

Movable Kidney, etc., with an outline that may include relaxation of a part or of the whole of the abdominal viscera. The physician is all too prone to simply note the most offending or conspicuously disturbed organ instead of carefully analyzing all the features, great and trivial, that may be either apparent or marked. A general relaxation of the abdominal and pelvic organs may be found, and a nearly complete restoration take place under treatment, but still a lacerated perineum may have to be repaired before a cure is completed. Or it may be in a general abdominal ptosis that a floating kidney will resist all measures for restoration, short of surgery, and before much improvement can be obtained the kidney will have to be stitched into place. An enlarged liver may crowd the kidney out of place or a transverse colon may prolapse and drag on contiguous tissues and still the annoying symptoms be referred elsewhere. Then the primal point of general relaxation may not be in one organ, but there may be a simultaneous displacement of several.

The thorax itself may be distorted from various diseases so that the chest is narrowed, the diaphragm displaced with consequent descension of the abdominal organs, and from the latter a displacement of the pelvic.

"Far down displacement, marked changes of form, and real disfigurements of the stomach are found in some cases of kyphosis and scolio-kyphosis."¹ The osteopath will not only find this true in some cases, but in many cases, although he recognizes as causative factors injuries to the spine causing curvatures and postural defects as prolific sources of abdominal relaxation.

"Glenard's whole theory of splanchnoptosia is based on the relaxation of the suspensory ligaments of the intestines, especially that of the transverse colon; and Stiller, the discoverer of the floating tenth rib, says that splanchnoptosia is a descent of the atonic stomach, of the colon (especially the transverse portion), of the kidney (the right or both kidneys), exceptionally of the liver or the spleen. A descent which has been developed mostly in tender age, in consequence of general relaxation, especially of the peritoneal suspensory ligaments in individuals with congenital general dyspeptic neurasthenia, tender muscles, lean habit, and slender bone structure, manifested in a higher degree by a floating tenth rib." Stiller observed that when there is a floating tenth rib there is a displaced stomach and a floating kidney, although it is not found in every case, but never missing if the case is pronounced. The tenth ribs in these cases have only a ligamentous fastening and are as freely movable as the eleventh and twelfth.

1. Rose and Kemp—Atonia Gastrica.

That abdominal relaxation plays a very important part in many diseases of the abdominal and pelvic organs, in cardiac and pulmonary affections, disturbs the circulation in the legs, and is the source of many reflex affections no one can gainsay. The osteopath should always pay particular attention to tonic condition of the abdominal viscera, for relaxation of the suspensory tissues and walls, and atony and sluggishness of the organs are frequently paramount etiological factors. And the osteopathic treatment is the remedy par excellence.

SKIN DISEASES

Various skin diseases have been treated osteopathically with varying success. So much depends upon the cause of the disturbance and its removal, in skin diseases, that the cure does not rest so much with the mere treatment, as with the necessary skill in locating the disturbing factor. One has to be continually on his guard to locate external irritations and disorders of the digestive and genito-urinary tracts. A great deal depends upon the avoidance of external influences; eating nutritious food and having an unobstructed circulation. The leading object of osteopathic treatment is to free the circulation and thus promote a healthy and unobstructed flow of blood; in no other class of diseases is this more essential than in skin diseases. After the removal of cutaneous irritations and the correction of internal disorders, the cure of the case depends upon the removal of constrictions to the cutaneous blood-vessels. The osteopath corrects the lesions found, relaxes the muscles thoroughly and stimulates the circulation to the parts involved, and promotes a healthy activity of all the excretory organs. When the upper part of the body is affected, lesions are generally found at the atlas and axis, and when the lower part of the body is affected, lesions at the fifth lumbar are of common occurrence, although lesions may be located at various points corresponding with the seat of disturbance. The constant use of hot baths will be found a helpful measure in many skin diseases. But use of soap must be considered as too much alkali will neutralize the oil of the skin and cause undue dryness, but bran may be substituted to advantage. Cleanliness is necessary but the result sought is, also, flushing the cutaneous vessels. There are many cases where a specific vertebral lesion will cause, through the peripheral nerves, a cutaneous irritation with intense itching and discomfort. This, in turn, produces an exudate with or without a crust and a condition results which is not amenable to any local or constitutional treatment but an adjustment of the lesion will in most cases bring immediate relief. Application of this principle will aid greatly in treatment of any skin disease. In no disturbance of health is it more necessary to find the cause than in skin disease and once found to apply specific treatment.

Eczema is frequently met in osteopathic practice. It is the most common form of skin disease, comprising nearly one-third of all these disorders. For a differential diagnosis of the several varieties the student is referred to special texts. It is well to remember that the same underlying causes may be basic to the various forms, for several varieties may

occur at the same time or one variety pass into another, though commonly one form is more prevalent. The limbs, face and genitalia are the most common sites, though the eruption may occur on various parts of the body.

Etiology includes a number of factors, constitutional and local. Dietetic errors, indigestion and faulty elimination comprise the principal underlying causes, often manifested through absorption of toxins and leucomains. In fact any disorder of the abdominal viscera, organic or functional, may be a predisposing factor, likewise various disorders of the pelvis, tuberculosis, diabetes, anemia, etc. should be considered. So-called gouty and rheumatic tendencies may be the constitutional basis.

The many osteopathic lesions play a very important role in lowering not only systemic resistance but of local tissue as well. This feature can not be over-emphasized.

Then local irritants, mechanical, chemical and thermal, are not to be neglected. These are usually of secondary importance. Micro-organisms are probably a complicating factor after the lowered resistance has been established. Vasomotor neurosis, through constitutional defects, toxins and the very significant osteopathic lesion, is probably an essential part of the pathogenesis.

Treatment is usually successful if the various etiologic factors are eradicated. Early treatment is very important. If the disorder is of more than local significance change the entire daily regimen of the patient. Diet, out-door exercise and sufficient sleep should be definitely regulated. A certain amount of general treatment to improve digestion, assimilation and elimination is imperative. An unbalanced diet and over eating must be corrected. In certain moist types, eliminating fatty foods will be helpful, while in dry forms the starches and sugars should be reduced.

If there is an underlying disease this should be remedied if possible. Particular attention should be paid to constipation.

Common sense in diet, rest, change of environment and free elimination, coupled with due attention to the osteopathic lesions, will cure the vast majority of cases. The greatest difficulty arises where there is some underlying disease. The parts should be protected against irritation such as dirt, cold, soap, and too much water. Meddlesome local treatment is to be guarded against. A simple application is boric acid, rice-flour or corn-starch, or where there is much itching add carbolic acid to the saturated solution of boric acid. Substitute bran for soap for cleansing purposes.

Herpes Simplex, fever-blister, or "cold sore" comprise two principal varieties: **herpes facialis** and **herpes genitalis**. The first occurs upon or near the lips, face, neck or ears. When the herpes is on the tongue or the mucous membrane within the mouth it is commonly termed "canker sores."

Herpes genitalis is located on the prepuce, glans penis or farther back upon the penis. In the female the labia majora and minora and vestibule are the usual locations. Lack of cleanliness, sexual excitement and adherent prepuce are causative factors, though predisposing factors such as faulty circulation and disturbed innervation are to be considered.

In "cold sores" there is often some gastro-intestinal disturbance, especially intestinal stasis, cold in the head and other infections that supply toxins which irritate the nerves. No doubt there are underlying osteopathic lesions that lower the local nerve resistance or block the impulses such as vertebral and inferior maxillary lesions. The predisposing disturbance is probably due to the Gasserian ganglion.

Cold winds and excessive exposure to the sun's rays will effect the tissues over the mental and infraorbital foramina, tensing the muscles and irritating the nerves at these points. On palpation they will be found sensitive. Frequent rotary motion by tip of finger over foramina will open them and allow congestion to drain.

Herpes Zoster, or shingles, is an acute inflammatory disease characterized by groups of small vesicles, usually along the course of the intercostal nerves on one side of the body. Before the vesicles appear there is more or less severe neuralgia. The eruption is unilateral, very rarely bilateral. The nearby lymphatics are usually enlarged.

Though the intercostal nerves are the ones most frequently involved, still the lumbar, thigh, trifacial and other cutaneous nerves may be affected.

The most common lesion is an inflammation of the posterior spinal ganglion which usually involves the fibers of the entire nerve. Inflammation of the nerve outside of the ganglion will cause the disorder. Toxins from various infectious sources are often exciting causes. Vertebral and rib lesions are always found; and where the Gasserian ganglion is involved lesions of the inferior maxilla and upper cervical vertebrae are predisposing factors. Thus osteopathic lesions from traumatism, cold and wet, and imbalance of muscular tension are important. Exudates, tumors, pleuritic and pulmonary affections are to be considered as possible sources.

Treatment.—Adjust vertebral lesions and carefully raise and separate ribs if intercostals are affected. Look after vertebral origin of any other nerve or nerves if otherwise. Local application of talcum or starch or boric acid will generally be sufficient.

Urticaria, hives or nettle rash is a common affection often due to some derangement of the digestive tract. This may be a mechanical irritation or of a toxic nature. Every one is familiar with the various foods that are apt to cause the hives, shell fish, strawberries, cheese, pork, oatmeal, mushrooms, etc.

The irritation may be a reflex one from the visceral disturbance; also, there may be irritation of the pelvic organs that would give rise to the trouble. It is well known that certain drugs will produce urticarial eruptions. There are cases where the irritation is simply local due to the nettle, mosquito bites and wasp stings.

In chronic cases intestinal stasis, nervous exhaustion and nephritic diseases are important.

No doubt osteopathic lesions frequently determine the location of the wheals. These lesions affect the innervation and thus establish a basis for the reflex vasomotor effect. This is in the nature of spasm of the cutaneous vessels quickly followed by dilatation with exudation of serum. The irritant probably acts on the walls of the blood vessels.

Treatment consists of thoroughly emptying the bowels by warm water enema, correcting the diet, toning the viscera and adjusting the osteopathic lesions. Thorough attention to the patient's environment, daily habits and occupation are of value. Warm soda baths will relieve the itching.

