tion of the upper pharynx and nasal chambers from behind is known as posterior rhinoscopy.

In these examinations of the nasal cavities the relationship of the patient and physician with regard to the source of light is absolutely the same as it is in laryngoscopic examinations. The patient sits in a simple straight-back chair, without head support. The physician sits directly in front of the patient, or, what is preferable, directly beside and on the left-hand side of the patient. The source of light should be to the right of the patient, just to the side of and on a level with the upper border of the right ear. The patient should sit in an easy, erect, comfortable position, when the examiner reflects the light in a circle just upon the area to be examined. Either may then move, within a certain latitude, from this fixed position; nevertheless, it will be noted that when they return to the examining position the light will fall directly on the point upon which it originally fell. The method of examination, as well as the character of furniture used for patient and doctor, is a question of individual preference and perfected method on the part of the operator.

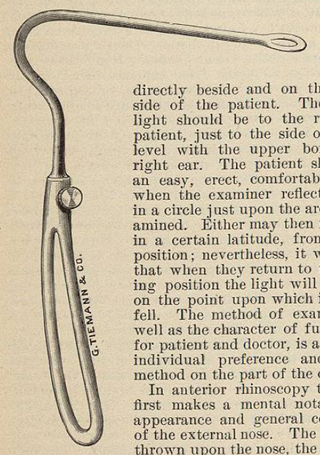

FIG. 3488. — Kyle's Tongue Depressor.

In anterior rhinoscopy the operator first makes a mental notation of the appearance and general configuration of the external nose. The light is then thrown upon the nose, the head of the patient is slightly tilted backward, and the general appearance, the patency, and the outline of the anterior nares are noted, after which the tip of the nose is slightly tilted upward and the vestibule is thoroughly inspected. Little children fear instruments, and, as their hairs are undeveloped, we can often make a thorough inspection without the use of speculums. Special care should be made to note fissures, abrasions, or pimples on the inner surface of the nares, which would make the introduction of the speculum painful.

We are now prepared to introduce the speculum. This instrument should be gently insinuated into the anterior nares in a closed state. After the speculum is placed slightly within the vestibule, it is moderately dilated until slight resistance is felt. No pain should ever be given. With the instrument in position, the two crura being controlled by the pressure of the thumb and index finger of the left hand and with the little finger of the same hand hooked under the lower jaw, the patient is practically under control of the examiner. Slight pressure is usually all that is sufficient to make the patient move in a required direction. With the patient's head slightly tilted forward, the first object that attracts attention is the prominent rounded red mass on the outer wall projecting nearly to the floor of the nose, and which we recognize as the anterior end of the inferior turbinate body. Opposite this we recognize the cartilaginous wall of the septum, and below, the floor of the nose and the inferior meatus. According to the amount of space between the inferior turbinate and the septum, we can see to a greater or less depth within the nasal cavity toward the pharynx. In many cases, with a fair amount of space between these parts, or when the turbinal tissue is contracted under the use of cocaine, we can well see the posterior pharyngeal wall. A tilting of the patient's head slightly backward brings into view the middle turbinate, which is paler and more translucent than the inferior, and just opposite its anterior extremity on the septal wall is seen often an aggregation of erectal tissues, which is designated the tuberculum septi. The whole extent of the visible upper surface of the inferior turbinate is seen in this position, as well as the middle meatus. It is only when the middle turbinate is removed or has undergone great atrophy that the interesting features contained within the middle meatus are brought under observation. Tilting of the patient's head still farther backward brings into view the upper portion of the middle turbinate and the roof of the nasal cavity. It is rather unusual to be able to demonstrate the superior turbinate body. Occasionally the orifice of the sphenoidal sinus can be made out. The use of the probe is indispensable in making this examination, and so also is the instillation, after the preliminary examination, of a very mild solution of cocaine, —a procedure which should be followed by a re-examination of the parts after the effects of the drug have become manifest. Great care should be exercised in examining the septum; it should be viewed from both sides, and the head should be held carefully in the middle line.

Posterior rhinoscopy is the most difficult procedure in the examination of the upper air tract, and therefore requires more tact and skill in its prosecution. The position of the patient and of the source of light, and the methods of reflection are the same as in anterior rhinoscopy. The only instrumental addition is the rhinoscopic mirror and the tongue depressor. I have never found it necessary to make use of the so-called palate retractors, but see no objection to the use of such an instrument, for holding forward the soft palate, if the examiner so desire. The most desirable instrument for retracting the palate is that invented by Dr. J. A. White. Occasionally the examination can be made without the use of a tongue depressor, but this is exceedingly rare. After depressing the tongue, and noting the space between the soft palate and the pharyngeal wall, as well as that between the pendent uvula and the base of the tongue, the largest size mirror which it is possible to use is gauged. The mirror is first heated to a proper temperature and the tongue carefully depressed. In introducing the tongue depressor care should be exercised in so introducing it that the tip of the tongue depressor first comes in contact with the tongue just posterior to its arch, which is somewhat anterior to the circumvallate papillæ. The tongue is then drawn downward and forward into the floor of the mouth. Backward pressure of the tongue is always to be avoided, as it is certain to give rise to retching and gagging.

