cold, for four or five days; then he should be allowed to change it and put in fresh cotton as often as desired. A ten-per-cent. solution of methylene blue may be employed to touch the line of cauterization in place of iodol, or the compound tincture of benzoin may be used for this purpose. The latter in some cases has seemed peculiarly efficacious in the prevention of subsequent reaction. A similar cauterization may be made in the opposite naris in from ten to twelve days, and these may be repeated at similar intervals until the swollen tissues have been sufficiently reduced. Usually two cauterizations upon each inferior turbinated body are sufficient; sometimes one is necessary upon each middle turbinated, and occasionally two short lines will have to be drawn through the tuberculum septi. It is well to have the patient return to the office four or five days after the cauterization, and to pass the probe between the opposing sides of the nares in order to prevent adhesions. The patient is given a small quantity of powder containing three per cent. of cocaine and twenty-five per cent. of iodol with one and one-half per cent. each of bichlorate and bicarbonate of sodium, and three per cent. of the light carbonate of magnesium, with sufficient sugar of milk to make the whole quantity about one hundred grains. This the patient is directed to insufflate into the nasal cavity two or three times a day for the purpose of keeping down the swelling. He is also given an oily spray containing one-third of a grain of thymol and from three to five minims of the oil of cloves to the ounce of liquid albolene, which he is directed to use freely in both nares four or five times daily. The powder is continued for four or five days and subsequently is used only once a day, but the oil is continued regularly until other treatment is instituted, or for two or three weeks. The frequent superficial cauterizations which are recommended by some appear to destroy more tissue, to give the patient more discomfort, and to be much less efficient. I have seen one death from ulcerative endocarditis evidently caused by the suppuration set up by this latter method. Usually such cauterizations cause little or no pain either at the time or subsequently, and may give the patient no more discomfort than would be experienced from a severe cold in the head. However, the patient should be warned, in order to prevent unnecessary anxiety, that there is likely to be some bloody discharge from the nose for two or three weeks. The principal discomfort following cauterizations is from the effects of the cocaine upon the nervous system; therefore care should be taken to use as little of this as is practicable. There are occasionally patients who cannot tolerate a sufficient quantity of cocaine to produce anesthesia, in whom eucaïne may be advantageously substituted; ten or fifteen grains of the bromide of potassium or a cup of strong coffee will commonly relieve the immediate poisonous symptoms caused by the cocaine; but it will not always succeed, and in patients peculiarly sensitive to the drug, none of it should be employed in the subsequent treatment except to prevent the pain of actual cauterization. When the turbinated bone itself is enlarged, or when there is a prominent deflection or spur from the septum, adhesions are very likely to occur if cauterization upon the turbinated body is made upon that side. In these cases, therefore, an operation upon the bony tissue should usually first be done. In spite of all precautions, adhesions sometimes result.

When this accident occurs it is best to wait until complete healing takes place, and then the adhesions should be cut with scissors. A pledget of wool or bit of rubber tissue may be placed between the opposing surfaces to prevent renewed adhesion, and after four or five days the healing will usually occur without difficulty. Sometimes adhesions may be prevented by touching the raw surface with monochloroacetic acid, as this forms an eschar that tends to remain until the healing has taken place under it. Follicular tonsillitis occasionally follows the cauterization of the nares. I have seen it in about one-half of one per cent. of the patients operated upon, though not more than one-fourth as frequently as this if the individual cauterizations are considered. In rare cases otitis media is said to have followed the operation, and I have known of one case in which an inexperienced operator made an extensive cauterization that was followed by fatal meningitis. More or less blood is mixed with the discharges in the majority of cases for two or three weeks, and occasionally a secondary hemorrhage may occur at the end of a week or ten days. I have never had this experience myself, but have known of two cases in the practice of experienced operators in which an alarming hemorrhage recurred time after time until the patient was in the gravest danger; however, in both the bleeding was eventually checked and the patients made a good recovery. I recall two or three cases in my own experience in which erysipelatous inflammation of the skin covering the nose, lips, and cheek invariably followed cauterization. It is needless to say the operations were not repeated when this tendency was discovered. Occasionally in cases of extreme intumescence the swollen tissues may be grasped with a snare, providing this is done before cocaine has been applied; but excepting in the rarest instances this operation is reserved for hypertrophic rhinitis. D. Braden Kyle removes a prism-shaped piece with a knife instead of cauterizing, and believes that he gets better results in this way. The pharyngeal and laryngeal symptoms usually improve speedily after the nares have been made free, though it is well to carry on appropriate treatment for these parts during the treatment of the rhinitis. In professional singers whose living depends upon the voice, the cure of intumescent rhinitis is of the very greatest importance for the prevention of chronic laryngitis, and in nearly all cases, fortunately, we may confidently predict the happiest results from judicious radical treatment.