Acne is a common skin disorder that is characterized by an inflammation of the sebaceous glands of the nature of papules, tubercles or pustules. The face, shoulders, chest and back are the regions usually involved. It generally appears about puberty. Blackheads is the starting point; these are accompanied with greasy skin and dust, and influenced by micro-organisms and more or less intestinal disorder.

The general or systemic health no doubt affects the local disorder, as in many skin diseases; for various intestinal derangements as indigestion, constipation, etc.; pelvic and menstrual irregularities; general ill health; anemia, etc. affect circulatory, glandular and nervous integrity. Any disturbance of normal elimination is important.

The **treatment** consists of careful attention to the general health and to the local innervation of the face or region involved. Measures that tone the bodily organs such as outdoor life, regular habits, plenty of sleep and correct diet are important. In some cases the X-ray is of value.

ANIMAL PARASITES

Tape Worms

Varieties.—*Taenia solium*; *taenia saginata*; *bothriocephalus latus*.

The larvæ of tape worms are introduced into the intestinal canal by food and drink. The parasite reaches adult growth in the intestines. The larval forms are then found again in the muscles and solid organs.

Taenia Solium.—This is derived from the hog, and is the most common form in this country. When mature it is from two to four yards in length. The head is small, about the size of a pin, and provided with four cup-like suckers surrounded by a double row of hooklets, hence it is called the armed tape-worm. The head is fastened to the body by a thread-like neck, and following the neck, the body occurs in segments. The sexual organs, both male and female, occur in the center of the broad surface of the segment. The segments are about one millimeter in length and seven or eight millimeters in breadth. There are thousands of ova in each mature segment. The worm attains its growth in about twelve to fifteen weeks, after which time the segments are shed and passed. For further development the ova must gain entrance to the stomach of a pig or of man, and passing from the stomach they may reach the muscles and organs and develop into larvæ or cysticerci.

Taenia Saginata.—This is derived from beef, and is much longer and larger than the *taenia solium*. It is from five to six yards in length; the head is over two millimeters in breadth, is square shaped, and has four large sucking discs, without hooklets; hence it is called the unarmed tape-worm, in contradistinction to the hooked variety. The segments are thicker and the ova larger, and they are passed and ingested in the same manner as the *taenia solium*.

Bothriocephalus Latus.—This is found especially in Europe and is very long, measuring from eight to ten yards; it is derived from fish, is not provided with hooklets, but has two lateral grooves. The segments are short and wide, the sexual organs being on the narrow side of the segment.

Etiology.—Unhealthy condition of the stomach and intestines is the predisposing, and uncleanness an important, factor in the occurrence of tape-worm. Those eating imperfectly cooked beef, pork, fish or other meats, and those handling fresh meats, are liable to be affected with tape-worm.

When the ovum is taken into the stomach the capsule is dissolved and the embryo passes into the small intestines, fastening itself into the mucous membrane, by its hooklets and suckers and grooves.

Symptoms.—Tape-worms occur in the human being at all ages. Oftentimes symptoms are absent, the expulsion of segments being noticed and thus the worms accidentally discovered. The tape-worm is seldom dangerous, but if a worm is known to exist it is always a source of considerable anxiety on the part of the patient. Severe anemia may result and be wrongly diagnosed.

There are dyspeptic symptoms, colicky pains, nausea and occasionally diarrhea. The appetite is variable, sometimes ravenous. This condition is followed by loss of flesh and various reflex phenomena, as vertigo, headache, convulsions, palpitation, choreic movements, itching of the nose and anus, paralysis, and rarely, insanity. In addition to these symptoms there may be a wrinkled countenance, sensation of a cold stream winding itself toward the back immediately after a meal, pain in various parts of the body and ringing in the ears. The decisive diagnostic symptom is to find segments of the worm in the stools.

Diagnosis.—Discovery of the ova or segments in the passages of the bowels is the only proof of the presence of a tape-worm.

Prognosis.—Favorable in all cases.

Treatment.—Prophylactic treatment is necessary. Meats should be thoroughly cooked so that the larvae will be destroyed; and all segments of tape-worms passed in the stools should be burned—by no means should they be thrown outside or in the water-closet.

The immediate expulsion of a tape-worm is not a necessity. First of all the mode of living, and then the general state of health should be corrected. Tape-worms invariably result from a general state of unhealthiness, and with improved health and corrected digestive processes the worms cannot exist, and in a short time will be expelled. Expulsion of the head is necessary before the case will be cured, for if the head is not expelled new segments will continue to grow.

Stimulating the liver to increase the amount of bile, and increasing the activity of the digestive glands of the stomach and intestines, by a thorough treatment of the splanchnic region and direct treatment over the abdomen, will usually be sufficient for the cure of intestinal parasites. The treatment will probably have to be repeated several times, in order that the intestines may regain a healthy tone, so that the parasite will not find favorable conditions for its existence within the intes-

tures, and that the bile may be secreted in sufficient quantities to dislodge the worm.

Hahnemann claimed, "that during a period of comparative health tape-worms do not inhabit the intestines proper, but rather the remnants of food and fecal matter contained in the intestines, living quietly as in a world of their own without the least inconvenience to the patient and finding their sustenance in the contents of the bowels. During this state they do not come in contact with intestinal walls, and remain harmless. But when from any cause a person is attacked by an acute disease the contents of the bowels become offensive to the parasite, which in its writhing and distress touches and irritates the sensitive intestinal lining, thus increasing the complaints of the patient considerably by a peculiar kind of cramp-like colic. (In similar manner the human foetus in the womb becomes restless, twists its body and moves whenever the mother is sick, but floats quietly in the liquor amnii, without distressing her while she is well.)" This but harmonizes with the osteopathic theory and practice with regard to tape-worm, that there is an unhealthy condition of the intestines which predisposes to the affection, and consequently the cure must be a correction of such a disordered state.

During the treatment, if a light diet of milk and broths is given, it will favor an earlier removal of the parasite, by helping to remove the mucus in which the head is embedded. If this fails extract of male fern is suggested.

Ascaris Lumbricoides (Round Worm)

This is the most common parasite, and is found principally in children; it is also found in cattle and hogs. It is of a yellowish brown color and in form resembles earth worms. The worm is cylindrical, pointed at both ends; the female is from seven to twelve inches in length, and the male from four to eight inches. They are probably introduced into the stomach by food and drink. They occupy the upper part of the small intestine, and are usually one or two in number, though they may be numerous. Occasionally they migrate into the stomach and are ejected by vomiting, or into the trachea and produce suffocation, or into the larynx or Eustachian tube, or they may pass downward to the anus, or into the bile ducts.

Symptoms.—Oftentimes symptoms are absent. There may be dyspepsia, colicky pains, mucous stools, meteorism, vertigo, fretfulness, voracious appetite, anemia, sallow complexion, headache, chorea and convulsions. Other symptoms may be present, as grinding of the

teeth and itching of the nose and anus. Obstruction of the bowels has occurred. If a worm enters the bile duct obstructive jaundice occurs. A decisive diagnosis can be given only when the worm is seen.

Treatment.—Particular attention should be paid the liver, for it is here that we must seek the natural remedy in the form of bile, in order to eject and cleanse the system from nematodes.

Modes of improper living should be corrected; cleanliness is essential, and there should be attention to the general health of the patient. Thorough correction of all defects of the spinal column in the region of the splanchnics, and careful direct treatment of the bowels is indicated. The child may be put to bed and fasted twenty-four hours, then the liver strongly stimulated to increase flow of bile.

If the above treatment is not successful oil of wormwood may be employed.

Oxyuris Vermicularis

(Thread-worm; Pin-worm)

This small parasite, commonly seen in children, is from three to five millimeters long in the male and about twenty millimeters in the female, is blunt at one end and sharp at the other, and occupies the colon and rectum. They are probably introduced into the intestines in the ova, by uncooked fruits and vegetables, or by the dirty hands of mothers and nurses of the infants. They vary greatly in number; migrate to the rectum where they deposit their eggs, and are often discharged in the feces, where they appear like pieces of ordinary white thread.

Symptoms.—Loss of appetite, anemia, restlessness and irritability are marked. The itching becomes intolerable when the worms come down in the rectum to the anus and within the folds about the anal orifice. In the female the worms may wander into the vagina where they become particularly distressing, and thus may produce excessive sexual excitement and cause nymphomania and masturbation.

Treatment.—Cleanliness of the most scrupulous kind should be demanded in every instance. Injections of cold salt water (repeated for at least ten days) and other agents within the rectum will destroy the eggs as soon as they are deposited, besides relieving the terrible itching. In obstinate cases use quassia decoction.

Attention to the general health of the patient and great care of the intestines and other digestive organs are absolutely necessary. The spinal treatment to the intestines and other digestive organs, as well as thorough direct treatment over the abdomen, is indicated.

Uncinariasis

European hook-worm disease; Miner's anemia; Ankylostomiasis; Hook-worm disease)

This disease results from infection by the hook-worm of any of the various types. In Europe it is found in Italy, Belgium, Germany, France and Switzerland. In America it seems to be of Africo-Asiatic origin but was first discovered in the Southern states and abounds chiefly in Texas, Florida, Georgia, North and South Carolina as well as in the West Indies. Infection comes from unprotected feces that are allowed to be spread where the feet or hands may come in contact as it is without doubt that the contagion occurs through the skin. One authority states that hook-worm is rarely found except in cases where ground itch has occurred within a period of eight years. Negroes harbor the parasite and transmit it but seem immune to its effects while the poorer whites are afflicted to a large degree. The worms are carried from some abrasion of the skin, by the blood to the heart and lungs, thence to the pharynx and swallowed, thence to the duodenum and jejunum where they attach themselves to the lining walls. Here they not only feed upon the blood but develop a toxin. The female worm is about twice the size of the male, 10 to 18 mm. as against 6 to 11 mm. and there is slight difference between the old and new world varieties. The head is provided with four hook shaped teeth which form the attachment to the intestine and it is very secure.