If the depressor is so placed as to excite distress on the patient's part, it should be immediately removed and replaced. The depressor should be held between the thumb and index finger of the left hand, while the other fingers pass under the patient's chin. The mirror, which has been properly warmed, being lightly held between the thumb and index finger of the right hand, is now quickly introduced into the widely open mouth along its left wall until we come to the dependent palatine arch. The important feature in the introduction of the mirror is so to insert it as not to come in contact with any of the tissues. As the palatine arch is reached, the mirror is gently insinuated by slight depression and rotation so as to glide through the space between the left pillar and the base of the tongue without coming in contact with either.

After the mirror has passed behind the palate and has reached the pharyngeal space, the operator, by slightly rotating the handle, may bring the reflecting surface around so as to face him, and then he should slightly depress the handle so as to carry the mirror upward until its upper border is slightly hidden behind the soft palate. The mirror now being in position, its handle is so held toward the left angle of the patient's mouth that there is no interference with the thorough illumination of the buccal cavity. Finally, the mirror is to be rotated from right to left, depressed and elevated, and given different degrees of angles while in position so as to bring into view in rapid succession the various surfaces and parts of the upper pharynx and back of the nose.

The success of the procedure depends upon the depression of the tongue, the careful introduction of the mirror, and the ability of the patient, not only thoroughly to relax the soft palate, but also to hold it immobile in this relaxed state long enough for the operator to make a thorough inspection of the parts. The patient is an uncertain quantity. Many can submit to a rhinoscopic examination without any difficulty; others require careful manipulation and several efforts have to be made before a successful view is obtained; and, finally, there are a few who are so constituted as to present almost insurmountable difficulties to the exploration. The greatest difficulty is the retraction of the soft palate, which in some individuals takes place immediately upon the introduction of the mirror into the mouth. Careful training in nasal breathing with the open mouth and with the sounding of the nasal consonants en and em, will often overcome this obstacle. Among the other methods which have been suggested for overcoming these obstacles may be mentioned the application of a five-per-cent. solution of cocaine to the palate and post-pharyngeal wall, and the employment of the palate hook. The image reflected in the mirror at any given moment represents only a small section of the whole region. Consequently, in order to gain a fairly complete view, it is necessary to construct it in one's mind from the separate smaller pictures obtained by changing from time to time the angle at which the mirror is placed. Usually one observes first the upper surface of the soft palate and the lower portion of the posterior border of the septum which forms the inner boundary of the post-nasal orifice, the choanæ. Then, by giving the mirror a slight upward inclination, it will bring into view the whole length of the septum, broad above and tapering to a narrow edge below, and the posterior view of the nasal cavities as displayed through the choanæ. On either outer wall, from above downward, will be noted the ridge of the superior turbinate body; immediately below it and separated from it by a dark line—the superior meatus—will be observed the middle turbinate body which stands out as a somewhat elongated fusiform body of a very faint pinkish-white appearance. Below the middle turbinal body will be seen the middle meatus, and immediately below this the upper half of the inferior turbinate body, which oftimes seems to merge into the floor of the choanæ.

The color of the inferior turbinal body is of a grayish-white, resembling much the color that an ordinary mucous membrane assumes when œdematous. By slightly inclining the mirror to right or left, the corresponding mouth of the Eustachian tube will be observed, as well as the depression which separates it from the post-pharyngeal wall—the fossa of Rosenmüller. By changing the angle of the mirror to a more obtuse angle, the dome-like vault of the pharynx will be brought into view, as well as the upper portion of the post-pharyngeal wall. The vault of the pharynx is usually dome-like and smooth in its contour. In some individuals it may show elevations and depressions, or be so filled out as to appear flat, these alterations depending upon the amount and degree of enlargement of the pharyngeal tonsil.

Besides the rhinoscopic methods of exploration of the nasal chambers and post-nasal cavity we have, as additional aids to diagnosis, the digital exploration and the use of electric transillumination. Digital exploration is especially of value in exploration of the post-nasal cavity in very youthful patients and in adults in whom it is impossible to make use of posterior rhinoscopy, or in whom, for various other reasons, it is desirable to make use of this method. This procedure can usually be made in little ones, without causing alarm, by the use of judicious tact. No instruments are necessary. The hands should be well washed and the index finger scrubbed with a nail brush before the examination is made. The child is seated in the examining chair while the parent sits in front of the child and holds the little one's hands. The operator stands to the left side of and facing the patient, with the right hand firmly grasping the vertex of the head. I usually find it wise to tell the patient what I propose doing and of its unpleasant nature, but at the same time I assure him that the procedure does not cause pain. The patient is then told to open widely the mouth, the hands and head are firmly grasped, and the index finger of the right hand is quickly but dextrously introduced into the mouth and behind the soft palate into the post-nasal place. In this manner the character and condition of this region may be quickly determined through the tactile sense.