HYPERTROPHIC RHINITIS.

Hypertrophic rhinitis is a common affection, but it is not met with so frequently as the intumescent variety. It is characterized by obstruction of the nares with discharge from the naso-pharynx and the nostrils, and frequent hawking to clear the throat. It is often associated with chronic laryngitis. The obstruction in the nares is permanent, yet it varies considerably from time to time on account of the varying degrees of swelling.

ANATOMICAL AND PATHOLOGICAL CHARACTERISTICS.—Permanent thickening of the mucous membrane and sometimes also of the turbinated bones is found in this disease, and the nasal cavities are usually from one-third to three-fourths closed by the swelling. The mucous surface may be congested or paler than normal. It is sometimes smooth as in intumescent rhinitis, but is often more or less nodulated, and at times presents one or more tumor-like masses which are sometimes mistaken for fibrous or fibro-mucous polypi. The condition affects both the middle and the inferior turbinated bodies, and is not infrequently observed on the tuberculum septi. In many cases the inferior turbinated body is nearly as smooth in appearance as in the intumescent form of the disease, but usually its anterior extremity is more or less furrowed or nodular. The anterior end of the middle turbinated not infrequently presents numerous nodules, more or less translucent, and having something of the appearance of nasal mucous or fibro-mucous polypi. The hypertrophy at the upper part of the septum is generally

smooth, and at first appears to the observer like thickening of the bony septum. Hypertrophy of the posterior ends of the turbinated bodies usually presents a raspberry-like appearance, and may vary in color from a whitish-gray to a dark livid hue; the posterior end of the middle turbinated, however, is generally lighter in color and less granular upon the surface, and it often appears much like a mucous polypus. The condition is due to overgrowth of the connective tissue and bony elements in varying degrees, but the pathology of the disease will be considered elsewhere.

SYMPTOMATOLOGY.—The symptoms are not unlike those of intumescent rhinitis excepting that the nasal obstruction is more persistent and usually more complete. The patient generally complains much of accumulation of the secretions in the naso-pharynx and often of complicating laryngitis. Pressure symptoms, such as loss of the sense of smell, headache, nasal or supra-orbital neuralgia, and sometimes ocular symptoms, are more often present in this than in the intumescent form of the disease, and when present they are more persistent. Middle-ear disease with throat deafness is also common, and unfortunately after the hypertrophic rhinitis has persisted for some time, its effects are very likely to remain even though the disease in the nose may be cured.

DIAGNOSIS.—Although the disease is frequently mistaken by general practitioners for nasal mucous polypi, careful inspection of the nares should exclude all affections excepting intumescent and syphilitic rhinitis. Intumescent rhinitis is distinguished from the hypertrophic form by greater variation in the degree of nasal obstruction, by yielding of the tissues readily before the probe pressed upon them, and usually by contraction of the swollen mass to its normal proportions or even less, upon the application of a weak solution of cocaine. Commonly, also, the mucous membrane is more congested in intumescent rhinitis than in the hypertrophic form. Syphilitic rhinitis causing uniform swelling of the turbinated bodies cannot always be distinguished from simple hypertrophy, but the history of the case and the effects of treatment, or the occurrence of ulceration of the Schneiderian membrane with evidences of former syphilitic involvement of the fauces or other parts of the body, will usually enable one to make an accurate diagnosis. Nasal polypi are commonly recognizable upon inspection; but if this is not sufficient, the passage of a probe upon both sides of the polypus and its movability will generally distinguish it at once from the hypertrophied turbinated body.

PROGNOSIS.—Left to itself, there is little tendency for hypertrophic rhinitis to terminate in recovery. On the contrary, it is liable to increase gradually until the nares are three-fourths or four-fifths obstructed and then to remain permanent for a long time; in other instances the hypertrophy gives way to atrophy, and ultimately well-marked atrophic rhinitis results. There are also undoubtedly some cases in which the hypertrophy gradually subsides and the nares are left practically in a normal condition, but these are extremely rare. Subjected to proper treatment practically all cases of hypertrophic rhinitis may be cured in a comparatively short time, though the gentle or puttering treatment that is often adopted is likely to extend over years without much relief.

TREATMENT.—The more vigorous treatment recommended for intumescent rhinitis is equally applicable in the hypertrophic form of the disease, but the tentative soothing treatment recommended in the former is almost useless. The hypertrophied tissue must be removed in some way so as to bring the nasal cavities to a normal calibre. In doing this, however, the physician should be careful not to render the nares abnormally large, because if they are left too small they may be made larger; but once too much tissue is removed, nothing can restore it. Care should also be taken not to destroy mucous membrane when it is possible to avoid this, or rather to leave as large a surface of mucous membrane as should normally be present. The author is not at all in sym-