Diagnosis.—For years the languid, dull, expressionless, lack-luster of eye and general unambitious characteristics of the inhabitants of the great sand belt of the United States attracted attention and was attributed to laziness but the discovery of the hook-worm explained the cause. Children are stunted in mind and body and have a muddy, dirty white complexion.

At the beginning there must be a very considerable colony of the parasites to cause symptoms but as the disease advances there is a distention of the abdomen from enlargement of the spleen and liver and from flatulency. There is palpitation, shortness of breath, cardiac bruits from the severe anemia while edema of the feet and legs is rather common. The blood shows a severe secondary anemia with its coagulation time much increased. Leucocytosis is not common; hemoglobin is from one-tenth to one-half normal with erythrocytes about half normal.

Treatment.—The removal of the worms with the least possible

harm to the body is indicated. Thymol is a poison which is not absorbed by the body, when carefully given, and which is very toxic to the parasite. The dose varies from eight grains for a child under five years of age, to forty-five for an adult. Thymol is soluble in fats and in alcohol, so that for a day or so before the thymol is given, and from one to four days after, no fats or alcohol should be taken. The best way to avoid poisoning by thymol is to give the patient charcoal, then no fats or alcohol is permitted until the treatment is completed. When the stools become black, the thymol is given on an empty stomach. A purgative is given a few hours later. Enemas should be used very freely in order to facilitate the removal of the injured or poisoned worms. Another dose of charcoal is given, and when the stools are black again, the patient may return to his ordinary diet. The denial of fats to the person so thoroughly accustomed to bacon three times a day is a factor met with difficulty in dealing with patients of the ordinary class with the disease. (Clinical Osteopathy.)

Prophylaxis.—After treatment it is imperative to prevent reinfection and to do that the most rigorous sanitary measures must be instituted. All feces must be disposed of and habits of cleanliness in defecation insisted upon while negroes, who harbor the worm without showing symptoms, must be looked after as well as the actual victims. Care of the feet is important and shoes should be worn in infected regions and all abrasions of the skin protected. Drinking water must be uncontaminated which presents a problem as wells and springs are usually unprotected. Absolute and persistent cleanliness is the answer to the question of prevention.

Trichiniasis

Trichiniasis is a name given to a disease produced by the embryos of the *trichina spiralis*. In the adult condition the *trichina spiralis* lives in the small intestines. The embryos migrate into the muscles where they finally become encapsulated. Man is infected by eating insufficiently cooked pork containing the encapsulated worm, which is set free during the digestive process. About the third day they attain their full growth and become sexually mature. Each one discharges large numbers of embryos. As soon as born the young brood is carried away from the bowel and invade the muscles through various channels—principally by means of the blood stream and along the connective-tissue routes. The female *trichina* may bring forth several broods of embryos in succession. In nine or ten days after infection the first brood reaches

its destination. They attain to maturity in about two weeks after entering the muscular tissue. In this process an interstitial myositis is excited and a fibrous capsule is formed in four to six weeks. The capsule gradually becomes thicker and finally calcareous infiltration may take place.

Thorough cooking destroys the parasite. The disease is most frequent among the Germans who eat raw ham and sausages.

Symptoms.—These are sometimes absent, especially when only a few are eaten. If large numbers have been ingested, gastro-intestinal symptoms develop in the course of a few days. Vomiting, diarrhea, and pain in the abdomen may be present.

In from one to two weeks muscular symptoms develop. There is fever, muscular pain, especially during motion, and the muscles are stiff, tense and sometimes swollen. When the respiratory muscles are involved dyspnea is produced, which may prove fatal. Eosinophilia is a helpful diagnostic point. Edema, especially of the face, is an important symptom. Profuse sweats, itching and tingling of the skin have been observed.

Diagnosis.—Epidemics of this disease are more easily diagnosed than an isolated case. Among the Germans, if cases of apparent typhoid fever occur after a picnic or other feasting occasion, where raw ham or sausages have been indulged in, this disease should be suspected. Examination of the stools and of the muscles will be of aid. The worms may be discovered in the pork, a portion of which has been eaten by the patient.

Prognosis.—This depends upon the number of worms ingested. The prognosis should always be guarded. Early, marked diarrhea is favorable.

Treatment.—Prophylactic treatment is of great importance in trichiniasis. Inspection of the meat supply, is doing much to prevent trichiniasis; although the most practical way to prevent the disease is to thoroughly cook all pork and sausages. The central portions of the meat should be well cooked.

In the feeding of hogs care should be taken that they do not receive any offal, but only milk, grain, vegetables, etc.

When a person is infected with trichiniasis, thorough and prompt evacuation of the bowels should be performed at once, so that the embryos will not have time to pass into the muscles, but will be ejected from the body. This should be followed by a thorough and persistent treatment for several days of the liver and intestines; treat both the

liver and intestines directly and through the spine. The object of this treatment is to render all the digestive juices active, so that they may dislodge the animal parasite, and to prevent their passing into the muscles. Also keep the bowels active for several days.

When the larval parasites have entered the muscles, a treatment cannot be applied to affect them directly, but the health of the body should be maintained if possible, and the severer symptoms, as the muscular pains, weakness and insomnia combated. Thorough manipulation, massage and hot baths will be of special aid in relieving the stiffness and weakness of the muscles.

Filaria

(*Filaria Sanguinis-Hominis*)

There are two varieties. One is a thread-like worm with tapering, blunt ends, appearing in the blood at night, hence called **nocturna**, while the other is of slightly different form, appearing in the blood only by day and is called **diurna**.

The mosquito is the communicating host of the parasite. During the night, or should the patient sleep during the day, the **nocturna** appears in the peripheral circulation, while during the other interval they are probably in the other vessels, particularly the lungs.

After the mosquito has taken blood from an affected patient it requires from six to seven days for the metamorphosis of the minute filaria which are then lodged in the proboscis of the mosquito and introduced into the blood of the next victim. The adult parasite is from three to four inches long and the thickness of a coarse hair, with clear sexual distinction.

Pathologically there are no distinct lesions, as the parent worm must establish one. Lymphatic engorgement may result from plugging of the thoracic duct or of a large lymphatic with consequent engorgement which may develop symptoms in the inguinal glands, pelvic and lumbar lymphatic trunks. As these varicosities develop rupture may occur; if into the genito-urinary tract chyluria or chylocele may result, or if in the abdominal cavity chylous ascites.

Lymphangitis follows a lymph stasis, which later results in **elephantiasis**. (Barbadoes leg.)

Symptoms.—Elephantiasis affects the legs, but the arms rarely; the labia of the female and scrotum of the male; occasionally the breasts and other parts of the body. Fever is present on account of the lymphangitis, accompanied by rigors and delirium and there is marked local

inflammation. The attack terminates in a pronounced sweat. In deeper parts there is deep seated pain and signs of sepsis, while abscesses may develop over the inflamed area.

The varicose inguinal glands are doughy, soft and painless, with both sides affected alike. The scrotum is affected by the extension, and at times the testes.

Treatment is surgical, as the tumors must be removed. Unless the female worm is also removed this is, however, only palliative.

Methylene blue is said to be destructive to the filaria and it is practically harmless to the human body. The only treatment is one that will aid in building up the general health.

HEMORRHAGES

Nasal Hemorrhage

(Nose bleed; Epistaxis)

Osteopathic Etiology and Pathology.—Traumatism, such as picking the nose, blows, and surgical operations; straining when coughing; nasal tumors and ulcerations; lesions of the atlas, or any lesion of the upper cervical vertebræ, that would interfere with the vasomotor distribution to the nose and cause local congestion or weakness of the blood vessels; obstructions to the general circulation; irregularities or suppression of the menstrual flow may result in nose bleed, as a vicarious menstruation; suppression of a habitual hemorrhoidal discharge.

Pathologically the great frequency of nasal hemorrhage is due to the great vascularity of the nasal mucous membrane. Usually in cases of spontaneous origin, bleeding is from the region of the septal artery. Spontaneous bleeding may also occur from posterior hypertrophies or adenoid vegetations. The blood flowing downward into the fauces, is expectorated in such cases, and may be mistaken for a hemorrhage from the lungs.

Treatment.—The position of the individual is important. He should assume a sitting posture, or as nearly so as possible. Holding the nostrils tightly, or plugging them with a piece of cotton, will favor the formation and retention of a clot, so that the hemorrhage may be controlled. Pressure upon the carotid artery, or upon the facial artery at the angle of the inferior maxilla, will slow the blood current and favor the formation of a clot, also pressure on the sides of the bridge of the nose may influence it. Correcting any lesions that may exist in the superior cervical region, as derangement of the vertebræ or contracted muscles, will remove obstructions or irritations to the vasomotor system of the affected region, and thus equalize the vascular system. Holding the arms above the head, and the application of ice to the nose are of aid in some cases. Also, injection of cold or hot water into the nostrils. In serious and obstinate cases, where other methods fail, a plugging of the anterior and posterior nares should be resorted to, using absorbent cotton or gauze.

Broncho-pulmonary Hemorrhage

(Hemoptysis)

Osteopathic Etiology and Pathology.—Pulmonary congestion; croupous pneumonia; tuberculosis; hemorrhagic infarction; ulcers of

the larynx, trachea or bronchi; gangrene of the lung; fibrinous bronchitis, carcinoma of the lung; lesions of the ribs or vertebræ from the second to the seventh dorsal inclusive, may cause diseases of the bronchial tubes or lungs, that result in hemoptysis, or the hemorrhage may be caused directly by extreme congestion resulting from the disordered vasomotor nerves; diseases of the heart, such as mitral disease, causing pulmonary congestion; aneurism of the branches of the pulmonary artery; vicarious menstruation from deranged menstrual functions; diseases of the vessel walls, or blood, as scurvy, anemia, hemophilia, etc.

