

appear the symptoms of laryngeal obstruction. The hoarseness has become fixed, and the cough assumes a clanging, metallic, or "croupy" character, rapidly changing to a stridulous, husky, and toneless sound. Now and then, on sudden, deep inspiration, there is still the peculiar whoop, but the voice becomes more and more husky. Dyspnoea now comes on. The respirations increase in frequency, and are seen to be so labored as to require the aid of all the muscles. The child can not lie down. If, exhausted by the efforts made, the child seeks repose, resting its head high upon a pillow, it soon starts up in a fright, breathing more heavily, and with a shrill, whistling inspiration. Tossing from side to side, he seeks, in endless changes of position, for the relief which no change brings. With open mouth, rapidly working alæ of the nose, and every respiratory muscle called into play, he exerts himself to the utmost to obtain the necessary air, but ineffectually, the lower portion of the chest being drawn in deeply with each inspiration. The air passes with difficulty through the narrowed chink of the glottis, and hence the slowness, and the whistling, crowing, and stridulous inspirations, which can be heard at quite a distance from the patient. Ultimately the narrowing of the glottis is such that expiration becomes difficult and somewhat noisy. To the difficulty of breathing from the swelling of the mucosa and the presence of the false membrane are now added paroxysmal attacks of spasm of the glottis. When these attacks come on, suffocation seems imminent. The child, who has been restless when these seizures are felt, tosses wildly about with an agonized expression, tears at his throat to remove some obstacle, the face cyanosed, the alæ of the nose widely separated, the inspiratory efforts gasping, and the muscles working to their utmost, the body covered with a profuse sweat from the intensity of the exertions; and at last, when death seems at hand, a little air enters the chest, the breathing becomes somewhat easier, and the child, exhausted and stupefied by the carbonic acid which is accumulating, drops into a fitful sleep of a few minutes' duration. These suffocative attacks appear at shorter intervals. By some these attacks are supposed to be due to a paresis of the laryngeal muscles instead of spasm, and Steiner supports the opinions of Niemeyer on this point. In some cases there occur decided remissions between the attacks of suffocative dyspnoea. Considerable portions of false membrane being expelled, air again enters the lungs; the cyanosis disappears, the fever ceases, and some refreshing sleep is obtained. As the false membrane is renewed again, the former difficulties are resumed; the breathing becomes difficult, and the suffocative attacks even more violent. Sometimes a mass of exudation is suddenly detached and thrown against the under surface of the vocal cords; breathing is suspended, the child turns deeply blue in the face, and violent coughing sets in, detaching the mass, and either carrying it down by inspiration, or outward by an

explosive cough. In the cases which tend to a favorable termination, the appearances of improvement, noted between the suffocative attacks, are maintained. The paroxysms of suffocation become less frequent, and the constant dyspnoea visibly lessens; the cough has less and less of the barking character, and the expectoration is more abundant and looser; the fever disappears; the voice gradually passes from toneless to husky and loud; sneezing occurs, and the nose discharges. If, instead of improvement, the case goes on as usual to a fatal termination, the final stage of *asphyxia*, or carbonic-acid poisoning, is now entered on. The cyanosis deepens, the agonized expression of countenance is replaced by indifference, drowsiness, and stupor, the eye grows dull and is nearly closed, the difficulty of breathing continues, and the respirations are frequent and shallow, but without the whistling and stridor. Now and then a paroxysm of dyspnoea comes on, in which the child is roused from its somnolent condition, gasps for breath, struggles, and then lies down, passing at once into an apathetic state. The symptoms of vital failure now come on: the pulse becomes rapid and weak; a cold, clammy sweat covers the body; the extremities are cold, the somnolence deepens into stupor and insensibility, carpopedal contractions occur, and sometimes general convulsions.