Another method of making the examination is by placing the child in the position described by Dr. A. A. Bliss. By this method the child is placed in the lap of a nurse or parent, facing forward. The little one's legs are held firmly between the legs of the assistant, while the arms of the assistant are slipped under the armpit of the patient and the hands extended upward and held firmly on either side of the head. The child is thus held immobile. Transillumination of the accessory cavities is resorted to as an aid to the diagnosis of the condition of these pneumatic cavities. The value of this method of exploration lies in the fact that most of the pneumatic spaces in the normal state allow the transmission of rays of light through their thin walls. The light used for this purpose is electric, furnished through the medium of a small lamp of about six candle-power. The method of its application will be described in the article devoted to the diseases of the accessory sinuses.

Charles W. Richardson.

NASAL CAVITIES, DISEASES OF: ABSCESSES OF THE NASAL SEPTUM.—Abscess of the septum may be either acute or chronic. The former is generally the result of hæmatoma, erysipelas, typhoid fever, or smallpox, and is located upon one or both sides of the cartilaginous septum. The chronic abscess is generally due to syphilitic infection, but it may be the result of poisoning by arsenic, copper, or mercury, or it may possibly be traumatic.

While the acute abscess is commonly found over the cartilaginous septum, the chronic abscess generally extends to the bony part, and it is often caused by disintegration of gummatous infiltration of the mucous surfaces. The swellings are usually rounded, and they appear red and inflamed and sensitive to the touch. When a syphilitic abscess is opened it emits foul-smelling pus, and if a probe be introduced into the abscess cavity necrosed cartilage or bone may be detected. In most chronic cases the treatment, after the abscess has been opened, is the same as that recommended for nasal syphilis.

E. Fletcher Ingals.

NASAL CAVITIES, DISEASES OF: ACTINOMYCOSIS.—I have been unable to discover any report of well-marked cases of actinomycosis of the nose, though it is probable that the disease sometimes affects this organ.

E. F. I.

NASAL CAVITIES, DISEASES OF: ACUTE INFLAMMATIONS.—The many varieties of acute inflammation of the nasal mucous membrane that are mentioned in medical literature may be comprised under the following headings: (1) Acute Catarrhal Rhinitis, (2) Acute Purulent Rhinitis, (3) Acute Membranous Rhinitis, (4) Acute Phlegmonous Rhinitis, and (5) Acute Rhinitis due to Occupation or to Trauma.

(1) ACUTE CATARRHAL RHINITIS.—Synonyms: Acute Coryza, Cold in the Head, Acute Nasal Catarrh, etc.

This disease is an illustration of the simplest form of exudative inflammation occurring in a mucous membrane and affords us the most accessible illustration of such a process inasmuch as the changes occur under direct observation. Any special peculiarities which it presents are amply explained by the vascular mechanism of the nose, which calls for a somewhat extended consideration.

Vascular Mechanism of the Nose.—The vascular mechanism of the nose (and the glandular as well) is somewhat unique, and a full understanding of it is called

for in order to explain the sequence of various pathological changes. To the blood supply of the turbinates does this observation apply with special force. The larger arterioles are well supplied with muscular coats and lie in the deepest layers of the mucosa close to the bone. They give off branches which supply, by a network of capillaries, the periosteum, glands, and the epithelial layer. These capillaries are collected into veins which dilate into venous sinuses, the larger lacunæ of which are the deeper, while with them the superficial lacunæ (cortical network) communicate. These lacunæ again empty into the veins accompanying the primary arterioles into the periosteal layer. As a rule the capillaries do not enter directly into the sinuses but are at first collected into veins. It is a matter of doubt whether the arterioles empty directly into the sinuses, as is the case in the erectile tissues of the genital tract. There is in the nose nothing comparable to the tunica albuginea of the genitals to exert direct compression on the sinus contents.

These views as to anatomical structure are those of Zuckerkandl (as quoted by J. Wright), who also reminds us that the arteries enter the nose through various bony foramina along with the veins. If the artery dilate from any cause, such dilatation must compress the vein against the bony wall. While therefore the inflow of blood to the part supplied is increased, the outflow is diminished and engorgement results. Arterial contraction produces of course the reverse effect.

Another point deserves mention. Sections of the mucosa taken from infants show veins compressed between the parallel fibres of the periosteal layer and the elastic fibres and glands external thereto. It is here also evident that engorgement of the superficial tissues supplied by dilated arterial twigs will bring an increased pressure to bear against the vein and obstruct the outflow of blood. As a result of this general arrangement here and in the radical vessels there may be serous transudation, especially in the region of olfaction, without any necessary glandular intervention. It is estimated that under normal conditions this transudation amounts to one pint in twenty-four hours. Zuckerkandl has also described a special network of veins surrounding the glandular mouths in such a way that the engorgement of the former would necessarily close the latter. Wright believes that the foregoing facts clearly explain the phenomena of ordinary acute inflammations of the nasal mucosa. The first visible stage of a coryza is a nasal occlusion following upon vascular engorgement of the erectile bodies. A preceding vascular constriction is assumed, but this is problematical. Now with the blood-vessels all full and with the stimulation of the glands, we should expect the secretion of mucus to be discharged almost coincidently with the congestion; but this is not so, for secretion is scanty for the first few hours, and even for days it may be almost watery. Later, when vascular tension relaxes, it begins to assume a mucous character. Evidently this absence of secretion is due to the occlusion of the glandular conduits by the surrounding plexus of veins. The primary watery exudate comes by transudation directly from the blood-vessels through the areolar tissue and surface epithelium.