Pathologically in many cases, the lesions are microscopic, consisting of ruptured capillaries. In other cases larger vessels may be ruptured, or are the seat of erosion. Many other lesions may be observed. After death the bronchial mucosa is occasionally found inflamed and the lung tissues paler than normal.

Diagnosis.—A differential diagnosis must be made between epistaxis, hemoptysis and hematemesis.

In **epistaxis** the blood may flow from the posterior nares into the pharynx; it causes coughing and a discharge of the blood may occur the same as in hemoptysis. A careful examination of the nasal region alone can determine the source of the bleeding.

In **hemoptysis** the history of the case as to pulmonary or cardiac diseases is to be considered. There is a feeling of weight and of uneasiness in the chest. A salty taste and a tickling of the throat precedes the bleeding. The blood is ejected by coughing and is bright red, frothy, very little coagula, and is alkaline in reaction.

In **hematemesis** the history would indicate disease of the stomach, spleen, liver or heart. Uneasiness, and occasionally nausea and faintness, precedes the bleeding. The blood is ejected by vomiting, and is dark, clotted or fluid, mixed with food, and is of acid reaction. In a few instances the blood due to hemoptysis may be swallowed, and vomited.

Treatment.—In all these cases of hemoptysis the patient should be placed in bed and absolute rest demanded. An attempt should at once be made to correct any lesion that may be found influencing the cause of the bleeding. Correcting lesions to the vasomotor nerves of the lungs and bronchial tubes, and equalizing the disturbed vascular area, may be sufficient in a number of cases. These lesions will be found principally in the upper dorsal region. In some cases, perhaps, there is an impairment of the trophic nerves by the same lesions, thus interfering with the

tone of the vessel-walls and pulmonary tissues. The diet should be light, nutritious and non-stimulating. The use of hot drinks is to be avoided. The rapidity of the heart's action should be reduced. This is best performed by thorough treatment of the dorsal spinal nerves of the left side over the heart, and by inhibition in the sub-occipital region. The ice-bag to the precordia is also helpful. Iced drinks and the eating of ice is of aid. Stimulation of the systemic circulation will be of value in helping to relieve the pulmonary congestion, although the two systems are somewhat independent of each other. Also, hot foot baths and the evacuation of the bowels may be of additional value. In cases due to organic disease of the heart, the mind and body should receive absolute rest, so that the diseased areas may be strengthened as much as possible; besides a tonic treatment for the heart's action is necessary.

After the hemorrhage has subsided care should be taken that bleeding does not occur again. All irritations of the respiratory tract should be avoided. A stimulating diet, tobacco and alcohol should be avoided. Nutritious food and a moderate amount of exercise is indicated.

Hemorrhage of the Stomach

(Hematemesis)

Osteopathic Etiology.—Injuries to the stomach; local diseases, as congestion, ulcers and cancer; vicarious menstruation; a mechanical obstruction to the portal circulation; spinal lesions to the vasomotor nerves of the stomach; alterations in the blood; perforation of the stomach walls, involving a blood vessel; disease of some neighboring organ.

Diagnosis.—A careful examination of the case and of the blood ejected will be necessary to determine the nature of the cause. The differential diagnosis as to the source of the blood, whether from the stomach or lungs, was given under hemoptysis.

Treatment.—Correction of any lesions that may influence the blood pressure in the region of the stomach, is the first requisite. Treatment of the splanchnics has the greatest influence upon the vasomotor nerves to the stomach. Treatment of the vagi nerves and of the fourth and fifth dorsals, will quiet the violent movements of the stomach, and thus aid in controlling the hemorrhage. Stimulation of the cervical sympathetics and heat applied to the feet will tend to equalize the vascular system, and thus lessen the gastric congestion. The application of a broad flat ice-bag over the stomach will be of great value. Keep the patient quiet in bed. Surgical interference may be necessary.

Intestinal Hemorrhage

Osteopathic Etiology.—An obstructed circulation of the blood through the venaporta, as in diseases of the heart, lungs and liver; lesions of the vertebræ deranging spinal nerves to the intestinal blood supply; injuries caused by corroding or cutting substances; mechanical injuries to the intestines; degeneration or erosions of the blood-vessels from ulcers of the intestines, as from typhoid fever, typhus, dysentery, etc.; disordered menstrual or hemorrhoidal discharges.

Diagnosis.—The locality of the intestines affected can be approximately determined by an examination of the discharged blood. When the blood comes from the upper part of the intestines, it is generally dark and mixed with the intestinal contents, which gives it a tarry appearance. It is generally red and fluid when it comes from the lower portion of the bowels. If from the stomach, the blood is thoroughly mixed with fecal matter. Throwing the passage into water, the water is colored red when it contains blood, and if the contents contain bile the water is colored green or yellow. Also, noting the areas of contracted muscles, as in intestinal colic, will aid in the regional diagnosis.

Treatment.—Absolute rest in all cases is necessary, the patient remaining as quiet as possible. Food, in severe cases, should not be given for ten or twelve hours. The bed-pan should be used in caring for the evacuations. Correction of the lesions along the spinal region, chiefly of the lower dorsal and lumbar regions, that are impeding the innervation to the intestines, should be attended to at once. This treatment tends to relieve any hyperemic condition of the intestinal mucosa and influences the whole vasomotor area of the mesentery. Direct treatment of the abdomen in a few cases is of great value to relieve obstructed and contracted vessels in the mesentery, but in certain pathological conditions, e. g., typhoid fever, leave the abdomen alone. Treatment (inhibition) along the spinal column from the sixth dorsal to the coccyx is helpful in all cases to quiet the peristalsis of the intestines. In severe cases cold drinks, eating of ice and an ice pack to the abdomen are of aid. In a few instances surgical measures will be necessary.

Hematuria

Osteopathic Etiology.—Congestion and acute inflammation of the kidneys, exacerbations of pyelitis, renal calculi, chronic nephritis, traumatism, tuberculosis, etc.; affections of the urinary tract, as calculi or lacerations of the ureter; calculi, cystitis, ulcerations, etc., of the blad-

der; calculi, gonorrhoea, parasites, etc., of the urethra; general diseases, chiefly the acute specific fevers and blood diseases; blows, wounds and traumatic influences, external to the kidneys; lesions of the renal splanchnics.

Diagnosis of the locality of the hemorrhage in the urinary tract: In hemorrhage from the **kidney** the blood is thoroughly mixed with the urine, giving a uniform color. Blood casts and leucocytes are present. In hemorrhage from the **ureters** the blood is usually molded in clots which conform to the shape of the ureter. The clots appear like small dark worms. In hemorrhage from the **bladder** the blood is not thoroughly mixed with the urine and large clots form upon standing. In hemorrhage from the **urethra** the blood often discharges without micturition. When urine is passed the blood precedes the passage of urine.

Treatment.—Rest is essential. A correction of the lesions to the renal splanchnics is necessary to control the congestion and inflammation of the kidneys. When the ureters, bladder or urethra is involved, attention must be given to the condition of the spinal column below the renal splanchnics. In all cases the inhibitory treatment to the lower spinal column and ice to the loins are of value. If surgery is indicated, do not delay operation.

Uterine Hemorrhage

Most of the causes of uterine hemorrhage come under the subject of obstetrics; others under menorrhagia and metrorrhagia. Such will be found in obstetrical and gynecological works.

Treatment.—The patient should assume the dorsal position with the buttocks raised. If any displacement of the uterus is present or if there is any foreign material in the uterus, usually such should be corrected or removed at once. Stimulation of the clitoris is a most effectual means to control uterine hemorrhage; it contracts the circular fibres of the uterus. Stimulation of the uterus directly through the vagina, and over the abdomen, and stimulation of the upper wall of the vagina, will aid in contracting the uterus. A quick, unexpected pull of the hair on the mons veneris will have the effect of closing the capillaries by shock to the nervous control (Dr. Still). Before closing the os, however, it is well to know that there is no irritating foreign material within the body of the uterus. Correction of obstructions of the vasomotor nerves of the uterus through the splanchnic and lumbar region is important. Compression of the abdominal aorta, and vaginal injections of hot water may be of aid, as will also a hot water bag at the lumbar region and ice

water bag over symphysis. In severe cases inversion of the body, if it can be done with safety, may be performed. Packing the vagina is a method resorted to occasionally in severe cases.

Hiccoughs

Occasionally there is a case of hiccoughs that has been continuous for hours or even days and that all efforts have failed to stop. They are caused by an irritation to the peripheral distribution of the phrenic nerve from some gastric disturbance or a local irritant acting upon the center in the medulla. It may follow fright or great emotion and be associated in persistent form in rheumatism, typhoid fever and other febrile diseases. It follows abdominal operations at times and is very distressing. When occurring in elderly people with pneumonia and in peritonitis with distention it usually marks the end. The same may be said in case of carcinoma of the stomach and bowels.

Treatment.—Go first to the origin of the phrenic nerve at the third, fourth and fifth cervical and, if there is a lesion as there will probably be, adjust it and note results. This will be sufficient in many cases. Failing, bring direct pressure on the nerve just above the clavicle and anterior to the sterno-mastoid muscle and release the scaleni muscles. After this examine and treat at the fifth and twelfth dorsals. Correct any lesions but best results will be had from inhibition at these points. Another method is to stand beside the patient and insert the fingers of both hands under the costal end of the ribs and lightly pull. Firm pressure over the solar plexus with flat of the hand is sometimes beneficial. In hysterical cases, drawing out the tongue will often be effective and it has been suggested that standing the patient on the head will stop them in short order. Tickling the nose to produce violent sneezing is an ancient remedy. Some one of these will cure the case, as osteopathy has never failed so far as recorded.

The stomach should be emptied of all irritating matter to prevent recurrence.

VARICOSE VEINS

In varicose veins there is a dilatation of the calibre of the veins and their valves are insufficient. The walls are irregularly thinned, lengthened and tortuous.

Osteopathic Etiology and Pathology.—The **internal saphenous** is the vein most frequently affected, although any vein throughout the body may become varicose. Commonly, varicose veins occur in the lower extremities and occasionally in the arms.