Course, Duration, and Termination.—The first stage, characterized by the symptoms of laryngeal catarrh, runs its course in twenty-four to thirty-six hours. The fulminant cases, beginning abruptly at the second stage, with its symptoms of laryngeal stenosis, will terminate fatally within two days, and sometimes within one day. The usual duration of ordinary cases is about one week, and rarely do cases extend to ten days. The second stage may continue from one to fourteen days, but the latter duration must be regarded as exceptional. The third—the stage of asphyxia—lasts from thirty-six to forty-eight hours. In most of the cases the cause of death is general paralysis, due to carbonic-acid poisoning. Very rarely is death caused by apnoea, the access of air prevented by closure of the glottis with shreds of false membrane, or by spasm. Œdema of the glottis, croupous pneumonia, œdema of the lungs, or capillary bronchitis, may be a cause of death.

Diagnosis.—Until the characteristic membranous formation appears in the throat, croupous laryngitis may be confounded with pseudo-croup or laryngismus stridulus. The latter occurs frequently in some children, comes on suddenly in the night, and after a few hours ceases to give trouble. True croup develops more slowly and does not present the apparent laryngeal obstruction of false croup until the case is well advanced. The fulminant form, it is true, begins abruptly and with violence, but there is no amelioration in the condition as in pseudo-croup. The most certain means of diagnosis consists in the discovery

of the exudation, which soon appears after the initial symptoms are well declared.

Treatment.—The means employed in the treatment of membranous laryngitis are naturally divisible into two classes—local, systemic. An almost infinite variety of remedies have been applied to the throat: we mention those that are really useful. Caustic applications, as nitrate of silver, the mineral acids, etc., are injurious; for, although they may remove the existing membrane, they can not prevent its reformation, and the extension of the exudation is invited to the healthy tissue corroded by the caustic. Solvents that are not irritating are most useful. The first and most important one is lime-water, which may be applied by a large soft probang, or atomized by a spray douche. The application of the spray should be nearly continuous; of the probang, frequent. An excellent method consists in slaking bits of freshly burned lime in water placed in a wide-mouthed bottle—the patient inhaling the vapor as it arises. Next to lime-water is lactic acid, as a solvent, and it is as safe as it is efficient. Sufficient of the acid should be added to water until a distinctly sour solution is obtained, and this may be freely applied by the spray douche or probang. Recent reports are very favorable to washed sulphur or sublimed sulphur freely dusted over the affected parts in diphtheria. Chlorate of potassa is preferred by many, either atomized or on probang or brush; it is also used with chloride-of-iron tincture, or the latter, undiluted, is applied on a camel's-hair brush to the false membrane and fauces. The bromides of potassium and ammonium, in solution, are also sprayed over the throat and fauces. Good results have been claimed for a mixture of fluid extract of belladonna and the bromides in solution, used in the same way, a continuous application of the spray for hours at a time, or until the pupils are affected. It is claimed for this mixture that the belladonna allays the spasms of the glottis. A solution of chloral has been employed as a local application, both for its antiseptic effects and as a moderator of the reflex spasms of the laryngeal muscles. The air of the apartment should be kept moist with the vapor of water, or impregnated with the vapors of eucalyptus and turpentine oils, which can be accomplished by boiling in a suitable vessel some eucalyptus leaves with turpentine. This expedient has been found to be exceedingly useful in the Children's Hospital at Lisle.* The internal remedies are equally numerous. There are three main objects to be kept in view in the treatment of true croup: to detach, remove, and prevent the formation of the false membrane; to prevent the attacks of laryngeal spasms; to maintain the strength. Quinine, calomel, chlorate of potassa, tincture of iron, and the bromides, are recommended, and some of them much lauded by their respective proposers. There are

* "Journal de Therapeutique," February, 1886.