The contraction of the smooth muscle fibres and of the elastic fibres of the stroma contributes to the collapse of the venous sinuses, the floodgates of the radical veins being opened by the contraction of the encroaching arterioles. Expression of glandular contents follows, the glandular mouths having been opened by the subsidence of the superficial venous engorgement.

Causes of Acute Catarrhal Rhinitis.—These are predisposing and exciting. The former include the various diatheses, especially the syphilitic, rheumatic, and gouty. The existence of the uric acid or lithæmic state strongly predisposes to coryza. A patient who eats heartily of animal food and who does not take sufficient exercise is far more liable to "take cold" than is one leading an opposite life. Furthermore, the prevalent habits of living in overheated houses and of swaddling the body with too heavy clothing, especially the wearing of tippets, mufflers, etc., powerfully invite the very dangers they are popularly supposed to avert. The combined effect of the foregoing modes of life is easy to appreciate. The system is overloaded with nitrogenous food and elimination is deficient. As a result there is set up a sort of autotoxæmia ready to be fanned into open outbreak by any one of a large class of excitants. Excesses in alcohol, tobacco, and venery also predispose to coryza.

The exciting cause is generally exposure of some kind, wet feet, draughts, standing or sitting in a cool place when the skin is covered with perspiration. Often a localized exposure, such as a draught through a partially open door or window, seems to act more powerfully than a general exposure. The amount of moisture in the air, as well as its temperature, requires consideration. A combination of cold and moist air offers the most favorable conditions for exciting an attack.

Coryza may be a symptomatic lesion in many general diseases, *e.g.*, measles, scarlatina, smallpox, scurvy, whooping-cough, typhoid fever, influenza, diphtheria, diabetes, erysipelas, and rheumatism. The affection under these circumstances offers no pathological or clinical peculiarities.

Pathology.—At first the nose is dry, but after a few hours a serous discharge comes on, and in the course of a day or so becomes very abundant. As the disease progresses it becomes mucous and finally muco-purulent. It may consist of almost pure yellowish pus. Later, it lessens and at last ceases, and the patient is well again. No special bacteriology attaches to the affection. The discharge contains the usual micro-organisms which have their habitat in the nose. They are relatively, as well as absolutely, increased in quantity. Lennox Browne refers the yellow color of the later secretion to the staphylococcus pyogenes aureus, which he says exists under these conditions in nearly pure culture.

Symptoms.—An attack commences with a sense of nasal occlusion, burning, tickling, and occasional sneezing. Later come headache, mild general malaise, fever, pains in the eyes and over the regions corresponding to the various accessory sinuses. These pains may be due to direct extension of the inflammatory process into the sinus linings or to their occlusion and consequent impaired ventilation. This extension of the inflammation to the sinuses explains the large amount of discharge regularly present, for it is difficult to believe that the quantity of muco-pus voided in a severe coryza can come from the lining of the nasal fossæ alone. In an ordinary case the foregoing sequence of changes will extend over a period of from four to seven days, often longer.

Prognosis.—While the lesion is a comparatively trivial one, it must not be forgotten that frequent coryzas lay the foundation for subsequent hypertrophic changes and may possibly introduce some serious disease; they should therefore be promptly cared for.

Treatment.—This may be prophylactic, abortive, or palliative. Most of the patients who consult the physician for a cold in the head, commonly regarded as a trivial affair, do so because they are sufferers from an intermittent or continual series of such attacks. No sooner is one ended than another begins. For such patients a plain talk on the necessity of changing their mode of living is the first thing required. It will afford more satisfaction to both physician and patient than will drug administration. In season and out of season three things must be insisted on. (1st) Avoidance of too much animal food. Meat should be eaten only once a day. To the gouty the time-honored advice may be given of "no red meat and no vegetables taken from the ground"; (2d) proper daily exercise; (3d) proper care of the skin and the eliminative functions; this includes regulation of the bowels and daily bathing. Not every patient may be led to jump into a tub of cold water on rising, but every patient should go over the surface of the body daily with water. At first this may be tepid, but as tolerance is established the temperature should be lowered until the water is distinctly cool. Actual thermo-

metric figures are not so good a guide as the patient's sensations, for a personal equation is concerned in the sensation of coolness. In winter the bath should be taken in a room properly warmed, and in case a tub-bath be taken the patient should dry himself not standing in the water but on a bath-mat or rug. In this way much of the immediate chilliness after the bath and sluggishness of reaction can be avoided. Delicate patients may be advised to sponge one-half of the body on rising and the other half on retiring, the unbathed portion being clothed. Some fortitude may be required to inaugurate the process on the part of those who have never been properly trained in this respect, but they should be encouraged to persevere until a daily bath is taken on rising. *This is the time of the day in which to bathe, not at night.* If for any reason one wishes to take an old-fashioned hot-water and soap bath at bedtime, it should be followed by a cool affusion. One soap bath weekly is ordinarily sufficient for those who take daily ablutions. In all cases, after the bath and the application of the drying towel, there should be a vigorous application of the flesh-brush, or Turkish towel, "Luffa" sponge, etc., to promote reaction. Brisk, light gymnastic exercises may be employed by those whose reactive powers are deficient.