The **valvular insufficiency** is caused by stretching of the wall of the vein, thus separating the thin, free edges and leaving an interspace that allows regurgitation of the blood. The valves becoming insufficient, the column of blood in the veins has no support against gravity, and being interrupted in its course does not flow normally into collateral channels. The walls of the veins become thin, as does also the adjacent skin, thus increasing the danger of a rupture, either external or subcutaneous.

Varicose veins are most frequently found in females, following uterine enlargements. The condition may be due to any obstruction or constriction that prevents the free return of blood from the veins, such as dislocations of the hip, either slight or complete, dislocations of innominate, contractions of adductor magnus muscle affecting femoral vein, prolapse of diaphragm obstructing vena cava, tissue constrictions about the saphenous opening, garters, and, in fact, anything that might impede the free venous flow. The tendency to varicose veins increases as age advances, and many cases are found among people of middle life who have been accustomed to standing a great deal. Injuries to the pelvis, thigh or leg, lessening the nutrition to the leg, or injuries to the nerves, as vertebral dislocations in the lower dorsal or lumbar regions (the fourth lumbar especially) may be causes of varicose veins. Pregnancy or tumors in the abdomen or pelvis, causing pressure upon the iliac veins, are occasionally causes. Distention of the sigmoid flexure, causing pressure upon the left iliac vein, or distention of the cecum; pressing upon the right iliac vein, are fruitful sources, as are also diseases of the heart and lungs. Varicose veins of the upper extremities are due to occupations requiring overuse of the arms.

Complications.—Varicocele, hemorrhoids, labial varix in the female, varix over pubes, ulceration and eczema due to disturbances of nutrition, edema and thrombus.

Symptoms.—**Lower Extremities.**—Cramping pains in the limbs

upon rising. Fullness and heaviness of the limbs. Inspection may reveal superficial varicose veins near the saphenous opening, upon the external thigh, in the popliteal space, upon the external leg or behind the ankles. Edema and congestion of the foot and ankles occur in a few cases. Pain is quite a prominent symptom, due to pressure upon the nerve fibres. Eczema and itching are due to disturbed innervation and blood supply to the skin. Ulceration may occur, due to the bursting of a vein.

Upper Extremities.—Before the varicosity appears there is usually pain or a feeling as of a sprain in the involved region of the arm. The pain is usually confined to a muscle or group of muscles.

Treatment.—The majority of cases are due to disorders about the pelvis, hip or thigh, and the treatment resolves itself into the removal of these obstructions or constrictions. Occasionally cases are caused by partial dislocations of the hip joint, which can be easily overlooked during a hurried examination. The slipping of an innominatum is an important factor. Rest in a recumbent position, attention to the general health, and especial attention to the bowels and liver, are essential in acute attacks. Occasionally the heart and lungs are at fault. Treatment twice per week should consist of removing any of the numerous causes of the condition, and spinal treatment as well; then the leg should receive special attention. Remember, thrombi may form and the vein must, under no circumstances, be touched in the treatment. Begin by carefully rotating the leg to stretch contracted tissue about the saphenous opening, then separate the tendons of the popliteal space and follow the course of the vein to the abdomen and relax tissue about it. Keep patient off the feet as much as possible and elevate the leg when sitting.

In rupture of varicose veins the hemorrhage can be arrested by elevating the limb and applying pressure with the fingers, above and below the wound, until a compress and bandage can be applied. The support of the varicose veins by elastic stockings will ease the pain and prevent edema in many cases, but, as a rule, it is a direct hindrance to the circulation on account of the necessity of having the stocking fit closely. Surgical operations are rarely indicated.

Phlebitis

(Phlegmasia alba dolens; milk leg)

An inflammation of a vein. In the condition described here it is a puerperal septic inflammation of the femoral vein. About the third

week after confinement there is a swelling of the leg with or without redness. Great pain accompanies the condition and the temperature gradually rises to $102^{\circ}\text{--}3^{\circ}$. As understood by osteopaths, this is the result of a partial closing of the saphenous opening during parturition so that the venous flow is partly stopped.

Treatment consists in carefully rotating the leg at the hip so that the fascia lata is spread, opening the lumen of the vein so the congestion will drain out. There will, also, probably be found innominate or lumbar lesions which must be adjusted with the result that almost immediate relief is given as a rule.

Chronic Phlebitis

The chronic form shows considerable inflammation along the line of the vein marked by tenderness, edema and thickening of tissue. The entire leg may be more or less involved through circulatory injury. In these cases will be found definite innominate lesions of a primary type or the distortion is superinduced by lumbar lesions. A few cases are quickly cleared up through adjustment that is readily secured. However, in others, there being considerable thickening of the sacro-iliac articulating tissues, some time may be required to get complete adjustment and consequent restoration of femoral circulation. In addition to this, careful abduction, flexion, hyperextension and circumduction is indicated. This last technique should be executed with great care and with due regard to pathology. If Dr. Still's emphatic command were followed, that all maternity patients should have both legs rotated and innominates inspected, there would be no phlebitis cases, acute or chronic.

THE RECTUM

To treat the rectum intelligently and thoroughly, requires special knowledge on the part of the osteopath. A speculum should be used in many cases when making an examination, and all abnormal conditions carefully inspected with the eye; although much can usually be noted by the examination with the finger alone. The best position in which to give an examination and treatment is to have the patient on the side, with thighs flexed upon the abdomen. In a few cases the patient may lean over an operating table.

The **objects of rectal treatment** are many—to relieve hemorrhoids, etc., of the mucous membrane; to correct a dislocated coccyx; to treat an enlarged prostate gland; to replace a prolapsed rectum; to tone the lower bowel in cases of constipation; to give reflex stimuli to the heart and lungs, in cases of fainting, paroxysms, etc.; to relieve severe pains in the rectum at the time of the menstrual period, and to relieve congestion, inflammation, contracted tissues, etc., of local sources; to relax spasms in croup, and to remove tension to the nervous system in some forms of insomnia. In fact, so many diseases are affected by reflex irritations from the rectum that its examination is a necessity in many cases. The phrase “when in doubt treat the rectum” was coined by a progressive student and there is an element of truth in it. Surgical assistance to treatment will be considered under hemorrhoids.

The principal need of osteopathic internal rectal treatment, is: (1) To relax all contracted and constricted fibres about the walls of the rectum and between the sacrum and coccyx. (2) To correct a dislocated coccyx. (3) To dilate the sphincters thoroughly, in order to relieve irritations about the sphincters, and to stimulate the sympathetic nerves.

Work through the rectum to treat an enlarged prostate gland, to correct a displaced uterus, and to make a more thorough examination of the uterine tissues, the Fallopian tubes and the ovaries, is a frequent occurrence.

In giving **local treatment**, cleanse the fingers and oil the index finger; then, after introducing it into the rectum relax the contracted tissues by an upward sweeping motion on all sides. This treatment relieves all obstructions to vessels and nerves caused by contracted fibres, and tones the rectal walls. In prolapsed sigmoid, causing obstructive constipation, the finger can be used to separate the folds of mucous membrane and open the lumen of the bowel. Frequently there will be enough

tone to the muscular coat so that the irritation will set up slight peristalsis and cause the bowel to draw up to a considerable degree. In children where there is much straining at the stool, the sigmoid will often be found down and by using the little finger the same results can be accomplished and much relief given.

To **dilate** and **stretch** the sphincters thoroughly a speculum or dilator should be used under anesthesia; still, considerable can be done by one or two fingers. The sphincter should be thoroughly stretched in all directions, care being taken when an instrument is used that too much force is not applied. Secure as much voluntary relaxation of the sphincter as possible. Inhibition at 2d and 3d sacral will aid. This treatment is of aid in cases of hemorrhoids and prolapse of the rectum, in constipation due to the loss of tonicity of the lower bowels, in tightness of the sphincters, in pain of the rectum, and in stimulating the heart and lungs. In cases of a prolapsed rectum, due to irritation about the sphincters, causing tenesmus, this treatment is of special value, as it gives the sphincter a physiological rest. Frequency of treatment per rectum must depend entirely on the patient and disease. It can be given daily in many cases and is frequently so indicated in acute hemorrhoids, prostatic troubles, etc.

According to Quain, the sensory nerves to the rectum are from the second, third and fourth sacrals. Some of the motor fibres of the circular muscles of the rectum are from the lower dorsal and upper two lumbar nerves; these pass by the aortic plexus to the inferior mesenteric ganglion. Associated with these fibres, are the inhibitory fibres of the longitudinal muscles of the rectum. The sacral nerves contain motor fibres to the longitudinal muscles, and inhibitory fibres to the circular muscles of the rectum. In all cases of rectal trouble, the lower dorsal and upper lumbar vertebræ may be found deranged, and thus interfere with the rectal nerves. Relaxation of the sacral muscles over the sacral foramina has a marked effect in relieving **tenesmus**. In dysentery, where there is a constant desire to defecate, a thorough upward relaxation of the sacral muscles will give great relief.

Proctitis or inflammation of the rectum is not an uncommon disorder. The disease has been divided into acute, chronic, gonorrheal, dysenteric, and diphtheritic. Foreign bodies, impacted feces, cold, purgatives, prolapse of the sigmoid, and lumbar, coccygeal and innominate lesions are the most important causative factors. The **acute** form is more frequently found in older people. The **symptoms** are tenesmus, frequent evacuations of blood and mucus (possibly pus),

prolapse of the mucous membrane, feeling of fullness, and radiating pains. The gonorrheal, diphtheritic and dysenteric forms are of rare occurrence, with the exception that the dysenteric may be somewhat frequent. The **treatment** is to remove all local irritations, cleanse the bowels, and put the patient in bed. All irritating foods are to be prohibited. Use milk, soups, beef-juice, soft boiled eggs and similar foods. Correct all osteopathic lesions; especially will inhibition over the sacral foramina relieve the tenesmus. Cold water in the rectum and applied to the anus will be beneficial. If abscesses occur, employ surgical measures.