two of unquestionable utility—quinine and bromide of ammonium. Quinine should be administered in full doses (for a child, three to five grains every three or four hours). Cinchonism should be kept up as fully as possible, with the object to stop the fibrinous exudation. In alternation with quinine, or by itself, should be administered full doses of bromide of ammonium. The particular fact which gives value to this and the other bromides is its elimination by the bronchial and faucial mucous membrane, thus acting locally. Furthermore, quinine and the bromides check the spasm of the laryngeal muscles, a most important action. The mechanical effect of an active emetic is often necessary to dislodge the obstructing membrane. Apomorphine is especially effective for this purpose. Ipecac is too depressing, tartar emetic is highly objectionable; alum and subsulphate of mercury are the best. According to Barker, of New York, the subsulphate has special power as a remedy for croup, an opinion in which the author is disposed to share. It should be given early, and not wait for severe obstruction. Besides the agents above advised—quinine and the bromides—for the laryngeal spasms chloral is to be commended. The author has preferred to give chloral and bromide of ammonium together, and the quinine separately. Besides its power to allay the spasms, chloral is one of the few remedies which possess the property to check the formation of an exudation. Many practitioners hold that chlorate of potassa has this property (Steiner), and this remedy is probably more largely prescribed than any other in croup and diphtheria. There are practitioners who still hold to the aplastic virtues of calomel, and use this remedy in large doses, with asserted success, but the most approved authorities are opposed to both opinion and practice (Oppolzer, Steiner). The measures to maintain the strength are very important. Alcoholic stimulants possess, according to the Brooklyn physicians, some peculiar, possibly specific curative power. It is alleged that the best results are obtained in diphtheria by large and sustained administration of whisky, brandy, etc. How far these facts are applicable to true croup remains to be determined.

CORYZA—NASAL CATARRH.

Definition.—By the term *coryza* is meant a catarrhal inflammation of the nasal mucous membrane. It may be either *acute* or *chronic*.

Causes.—Atmospherical causes are the most frequent and influential. The exposure of the neck to a current of cold air, of the feet and ankles to cold and dampness, passing from a warm to a cold atmosphere, and from a cold to a warm atmosphere suddenly, are among the most usual causes. Irritating gases and vapors, the spores of some plants, certain powders, as ipecac, tobacco, etc., excite an irritation of the nasal mucous membrane. Heredity is an occa-

sional factor. Epidemic influence now and then prevails on an extensive scale.

Pathological Anatomy.—An intense hyperæmia is the first change, with an arrest of secretion. This is soon followed by swelling or tumefaction of the membrane; the epithelium is detached, and a great number of new cells are produced. The mucous glands furnish an abundant secretion very rich in saline constituents. If the congestion is intense, vessels are ruptured, and more or less epistaxis results. With the progress of the case, a change occurs in the character of the discharge; at first watery and transparent, it becomes thicker and opaque with the increase of the pus-cells (leucocytes). When recovery takes place, the secretion diminishes, the congestion subsides, and the swelling of the membrane disappears. Such is the usual course of an acute inflammation. In the chronic form, the mucous membrane is reddish-brown, in very old cases grayish, the veins are dilated and varicose, often forming polypoid protrusions. There may be more or less extensive ulceration, and losses of substance, in old cases. The discharge is thick, greenish, and often offensive from decomposition. Large collections of inspissated mucus form on the turbinated bones.

Symptoms.—Taking cold in the head is announced by chilliness, weariness, headache, and general muscular soreness. The nares are dry, feel stuffed and uncomfortable, and an inclination to sneeze is often felt. Presently the nose pours out an abundant watery and saline discharge, the anterior nares are red and inflamed, and sneezing is frequent. The discharge soon assumes a purulent character, and contains numerous micrococci. The voice has a peculiar tone, rather nasal and muffled from the swelling of the nasal mucous membrane. In a few days the swelling subsides, the secretion lessens, and health is restored in about two weeks from the beginning of the attack. The chronic form may grow immediately out of the acute affection, or it may be the result of repeated acute attacks, or develop from the continued operation of the causes. In the chronic form of the disease, the mucous membrane is either livid, the vessels varicose, and the connective-tissue basis of the mucous membrane hypertrophied, or the membrane is pale, thin, bloodless, and atrophied. The discharge consists of greenish, offensive pus, or of scales taking the form of casts of the bones, which are also offensive from decomposition. If the mucous membrane is destroyed by ulcerations, and caries of the bones has occurred, the case is then called *ozæna*. The morbid process extends through the nasal passages and into neighboring cavities.