Finally comes the matter of proper body covering. Good stout shoes should be worn with felt or cork insoles if necessary. Rubbers should be regarded as a device of the enemy of good health. Of course in a heavy rainstorm they are permissible, but the habit some people have of wearing rubbers whenever the walks are the least damp is dangerous to health. Being practically air-tight, they prevent evaporation from the feet and elimination of waste material. With equal vigor a protest is uttered against all chest protectors and pads, also against the wearing of heavy furs, etc., unless they be immediately removed on coming in from the cold. Our prevalent habit of wearing our heavy wraps when inside the house is most reprehensible. The old saying that "sealskin sacks kill more people than does smallpox" is not far from the truth. The clothing next to the skin should be woollen, or at least contain a certain proportion of that substance. Some of the meshed garments of silk and linen are also commendable. There is no sense, however, in swathing the body in heavy woollen so as to bathe it almost constantly in perspiration. "Sanitary" woollens are sanitary only in so far as they conform to physiological laws, it matters not in what country they are made or whose name they bear. The so-called "union-suit," with vest and drawers made in one piece, is the ideal garment for both winter and summer, the weight being changed according to the season. Theoretically the same weight should be worn next to the skin the year round, the outer clothing varying to fit the season, but there are not many who will take the pains to live in this physiological manner. Some textiles are composed of a woollen layer covered on both sides with a cotton mesh. In this way the porous qualities of the woollen are retained without its irritating effect on the skin. So-called "medicated" underwear belongs to the category of "medicated" flannel and "medicated" toilet-paper. Excesses in alcohol, tobacco, etc., must be sternly interdicted.

If undue space seems to have been devoted to the foregoing directions, it must find its excuse in the writer's increasing experience that full directions in these respects will often render any drugs unnecessary.

In some instances it is possible to abort an ordinary coryza, but the efficiency of the countless measures devised for this end is conditioned upon their early employment. The combination of a hot drink with five grains of quinine and ten of Dover's powder is undoubtedly one of the most common. This aims at elimination by relaxation of the skin, in other words, at diaphoresis. The plan has the following objections: digestive activity is retarded and the biliary flow diminished, and with opium in full dosage there is also an increased reflex excitability. Full dosage of quinine checks oxidation, depresses the circulation, lowers body tempreature, and lessens perspiration. Under the conditions we are discussing, abstraction of water by heat is not sufficient to restore the bodily equilibrium. It is preferable to give a full dose of calomel, followed by small and frequent doses of quinine.

Many physicians use the familiar rhinitis or coryza tablet triturates. Familiar combinations are the Lincoln formula: Camphor gr. $\frac{1}{4}$, belladonna extract fl. ℥ $\frac{1}{4}$, and quinine sulphate gr. $\frac{1}{4}$; and the Edwards formula: Atropine sulphate gr. $\frac{1}{5\,6\,0}$, aconitine gr. $\frac{1}{5\,6\,0}$, morphine sulphate gr. $\frac{1}{1\,6\,0}$, and calomel gr. $\frac{1}{1\,0}$. Either or both of these may be taken hourly until physiological effects are manifest, when they must be continued at longer intervals.

Recently stress has been laid upon the autotoxæmia presented by many coryza patients, especially by those who are its frequent victims. These patients are sufferers from uric-acid excess. Hence the advice is given to put the patient through some vigorous exercise such as gymnasium work or a ride on horseback, etc., scour out the bowel (not merely give a light laxative) and then give full doses of the simple alkalies such as the bicarbonates of soda or potash until the urine is freely alkaline, the patient meanwhile going to bed for a day or so or at least remaining quiet. In the case of plethoric individuals this plan of treatment is far more efficacious than are the older methods. These latter aim at establishing relaxation and favoring elimination, but they take no account of the special underlying diathesis. In so far, they are but partially ideal remedies. Undoubtedly they are of service, but it must be remembered that coryza is not a long disease and will generally get well of itself. Moreover, they do not always abort an atack.

The Turkish bath has always enjoyed a high reputation for aborting coryza. If it be tried, the patient must keep in-doors for some time, and if practicable should remain at the bathing establishment over night.

In some instances the malady will yield to frequent applications, in the form of a spray, of the active principles of the suprarenal bodies (adrenalin), in say 1 to 2,000 solution. This contracts the vessels by its action on their unstriped muscular fibres. It must be added that some patients show a decided idiosyncrasy toward this remedy, and that while its immediate effect is in the line of relief there quickly comes a secondary relaxation, sometimes so severe that the patient's last state is worse than his first.