Prolapse of the rectum is another common rectal disorder. Acute cases are especially found in children, due to straining at stool. The sacrum is more straight, and thus violent straining, coughing, etc., the more readily produces prolapse. Prolapse of the mucous membrane is the most common, although all of the rectal coats may be involved. Prolapse of the upper part of the rectum into the lower or invagination is frequently met with by osteopaths. The sigmoid may prolapse and also affect the rectum. The **treatment** is to return the mass, using an anesthetic if necessary. If it is not retained, place straps across the buttocks. Then with attention to lesions that may be disturbing and weakening the rectal walls, and thorough local toning treatment, the prognosis should be favorable. In high rectal prolapse local attention is necessary as well as deep treatment through the abdominal walls to the sigmoid and upper rectum. The use of Cole's irrigator for high enema will replace and elevate both the upper rectum and sigmoid and greatly aid in a cure. Regularity of habits and proper food are essentials.

Hemorrhoids

Definition.—A dilated or varicose condition of the plexus of veins lying in the sub-mucous tissue of the lower part of the rectum. The dilatation of these hemorrhoidal veins may extend into the adjoining sub-cutaneous tissues and mucous membrane, and the perirectal plexus and adjoining venous plexuses of the bladder, uterus, vagina and sacral canal may become involved.

Osteopathic Etiology and Pathology.—The chief predisposing cause of piles is man's erect position and the absence of valves in the hemorrhoidal veins. Thus a retardation or stagnation of the portal vein would cause a backward movement of the entire column. It is evident that such a downward pressure of the blood in the portal system would dilate and extend the blood vessels, to the very capillaries in the rectal region.

This retardation may arise from several causes: obstruction of the portal vein, from diseases of the liver; diseases of the heart; obstruction or destruction of the capillaries of the lungs; pressure from a gravid uterus, tumor, etc.; a general loss of tonicity of the abdominal walls, as in persons who take but little exercise; the excessive use of wine, tea and coffee; injuries to the spinal column, especially in the lumbar, sacral and coccygeal regions; a dislocation of an innominate bone; lifting; constipation; straining at stool; carelessness of the calls of nature, etc. Catarrh of the bowels may cause a congestion of the mucous membrane and consequently piles. Hereditary influence may be a factor in a few cases.

Hemorrhoids are divided into two classes, **external** and **internal**. An **external pile** is one that arises from the margin of the anus outside of the external sphincter muscle. It differs from the internal pile from the fact that it is always composed either of skin or hypertrophied connective tissue, forming a mere cutaneous tag, or else it is composed of a small cutaneous vein enlarged by a clot of blood. The **internal hemorrhoids** are composed mostly of enlarged veins and are connected by hypertrophied connective tissue. They have a free arterial supply and are covered by the mucous membrane of the rectum. They are due, usually, to an affection of the middle hemorrhoidal blood supply, thereby being a part of the visceral vascular system. Internal hemorrhoids, when protruding, can be returned within the rectum, while the external ones cannot. The venous turgescence varies in size from a pea to a walnut. They may be single or may surround the entire anal opening like a bunch of grapes.

Repeated attacks of engorgement of the veins involved, will in time change the mucous membrane or the sub-mucous tissue, and cause catarrhal swelling of the mucous membrane, or hyperplasia of the connective tissue. At first the hemorrhoid is usually a blood tumor, but in chronic cases it is oftentimes made up largely of connective tissue. Owing to pressure of the varicose veins, atrophy of the mucous and sub-mucous tissue may occur. The white or slimy hemorrhoids occur when these roughened parts of the mucous membrane become inflamed and thickened, resulting in suppuration.

Symptoms.—The symptoms are quite diagnostic and need not be mistaken. Besides the appearance of tumors, there may be constipation, pain during stools, indigestion, headache and pain in the back. Hemorrhages frequently occur, and if suddenly checked, as by cold, other disturbances may occur, as congestion of the head, lungs, stomach, liver, kidneys, etc., which may result in hemorrhages from these or-

gans. Fissures of the anus, contraction of the rectal sphincters and prolapse of the rectum may occur. Occasionally in old people there is a varicose state of the veins of the neck of the bladder, and in females, of the uterus and vagina, which causes hemorrhages of these organs. The communicating plexus of the spinal canal may be affected, causing weight, numbness and pain, so as to simulate a lesion of the cord. The patient may have a hypochondriacal disposition and be disinclined to work, especially at mental labor.

Prognosis.—Depends upon the predisposing and immediate causes, but a large majority of cases can be cured.

Treatment.—A thorough examination of the patient should be made, not only to ascertain the extent of the local trouble, but to understand thoroughly the general health of the sufferer, especially the state of the heart, lungs and liver.

Many cases of hemorrhoids are caused by lesions in the lumbar and sacral regions, and especially dislocations of the coccyx (usually anterior) and the innominata. Correcting these lesions will oftentimes cure the hemorrhoidal disorder. Simple dilatation of the rectum once a week, in addition to other treatment, is of great aid in curing hemorrhoids, not a few of the cases being cured by dilatation alone. It relaxes the tissues about the tumefied vessels. Treatment is rarely necessary above the second lumbar, (unless there is more or less of a constitutional disorder) as the superior hemorrhoidal blood-vessel of the inferior mesenteric is given off about opposite the second lumbar.

In cases where the abdominal walls have become relaxed, a treatment should be given to strengthen the abdominal muscles and viscera. Particular attention should be given the liver. Treatment should be given over the abdominal muscles directly, and also to the spinal nerves of the same region. The diet should be strictly regulated and the bowels kept loose, and stimulants, indigestible food, full meals and too much meat should be avoided. Injection of cold water before stools is a good prophylactic, and applications of cold water to the protruding pile will be of some help in relieving the congestion. A squatting position during defecation will relieve considerable strain.

Hemorrhoids in the acute state, within twelve or twenty-four hours from the engorgement, yield quickly to treatment. The local technique is to relax the tissues about the tumor, especially above and along the line of the vein, then with pressure at its base carefully force out the engorged blood. Follow this up by another treatment the next day and continue until normal. The vein wall, not being permanently

stretched, will contract and if the irritating cause is found, there is little danger of return. Remember, in a case like this, the danger of embolism and be sure a clot has not formed. Cases of hemorrhage at stool, during or immediately following evacuation, when not from a bleeding pile, may be of considerable quantity and the source difficult to locate. It may be due to ulcerations or easily ruptured capillaries of the mucosa, but the cause will in many cases be found in the innominate and a reduction of the lesion give relief.

Rectal conditions, associated with piles, and **requiring surgery** after treatment has failed, are: **hemorrhoids**, which are of such long standing as to become organized tissue, (these will keep up continual irritation and cannot be absorbed); **sacculae** or pocket, formed by folds of mucous membrane catching and holding particles of feces, gradually enlarging and ending with considerable reflex symptoms; **fistulae**, complete or incomplete, may frequently be healed by adjusting coccygeal or innominate lesions, but are apt to recur from the tract not being clean in the center or bottom; **abscesses** in or about the anus or rectum are usually traced to coccygeal, innominate, or local interference to circulation; **fissure**, complete dilatation under anesthesia to insure physiological rest of parts, is probably the best treatment. It is suggested that a fissure may be healed by making surgically clean, touching with iodine and coating with collodium. **Papillae** are small, hard black-capped papules in the lower rectum, each one involving a nerve terminal and causing much distress. All these conditions give rise to much discomfort and with surgical assistance can be cured without much trouble. It is not necessary to make them a major operation and do uncalled-for things. The less surgery about the rectal sphincter the better.

Care of the **anus** and **rectum** after operation or successful treatment is a factor in preventing return. First, there should be soluble, non-irritating stools, which do not tend to bring about prolapse from straining. Diet and regularity contribute to this. Second, absolute cleanliness. This can only be obtained by following the stool with an enema of four or five ounces of cool water and immediately passing it. It will bring forth a considerable quantity of feces which would otherwise have been retained for another twenty-four hours. This procedure following, as it does, the stool does not in any way interfere with the normal function or create a habit. The anus should then be thoroughly washed in cool water and as thoroughly dried. Dusting with borated talcum powder, starch, etc., will prevent chafing.

GENITO-URINARY

THE PROSTATE GLAND

This gland is subject to several painful and annoying diseases, controlling, as it does, the flow of urine and exerting such a profound influence over the sexual functions. The nerves to the prostate pass between the gland and the levator ani muscle, and the secretory branches are from the sacral nerves, while Quain gives the sensory as from the tenth, eleventh (twelfth) dorsal, first, second and third sacral and fifth lumbar. Lesions affecting the prostate are occasionally found at the tenth and eleventh dorsal and fifth lumbar, while the innominate lesions are common causes of trouble. These should be corrected, if present, and local treatment given to the gland. "Massage of the prostate," says Lydston,¹ "properly performed, is one of the most valuable advances in genito-urinary therapeutics that has been developed in many years." Osteopathic technique is to place the patient on the side, knees flexed, and standing in front insert the index finger. Care must be used not to bruise the gland and it must be touched lightly when sensitive. Relax tissue about the gland, and, then, from the median line with an outward movement, massage the surface of each lobe. This influences the blood and nerve supply, while the pressure will tend to relieve congestion. Length of treatment, as well as frequency, depends entirely upon conditions. Do not make the mistake of treating the perineum instead of the gland and do not gouge it with the finger. Remember it is sensitive tissue.

Hypertrophy is most commonly met with in practice, as twenty per cent. of men past middle life are said to be afflicted. It is probably not a sequence of old age, but due to chronic, congestive and inflammatory conditions. Anything which would produce these conditions—spinal lesions, excessive venery, masturbation, or other more innocent causes—would in time bring about enlargement. As the length of catheter life is estimated at six years it is of great importance that the condition be early recognized, for in advanced stages surgery is the last resort. In early stages the prognosis is good, either for a cure or to stop further enlargement, while many enlarged ones at the catheter stage have been greatly benefited or cured. Treatment of the gland once per week is usually enough, but in older cases can be given semi-weekly. Look well to nerve and blood supply.