Course, Duration, and Termination.—The acute form reaches its maximum in a few days, and terminates in from fourteen to sixteen days if uninterfered with. The chronic form is excessively obstinate, and continues with varying fortunes for several years. During the summer and autumn it is milder, but in the winter and spring it

is worse. Although there is no danger to life, the disease in its chronic form is difficult to cure. The popular notion that extension to the lungs takes place is entirely unfounded. In the phthisical, the coexistence of nasal catarrh and the pulmonary lesions, which is very common, is often supposed to mean the dependence of the latter on the former.

Treatment.—An existing constitutional dyscrasia, especially syphilis, needs attention. If the least suspicion may be entertained, an iodide-of-potassium course should be carried out. Where there is a strumous diathesis, cod-liver oil, the phosphates, iodide of iron, etc., should be employed. If we have to deal with an attack of acute catarrh, an attempt may be made, and will often prove successful, to abort it by the administration of a full dose of quinine and morphine (for an adult, gr. xv of quinine and gr. ss. of morphine). When established, the best remedy is Lugol's solution, one drop every hour or two. If there is fever, one drop of tincture of aconite-root every hour will prove efficient. If the secretion is watery and profuse, tincture of belladonna may be given with the aconite, two drops every two hours. In the local treatment of chronic catarrh, the first step necessary is to clear the mucous surface of adherent discharges. The nasal douche, so much employed, has so often given rise to inflammation of the middle ear, by forcing the application into the Eustachian tube, that it must be used with caution. The post-nasal syringe and tepid water containing a little common salt are the best materials for cleansing the passage. Numerous are the kinds and forms of applications—gaseous, liquid, and solid. The volatile applications consist chiefly of iodine and carbolic acid, separately or in combination. The tincture of iodine and carbolic acid may readily be volatilized and inhaled from a small bottle. Still more generally successful is the introduction of a cocaine tablet. Containing $\frac{1}{4}$ th or $\frac{1}{8}$ th grain in the form of a flattened disk, the tablet is introduced alongside the septum, where it is allowed to dissolve, the head being inclined backward to permit the medicament to apply itself to the affected surface. One should be introduced on each side of the nares, twice or three times a day. The effect is usually prompt and complete. These tablets are the more effective the earlier they are applied. The liquid applications consist of solutions of chlorate of potassa, chloride of ammonium, sulphates of zinc, cadmium, and copper, acetate of lead, etc. The solutions must be very dilute, not stronger than one grain of sulphate of zinc to four ounces of water, for example, because of the very sensitive condition of these parts. When there are great thickening and ulceration, requiring strong applications, they must be made with the guidance of the mirror, and be confined to the part diseased. The most effective application, according to the author's experience, is a powder composed of tannin and iodoform (3 j—gr. x) applied by means of an insufflator. The membrane must be first cleansed, then the powder is dusted over the diseased

part, using a very small quantity. Pressure by means of a graduated series of bougies is a valuable mode of treating those cases in which the membrane is much thickened.

EPISTAXIS—NASAL HÆMORRHAGE.

Causes.—The Schneiderian mucous membrane is abundantly supplied with blood-vessels and bleeds easily. *Epistaxis* may be caused by ulceration of the membrane, by vascular tumors, by traumatism, by a constitutional state—the hæmorrhagic diathesis—by irritation of the mucous membrane, and by mechanical causes, as valvular disease of the heart, and the pressure of an intra-cranial growth, etc.