Palliative treatment consists in the thorough flushing out of the nares with some warm alkaline solution. It is doubtful whether the addition of distinctly antiseptic preparations is of much advantage. Normal salt solution or a mixture of salt, borax, and bicarbonate of soda, one teaspoonful of the mixture to the pint of lukewarm water, is as good as any. By such remedies the excess of secretion is removed from the nasal passages, and conditions are set up favoring a restoration to the normal. The smarting in the nares can be relieved by some such remedy as Ferrier's snuff (Morphine muriate gr. ij., powdered acaciæ ʒ ij., and bismuth subcarbonate ʒ vi.). A little of this may be insufflated every few hours. If the patient comes for office treatment, the nares may be cleansed with some alkaline solution, then sprayed with a little *weak* cocaine (not over two per cent.) and adrenalin, and this followed up with some oily preparation such as menthol in albolene, resorcin with benzoinol, weak camphor menthol, etc. Frequent sufferers with coryza should *never* be given cocaine solutions to be used at their own discretion.

Spiess insists that most of the sneezing in an ordinary coryza comes from a post-nasal irritation. He therefore advises the insufflation into this region of an anæsthetizing powder, such as orthoform 2 parts to sozoiodolate of soda 10 parts.

In the case of very young children a laxative should be given with a hot bath, and then they should be put to bed. Cocaine, if used at all, must be employed with the greatest caution. In infants the disease seems to be conveyed from one patient to another in the same family,

and consequently temporary isolation is advisable. Dentition and carious teeth seem to be predisposing causes. Difficulty in nursing is one of the most important features. For local treatment a weak menthol solution in albolene may be used, the application being made through a medicine dropper.

(2) Acute Purulent Rhinitis.—Synonyms: Blennorrhagic, Gonorrhœal Rhinitis.

The condition designated purulent rhinitis commonly occurs in children and runs a chronic course. There are, however, in both adults and children, cases of acute inflammation with the free discharge of almost pure pus. These are not to be confounded with sinus affections in which the nose serves merely as the conduit for the escape of discharges.

Causes.—The disease is essentially the expression of some form of infection. In very young children and babies a leucorrhœal discharge in the mother seems to be the infecting agent; in fact, most of the cases occurring in early life are due to this cause.

Pathology.—A high degree of inflammation of the mucosa exists with excoriations, and gonococci may be found in the discharge.

Symptoms.—If the child is only a few days old it begins to sneeze, while pus flows from the nares and excoriates the surrounding skin. This character of the discharge is in strong contrast to the earlier appearances of the discharge in a simple coryza. There is often a complicating purulent conjunctivitis and the inflammation may spread to the middle ear.

Treatment.—This consists in the thorough cleansing of the nasal passages with antiseptic washes. With young children the patient must be held in the upright position with the head slightly bent forward; otherwise some of the fluid may run down into the larynx and set up spasm. Boric-acid solutions are serviceable in the earlier stages and may be followed by slightly astringent combinations. The oleostearate of zinc serves as an efficient vehicle for medicinal agents. With adults, and even with children in whom the malady runs a longer course, it may be advisable to apply cocaine and then make a single application of silver nitrate, sixty grains to the ounce. This may be followed by a temporary increase in the discharge, but its ultimate effects are advantageous. Some of the newer silver salts find here a suitable field. We may mention protargol in ten-per-cent. solution and argonin in the same strength. The latter is said to lead to the early disappearance of the gonococcus, subsidence of discharge, and prompt restoration of tissue integrity. Of less value are argentamin and largin. With any of these, insufflations of some antiseptic powder, such as aristol, dermatol, nosophen, etc., may advantageously be combined.

(3) Acute Membranous Rhinitis.—By this designation we refer to that form of acute rhinitis in which we find a deposit of fibrin on the septum, on the turbinated bones, or on both.

Causes.—A consideration of the causes at once sharply divides the cases into (1st) those due to the Klebs-Loeffler bacillus (nasal diphtheria) and (2d) those due to various other micro-organisms, pus- and fibrin-producing cocci, especially the staphylococcus, streptococcus, bacillus coli, and pneumococcus. A French observer reports several cases due to the bacillus of hog septicæmia. Solutions of continuity of the intranasal tissues naturally predispose to and invite infection. The latter is not so common in the nares as might be at first supposed, for it must be remembered that there is a constant serous outpouring which cleanses the tissues, that the passages are continually flushed with air, and that the cilia of the epithelial cells tend to ward off all deleterious physical agents.

Pathology.—In membranous rhinitis the whole thickness of the mucosa becomes congested and swollen. There are an emigration of leucocytes and exudation of plasma from the vessels. Hence there is formed fibrin which infiltrates the interstices of the connective-tissue elements of the mucosa, and also arranges itself as a membrane on its surface. At times there is a superficial coagulation necrosis of the superficial layers of the epithelium. Under these circumstances the membrane is formed, not of true fibrin and pus, but of necrotic epithelium alone. In most cases the combined effect of vascular congestion and pressure of the exudate is sufficient to starve out a portion of the mucosa involved, and thus sloughs are formed, the separation of which gives the familiar ulcer.