Acute Prostatitis is a serious and painful inflammation, causing

1. Twentieth Century Practice of Medicine, Vol. XXI.

urinary retention usually. It results from trauma, horseback riding, over exertion, gonorrhea and its mal-treatment, etc. Lower dorsal and lumbar lesions are frequent. This condition must be closely watched. Inhibition of the sacral nerves will help control pain and stop any spasm of the sphincter. Cold applications to the gland externally at the perineum will aid in reducing inflammation. Local treatment should at first be given to the adjacent tissues as the gland will be very sensitive. Later direct massage will be of great benefit.

Chronic Prostatitis may follow an acute attack or it may originate as a chronic or sub-acute affection. Frequent micturition and dull pain, referred to the perineum and rectum, with the local examination, make diagnosis sure. The spinal lesions should be corrected and the gland massaged. This will induce absorption, by squeezing out the inflammatory products and do much toward preventing future hypertrophy. "Massage is done by the finger. The patient is placed in the knee-elbow position and massage employed for four minutes daily. The value of massage in chronic prostatitis is very great, but should be employed with much caution and never in cases of suppuration."¹

Prostatorrhea is often taken for spermatorrhea and any irritation of anterior sacral nerves would cause undue activity to the secretory nerves to the gland. This is easily determined.

The Seminal Vesicles can be reached just above the prostate, and if inflamed and tender or if engorged by inspissated seminal fluid, local treatment will be of benefit. Frequent massage, daily in some cases, to the gland and treatment to the sympathetic nerves above the trigone of the bladder, to the nerve fibres passing along the spermatic cord, and to the arteries directly, will be of the greatest aid in impotency.

In **Chronic Gonorrhea**, where the gonococcus has found lodgement in and about the gland, it can be more readily dislodged by massage than by any other form of treatment.

Retention of urine from nervous excitement or other minor causes, can often be overcome by local massage of the prostate.

Spastic stricture can usually be cured by work about the prostate and its innervation.

Varicocele

A varicose enlargement^g of the veins of the spermatic cord, epididymis and testicle. In varicocele^f the pampiniform plexus is usually enlarged, but all the veins of the cord^f may¹ be involved. The swelling gets smaller

1. C. Kruger, Munch Med. Woch.

under compression or in a horizontal position and enlarges again on standing erect. It is almost invariably found on the left side, and the testicle on the affected side is generally smaller and softer than its fellow.

The predisposing **causes** are a longer and tortuous spermatic vein on the left side; the absence of support of the veins from surrounding muscles; the imperfect valves; the entry of the left spermatic vein into the renal vein at a right angle, instead of at an acute angle like the right vein; the more liability of compression of the left spermatic vein by accumulation of feces in the sigmoid flexure; the lack of normal exercise of the sexual functions in young, unmarried adults. Lesions in lower dorsal and upper lumbar affect the condition; the eleventh dorsal particularly. A lesion at the second lumbar may cause neuralgia of the testicle with engorgement of the vein.

The exciting causes are straining during stool, heavy lifting, excessive sexual indulgence or anything that would determine more blood to the testicles. Varicocele is similar to the varicose state of the hemorrhoidal veins and may have like causes.

The **diagnosis** is easily made. The feeling of the veins between the fingers like a convolution of earth worms; dull, aching, dragging sensation, and possibly prostration, weakness and dejectedness of spirits, are characteristic symptoms. "The condition is devoid of danger, except that it often begets morbid fears on the part of the patient, usually the result of suggestion."¹

The **treatment** consists of regulation of the bowels, removal of such predisposing and exciting causes as may be found, treatment of the vessels along the spermatic cord, and treatment to the lower dorsal and lumbar regions. In severe cases a suspensary bandage will give temporary relief. Surgical interference may be necessary in some cases in order to effect a cure.

Impotency

Results from treatment in these conditions are particularly gratifying and offer a great field of activity in this day of sensational medical advertising. This condition can well be classed under four heads, Exhaustive, Traumatic, Psychic and Organic.

Exhaustive Impotency is the result of functional abuse, masturbation in early life, excessive venery, coupled with intemperate use of alcohol and improper diet without sufficient sleep. It can be symptomatic in neurasthenia. There is at first irritation of the spinal centers,

1. Deaver's Surgical Anatomy, Vol. II, p. 652.

which causes exaggerated sexual activity, and later this is followed by complete or partial loss of function. The first step is for a radical reform in habits; regulation of the bowels, as they will likely be constipated; direction of the mind into wholesome channels, and then skillfully directed spinal treatment. Where there has been masturbation, look well for sources of irritation to the parts; a long foreskin or adherent prepuce indicates surgical aid, or there may be a lesion at the sacra involving the nervi erigentes or, of greater importance, the pudic nerve. The innominatum can be at fault in this. The lower dorsal, ribs and upper lumbar are of importance. Kraft-Ebing says: "Conditions of absolute impotency are, however, rare, and are caused **only** by severe vertebral and nervous diseases." Nerve irritation undoubtedly is the cause of sexual perversion (outside of heredity and malformation) so their relief is as necessary to bring about reform of habits as to effect a cure. Where the general health is affected constitutional treatment should follow. Motschutkovsky uses suspension in treating these cases with good results. The effect is to separate the vertebrae, freeing spinal nerve and blood channels. The prostate will probably be found in an irritated, sensitive condition, as well as the seminal vesicles. Treat as outlined under the prostate gland. Ligation of the dorsal vein of the penis is recommended by some authorities as tending to aid turgescence of the organ. Prognosis is so dependent on how well the patient follows directions, age, environment and general condition that it is hard to give, but as a rule is rather favorable.

Traumatic Impotency is a strictly osteopathic classification, for the reason that sexual weakness is often traced to lesions resulting from remote injuries. These injuries may be to the spine, ribs or sacrum. The lower spine may be impacted from a fall or the result of long continued riding on rough streets or the railway. This inhibits the nerve supply to the extent of often seriously impairing the sexual functions. If the cord is injured to any extent the results are more serious. Treatment in these cases has given uniformly good results. It will always be due to a specific lesion, so the examination must be thorough.

Psychic Impotency is the form most frequently met with and generally the most difficult to cure, yet it should not be if the patient's confidence can be secured, for in many cases sexual power is but slightly impaired, but owing to the suggestions given by the medical advertisers the victim diagnoses his own case as hopeless. "It is not uncommon that virility returns with the peace of mind."¹ Observe all the procedure

1. Veeki, Sexual Impotence.

given and then inspire hope where it can be honestly given, and if the patient is progressing favorably, other things being equal, advise early marriage under strict rules of conduct. If already married, conjugal relations should be most carefully investigated and the wife taken into your confidence. Her co-operation in correcting very possible errors in sexual matters, as well as sympathetic aid in easing the patient's anxiety and chagrin, will be invaluable. Nothing but the frankest understanding between all parties is permissible and the osteopath must be in absolute control.

Organic Impotency is the result of a cortical injury or disease. The latter is the most common, as it follows tabes dorsalis, paralysis affecting the lumbar cord, some cases of diabetes, etc. Also, any congenital malformations or absence of all or part of the organs. Prognosis in these cases is bad, as cure is seldom possible.

In no other class of cases will honesty, tact and good judgment count for so much or the rewards be greater.

HEAT STROKE

(Heat Exhaustion: Sunstroke)

An affection produced by exposure to excessive heat. Two varieties are recognized; heat exhaustion and thermic fever.

Heat Exhaustion.—This is caused by prolonged exposure to high temperatures, combined with physical exertion. Fatigue, over-eating, alcoholic drinking, and poor sanitation predispose. This may occur without exposure to the direct rays of the sun, the heat being artificial, or in mid-summer, in close, confined rooms the same result will be produced. There is vasomotor paralysis, the surface of the body is usually cool, the temperature may be as low as 95 degrees F., while the pulse is small and rapid.

Sunstroke or Thermic Fever.—This is usually caused by prolonged work under the direct rays of the sun in a humid, very hot and sultry atmosphere. This is caused by the action of the heat upon the heat centers producing a paralysis of those centers.

Pathologically, rigor mortis develops early and is marked. Putrefactive changes appear early, owing to the high temperature of the cadaver. The various organs are deeply congested, the venous engorgement is extreme in the cerebrum. There is rigid contraction of the left ventricle; while the right is dilated and filled with blood. The blood is fluid and dark. Parenchymatous changes take place in the liver and kidneys.

In heat exhaustion with lowered temperature there is a paralysis of the vasomotor center in the medulla, and the heat is dissipated more rapidly than it is produced. In thermic fever the heat regulating centers become paralyzed by the action of the excessive temperature and more heat is produced, and less dissipated than normal.

Symptoms.—Heat Exhaustion.—This may occur gradually or suddenly with a severe attack of faintness, pallor, dizziness, headache, cold perspiration and sometimes blindness as the first symptoms. Consciousness is rarely entirely lost. In severe cases there is more permanent collapse. The pulse is rapid and feeble and there is great restlessness and delirium. Under prompt treatment mild cases may recover in a few hours, while in extreme cases death may occur almost at once from heart failure.

Thermic Fever.—In some cases the patient is struck down, becomes quickly unconscious, and may die within an hour, or death may

be almost instantaneous. In other cases there is pain in the head, oppression, dizziness, nausea, vomiting and sometimes diarrhea or frequent micturition. Soon unconsciousness sets in, the face is flushed, the eyes injected, the breathing labored and there is a temperature of from 105° to 110° F. The pulse is full and rapid, the skin hot and dry and the pupils are contracted. There is usually complete relaxation of the muscles, and in some cases there is twitching and jactitation. Epileptiform convulsions are rare. In fatal cases the coma deepens, the pulse becomes feeble, rapid and irregular, the breathing hurried and shallow and death occurs in a few hours. Favorable cases are indicated by a fall in the temperature and by the return of consciousness. In these cases recovery may be complete. In some cases the patient may never be able to stand even moderate degrees of temperature, which often produce excitement, headache and pain in the cervical region. Failure of the memory, and the loss of power to concentrate the mind are sometimes sequelæ. Meningitis, epilepsy and insanity are also sequelæ.