Symptoms.—There may be a sense of fullness of the head, headache, noises in the ears, vertigo, precede the epistaxis, and be relieved by it, or the bleeding may occur without any previous symptom to indicate its approach. The blood may at first be observed on the handkerchief; a sense of moisture about the nares suggests the necessity of blowing the nose, and then blood is seen coming drop by drop, and from a single nostril. The blood may be discharged by the posterior nares and be expectorated. On inspection of the fauces, it will be seen trickling down the soft palate and uvula, which will prevent the mistake of supposing it comes from the lungs. The quantity of blood discharged varies greatly. In most cases an ounce or two is lost, when the flow spontaneously ceases; again, many ounces—a pint, a quart even—may be lost, completely blanching the patient, and only ceasing because of the faintness. If the bleeding occur in a subject of the hæmorrhagic diathesis, it may continue to faintness and be resumed again as soon as the circulation regains its force. Under these circumstances epistaxis may endanger life. Again, epistaxis may occur periodically, as a manifestation of malaria, or take the place, vicariously, of the menstrual or hæmorrhoidal flux. Those cases due to the pressure of a tumor on the cavernous sinus, or pterygoid plexus, are accompanied by swelling of the eyelids, injections of the eyes, retinal changes, and the symptoms proper to tumor of the brain.

Diagnosis.—There can be no difficulty, if the inspection is made when the blood is flowing, in determining the source of the hæmorrhage. When, however, the bleeding occurs in sleep, from the posterior nares, and is swallowed, there may be, if vomiting of the blood occurs, much difficulty in ascertaining the true source. But the absence of any evidence of stomach ulcer and the occasional occurrence of nose-bleed will suggest the means of differentiation. The same method of analysis will be equally applicable to the apparent expectoration of blood, for the absence of pulmonary disease and the occasional occurrence of epistaxis will decide the probability in favor of bleeding at the nose.

Treatment.—The application of cold, in the form of ice, small pellets of which may be introduced into the nares, while a block of ice hollowed out to fit the nose may be put on outside, will often be sufficient to arrest the bleeding. Pressure on the artery supplying the anterior nares may be easily effected by passing the little finger under the lip, near the middle line where the artery may be felt. Simply pressing the nares together, to enable the blood to coagulate, may often suffice. If pressure and cold fail, a solution of tannic acid, or of alum, or of acetate of lead, may be thrown into the nares, and, if these fail, a solution of Monsel's salts. The measures above advised may be supplemented by the hypodermatic injection of ergotin, if necessary, and by the stomachal administration of arterial sedatives, as *veratrum viride* and *digitalis*. All other expedients failing, the posterior nares must be plugged.

DISEASES OF THE KIDNEY.

THE URINE—ITS COMPOSITION AND PATHOGENIC RELATIONS.

Organic and Inorganic Constituents.—The urine is a complex fluid which represents the waste of certain organic and inorganic constituents of the body. Full knowledge of its composition is, therefore, necessary to comprehend the metabolism of the tissues. Also, as the urine contains the products of the pathological changes occurring in the kidney, it is obvious that, to know these processes aright, it is imperative to ascertain the variations from its normal composition and character.

A healthy, fully developed adult passes from forty to fifty ounces of urine in twenty-four hours. But the quantity must always be considered relatively to the quality, or the urinary water must stand in a certain ratio to the urinary solids. In round numbers, the quantity of solid matter contained in normal urine is about 4 per cent. A simple rule for approximately determining the amount of solids in any given sample consists in doubling the last two figures of the specific gravity. Thus, if the specific gravity be 1,020, by multiplying 20 by 2, we have 40—or 40 parts in 1,000, which is 4 per cent. The whole amount of urinary solids excreted in twenty-four hours is, hence, merely a question of proportion: for example, if 40 parts of solids be contained in 1,000 parts of urine, how much in the daily quantity of urine discharged in the case under consideration?