It is thus seen that the process is identical with membrane formation anywhere, and that the appearance is the same no matter what the exact exciting cause. Frequently there is partial organization of the membrane, in the sense that it becomes laminated, permeated with leucocytes and epithelial cells, and presents partial vascularization. The areas most frequently affected are the faces of the inferior and middle turbinates and the anterior portion of the septum.

Symptoms.—In many cases the onset of symptoms is not unlike that of an ordinary coryza. There is dryness of the nose followed by irritation and sneezing, with headache, fever, and general malaise. Next follow the group of symptoms referable to obstructed nasal breathing, anosmia, aprosexia, sore mouth from direct impact of air, paresis of the soft palate, leading to a muffled voice, etc. In other cases, and especially in young children, there is the typical appearance of a drooping child without any special features suggesting nasal trouble, unless perchance the stoppage of the nares or the appearance of a purulent discharge at the outset calls attention to that area.

Examination shows the mucosa covered with a false membrane of a whitish-gray color. Removal generally causes bleeding, but gentle manipulation may clear the membrane without this sequel. The membrane frequently exfoliates and re-forms, so that the process is extended over days and even weeks. The general health does not seem to be depleted so much as might be expected considering the nature of the lesion.

Diagnosis.—The question to be decided in the presence of a given case is, Is it diphtheritic or not? While typical cases of the two conditions may present sharply defined boundaries, there are many in which the diagnosis can be made only by the culture test. There has been much discussion as to whether there are really two distinct affections or whether all are not true diphtheria with a bacillus of diminished virulency in the milder cases. Wishart has divided the partisans on this matter into three groups: (1st) Those who consider diphtheria and membranous rhinitis to be distinct affections; (2d) those who consider that there is but one disease, but that the degree of contagiousness so varies that we may safely neglect to isolate such cases as offer no clinical or bacteriological evidence of diphtheria; and (3d) those who would isolate every case. (It may be added that Wishart does not believe in the duality of the disease and advises isolation under all circumstances.)

Out of ninety-eight cases collected by this observer from various sources and reported as membranous rhinitis, sixty-nine showed the Klebs-Loeffler bacillus. E. Mayer notes that the earlier in the disease the test is made the more likely are the bacilli to be found. In the light of our present knowledge, then, the differential diagnosis in a doutbful case is to be made by the culture test. Some cases are found in which no Klebs-Loeffler bacilli are met, yet there is incontrovertible evidence that such cases have spread contagion to others and that the membrane in the secondary cases *has* shown the bacilli. A possible explanation would be that the bacilli were overlooked in the primary cases; but this experience has happened to some of our most careful bacteriologists. If culture media are not at hand, we must rely upon the general clinical features of the disease. Factors suggesting the presence of true diphtheria would be a history of exposure, coexisting deposits in the throat, swelling of the cervical glands, distinctly fetid odor from the nose, a marked constitutional involvement, and an offensive discharge excoriating the surrounding skin. Not

much reliance, however, can be placed on the degree of severity of constitutional symptoms. The occurrence of albuminuria and the development of paralysis would also bear in the direction of diphtheria. The opposites of the factors just enumerated would suggest mere coccus rhinitis.

Nasal diphtheria has always been regarded as a most malignant form of the disease, and this view still holds in those cases in which the deposit begins in the throat and spreads to the nose. But we see at the present time cases of true diphtheria with the deposit confined to the nasal mucosa and in which the constitutional symptoms are very mild. In this connection reference may be made to some recent studies by R. O. Neumann concerning the forms under which nasal diphtheria may occur. He has several times seen cases in which apparently simple coryza was due to the diphtheria bacillus. In many instances the general symptoms produced were more marked than those of a simple coryza, but very much less marked than in an ordinary case of diphtheria. The discharge from the nose was sometimes sero-purulent, sometimes markedly purulent. Neumann comes to the following conclusions from his study: Simple rhinitis, associated with virulent diphtheria bacilli, is much more frequent than is commonly supposed. The symptoms of this disease are not always the same. It comes on very often in a very mild form and may even be unobserved by the patient. It is quite in contrast with the so-called rhinitis fibrinosa, as there is no formation of membrane. Both forms exist upon a similar basis, so that one should not speak of them as two different diseases; they should be divided into nasal diphtheria with membrane formation, and nasal diphtheria without membrane formation. If the fact be considered that not only rhinitis fibrinosa, but also nasal diphtheria, especially the last, may serve as a focus of contagion for the surrounding neighborhood, it would be wise to investigate bacteriologically all doubtful cases of coryza.

Prognosis.—This is always good, although after either form there may be an anæmia, especially in those living in bad surroundings. Either type of the disease may attack all classes in society.

Treatment.—As a matter of precaution every case of membranous rhinitis should be isolated until a culture test can be made. In other words, it is better to consider all cases diphtheritic until the contrary is definitely shown to be true. If the Klebs-Loeffler bacilli are found, full antitoxin dosage should be administered and the usual hygienic and quarantine measures instituted. If the test is negative, we may give calomel in half-grain doses every four hours until five grains are taken. This is given with a view of aborting the membranous formation which in young children is apt to accumulate rapidly and be very thick. For the purpose of counteracting hyperinosis we may give to a child of five years, eight to ten minims of the muriated iron tincture in glycerin, every three hours. For local applications nearly every antiseptic in use has been at some time suggested. The systematic use of any one is preferable to the desultory and changing use of several. The nares should be cleansed with a warm alkaline spray, and if there is much tenacious secretion it may be loosened up with equal parts of hydrogen peroxide and lime water. If the membrane shows the least tendency to exfoliate, this should be assisted by gentle manipulation and the passages should be carefully dried with antiseptic cotton. Then it is well to apply pure iron tincture by means of a swab and to follow it by the insufflation of some powder, as iodol, aristol, nosophen, etc. Iodoform emulsion has also been suggested.

(4) Acute Phlegmonous Rhinitis.—This is a process attended with the localized formation of pus, generally in the deeper layers of the mucosa and submucosa covering the septum, and it generally presents itself under the form of the familiar septal abscess. One or two instances of abscess in the mucosa covering the turbinated bones are recorded, but in such cases the abscess has been caused by the burrowing of pus from the maxillary sinus; so also dentists have found a purulent collection on the nasal floor from some tooth abnormality, but these cases are so rare that they need not be considered here.

Causes.—Septal abscess is practically always referable to some trauma, as from a blow or a fall. Other possible causes are some intranasal operation and infection in measles, scarlatina, diptheria, erysipelas, and typhoid.

Pathology.—Following the trauma there is an effusion of blood into the tissues (hæmatoma), and this effusion may separate the two lamellæ of the cartilage. The initial injury may have been so slight as to escape notice and yet lead eventually to abscess. If the effusion is small it becomes absorbed; if it is large, absorption is but partial and is followed by the breaking down of the remains of the clot and formation of pus in the usual manner.

Symptoms.—These naturally follow from the history of the case. There is the initial pain of the injury followed by swelling of the external parts and nasal occlusion, unilateral or bilateral. The outer swelling subsides, while nasal occlusion persists, and, in case of abscess, the formation of pus is accompanied by burning and irritation with perhaps a slight general febrile movement and malaise. Examination reveals on one or both sides a tense, bulging swelling, soft on palpation, and with evidences of severe local inflammation.

Diagnosis.—The use of the probe will differentiate the swelling from the turbinated bones and from all forms of tumors projecting down from points of attachment higher up in the nares. The swelling does not subside under cocaine. Spontaneous rupture never occurs. Any unilateral purulent discharge from the nose suggests sinus disease or a foreign body. The history of the case will generally clear up all doubt as to the nature of the lesion.

Treatment.—Cases of recent trauma in which abscess seems threatened may be treated with ice compresses over the nose, while iodine tincture or five-per-cent. carbolic solution may be applied directly to the septal mucosa. As soon as the presence of pus is determined, the latter should be evacuated by free incision on both sides of the septum, as the abscess contents are apt to form a pocket. The cavity is syringed with hydrogen peroxide and a warm alkaline solution. A delicate strip of antiseptic gauze is then carried to the bottom of the cavity to provide for drainage. This should be changed in twenty-four hours. This dressing provides for healing from the bottom; otherwise the cavity may refill. With a view of maintaining the patency of the incision, it has been recommended that the latter should be made with the galvano-cautery knife. If the case is one of any duration, the pus will have a very foul odor. Subsequent cleanliness is all that is required.

It must be borne in mind that the initial escape of blood may be between the perichondrium and the cartilage or between the two cartilaginous plates which are united by a diploëtic structure. The cartilage may fracture, allowing a communication between the two nares. In case the contents of the cavity are at all grumous it is well gently to curette through the incision and remove all necrotic particles. If the perichondrium remains, the cartilage will be reproduced. Perforation may occur. It is well to be cautious in promising a perfectly normal contour of the nose after healing is complete, for some cases show a slight depression just behind the tip.

Another condition quite rare but requiring mention in this connection is that known as acute serous perichondritis of the nasal septum. While perichondrial inflammations are, as we have seen, common enough after trauma, there is a form of inflammation which develops in this locality without known cause. It must be due to some form of infection, though the time and mode of entrance of the infecting agent cannot be determined. The clinical history is somewhat as follows:

The first symptom is nasal stoppage, gradually increasing and attended with the phenomena of local inflammation. At times there are mild general symptoms. Examination reveals the septum swollen on one or both

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 manœuvre. 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 of 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 alumnol 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 children 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 anæmia 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 muco-purulent 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 potassum 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 anæsthetized with cocaine, it should be cauterized with a flat guarded electrode with sufficient thorough-