Diagnosis.—This presents little difficulty. The history and circumstances preceding the attack are very important in making the diagnosis. The diagnosis between heat exhaustion and sunstroke fever is readily made. In heat exhaustion the temperature is **lowered**, the pulse is feeble, consciousness is rarely completely lost; in sunstroke fever the temperature is extremely **high**, there is usually complete unconsciousness, and the pulse is full and rapid.

Prognosis.—This should be guarded, depending upon the severity of the case.

Treatment.—In cases of **heat exhaustion** remove the patient to a shady place and apply water to the face, chest and spine. Thoroughly treat the upper cervical region, in order to control the impaired vasomotor centers and nerves. If the temperature is below normal a hot bath should be given. Keep the heart and lungs stimulated.

In **sunstroke**, place the patient in a recumbent position and loosen all constricted clothing, and stimulate the heart's action. The high fever is to be met promptly. Place the patient in a bath of water, to which add ice freely. The patient may also be rubbed with ice, and ice water enemata may be employed. The muscles of the neck will be found contracted, probably due to cerebral hyperemia. A thorough relaxation of these muscles will be of great aid in equalizing the vascular system. It is a good plan to thoroughly relax all the muscles along the spinal column for the same purpose. When the temperature nears normal the baths should be stopped. After the temperature has been reduced place the

patient upon a cot with ice to the head. The cervical treatment should be repeated as often as necessary. The diet of the patient should be liquid for a few days. Plenty of water and stimulation of the kidneys and bowels will be found beneficial. The sequelæ are to be treated according to the condition. Much can be done for the sequelæ of heat exhaustion and sunstroke. Lesions will be found corresponding to the regions involved. Deep contracted muscles are common.

DEPARTMENT OF OPHTHALMOLOGY

By C. C. REID

It is the desire to make this discussion on the eye the most useful possible to the whole profession. Let it be plainly understood that there is no effort to cover every phase of eye pathology but to elaborate eye diseases and therapeutics strictly from the standpoint of osteopathy. There are many very elaborate and extensive text-books and even encyclopediæ written on the eye by the medical profession. The world of ophthalmic literature is extensive and profound. Just so are the elaborations on the general field of medicine. Such things as hereditary influences, congenital deformities, amblyopias, albinism, coloboma and the field of ophthalmic surgery does not concern us at the present time in an osteopathic text-book. This department is dedicated to a scientific development of ophthalmic therapeutics along osteopathic lines of thought. Some things in the therapeutics of the eye concern all schools alike. For instance, proper cleanliness and antiseptic precautions in regard to the eye, dietetics, hygiene and the care of the general health. The same anatomy and many of the same methods of examination and diagnosis obtain in all schools. It is the intention to go into the ophthalmic therapeutic field in these discussions where osteopathy has a different outlook with a definite distinct reform to offer in the viewpoint of the anatomy, methods of diagnosis and the system of treatment.

How to Examine an Eye

It has been said that one should be a good general man in order to be a competent specialist. This is especially true in regard to ophthalmic therapeutics. Many systemic diseases have eye symptoms and pathology. The same blood and lymph that nourishes and bathes different parts of the body, also circulates in the structures of the eye. In the examination of the eye, heredity, occupation and environment are to be taken into consideration. Osteopathic lesions may exist from falls, strains, twists, blows, colds and exposure and impair the integrity of the metabolic processes of the eye through the nerve connections and blood supply and lay the foundation for a great variety of eye diseases. With these lesions existing about the neck and upper dorsal, it is only required to have some insignificant local irritant to start symptoms and cause pathology apparently out of all proportion to the etiology. It is important then that one understand the nerve centers and reflexes and the

osteopathic logic underlying these conditions or else he must frequently work without a satisfactory explanation of the etiology and consequently be more or less unscientific in his treatment.

The eye examination should consist of the case history, the family history, inspection, osteopathic examination, especially from the fourth dorsal vertebra to the occiput and especial examination of the eye by inspection and other methods.

1. The Case History. Thoroughness of the doctor, or the lack of it, will be readily displayed at this point. Every little thing, as far as possible, that has a bearing on the case should be observed and uncovered in the case history. The physician should want to know every fact that helps him to better understand his case. Patience in hearing the history will often be of great assistance. It gives light on the physical and mental condition of the patient. Much can be gained by being careful and attentive. Notice carefully what he emphasizes and what he thinks is the most important. Inquire in regard to headaches, nervous symptoms, previous eye trouble and past illnesses. Get a venereal history if present, as many eye diseases are complicated or caused by syphilis or gonorrhea.

2. The Family History.—Inquire as to blindness in the family and about the age it occurred, if any. Get a venereal history if possible.

3. Inspection.—Much inspection can go on while the history is being taken. Observe the countenance, whether there is strabismus or frowning due to eye strain, photophobia as suggested by the effort to avoid the light; note symmetry. Look closely at the lashes, lids, conjunctiva, cornea and iris. Note any scales or crusts on the lids at the root of the lashes. Turn the lids for further inspection. Note the size and relation of the eyes. Exophthalmos may be due to an enlarged globe in high myopia, to Graves' disease, orbital tumor and paralysis of the extrinsic muscles, or staphyloma. In blepharospasm there may be a corneal ulcer or a rupture of the eye-ball. An exact examination must be made at the first visit in order for a diagnosis to institute the best treatment possible. Study the conjunctival sac for congestions, hypertrophy, swelling, tumors, foreign bodies, trachoma bodies and secretions. In all forms of conjunctivitis the congestion is most marked in the fornix and decreases toward the sclerocorneal junction. In iritis and cyclitis there is a circumcorneal injection, a pink or red color radiating from the cornea. Note any corneal pathology in the way of ulcers or abrasions and foreign bodies. Compare the tension of the eyes.

4. The Osteopathic Examination of the Eye.—This heading is

put here in order to show what osteopathy has to offer that is distinct as belonging to our system and not practiced by any other school. Osteopathic research so far has shown that osteopathic science has much to offer on etiology and diagnosis and treatment in eye diseases. The case history, family history and inspection should require but a few minutes but they are essential to a proper examination and may aid us in what to expect osteopathically. Weak nerves will cause asthenopia. A broken arch, an innominate lesion or a slipped axis may cause weak nerves. The osteopathic eye examination then should consider the whole mechanism of the body. In case glasses are being worn for asthenopia they may readily be made unnecessary by osteopathic treatment in the correction of the lesions and building up the system. Some time ago some parents sent their daughter to me to have her eyes fitted for glasses. They stated that she had been to different doctors and opticians and no one had ever given satisfaction. They said she was all right every other way if her eyes were properly fitted with glasses. They did not want her examined or treated otherwise because she would be well every other way with correct glasses. Her vision was right eye 5-20, left eye 5-15 or about one-fourth vision in each eye. A plus .87 diopter sphere combined with a plus 3 diopter cylinder in axis 90 gave her perfectly normal 5-5 vision in each eye. This gave her perfect satisfaction until she started to school in September, a couple of months later. Before the end of the first month she was having trouble with her eyes and was again sent to me by her parents. Her vision was reduced to 6-15 in each eye with her glasses on. She wondered and no doubt the parents did, if it was not another case of a misfit in glasses similar to all her previous experiences. This time I insisted upon a thorough physical examination against all protest. The following lesions were discovered: the left innominate was up and back or tilted posteriorly, first lumbar anterior and to the right, sixth and first dorsals to the right. The case was not refracted again. I took particular care the first time and I was quite sure the refractive error was corrected. It was all explained to the parents and regular osteopathic treatment was begun. In less than a month practically every lesion was corrected, her vision returned to normal and she also was cured of an annoying backache with which she had been bothered for years. Her nerves were depleted a great deal. She got benefit in ways that she had not dreamed of. This approach to the eye is not considered by physicians in general, even the oculists. I have had about ten special courses in medical colleges and hospitals on the eye, ear, nose and throat, and I have never heard anything mentioned

that would indicate any ideas of the logic involved in this case. Surely osteopathy has much to offer in eye troubles that is new and unique. The osteopathic examination of the eye then should begin with the feet, goins then to the innominates, lumbar, dorsal, ribs and cervical regions. Oculists are too prone to rely upon crutches (glasses) in the treatment of asthenopia.

It is easy for the osteopath to conceive how lesions of the upper dorsal and cervical regions may occur and disturb the nerve and blood supply to the eye. This is why asthenopia appears so frequently with ordinary use of the eyes, even without abuse or refractive errors.

The Lumbar Region

The lumbar region should be carefully examined, especially for any curvature which might cause a disturbance of the equilibrium above. Compensatory curves or individual lesions would be the result with a consequent interference with the integrity of the nervous reflexes to the eye.

The Dorsal Region

The same may be said of the dorsal region as of the lumbar in regard to curvatures. There is one individual lesion in this region that very frequently exists with eye troubles, i. e., the 2nd dorsal vertebra lateral. Any of the upper four dorsals in lesion may be a causative factor in predisposing to disease of the eye but it has been my observation that the 2nd is involved most often. In severe headaches due to eye strain from refractive error, a good diagnostic symptom is tenderness and contraction at the 2nd dorsal even when there is no subluxation.

The Cervical Region

This region should have particular care in search for individual lesions. It is quite easy to pass over some small cervical lesion that may be causing serious disturbance, especially if the neck happens to be fleshy. I have corrected cervical lesions and stopped twitching of the eyelids (orbicularis palpebrarum) and other muscles about the face.

The first case I ever saw was twenty-two years ago when I was a junior at Kirksville. Dr. F. P. Millard, now of Toronto, was a room mate of mine. He was constantly annoyed by a twitching of an eyelid. I did not find any lesion for it. We went one day to see Dr. Still at his home and told him of our difficulty. He said without examination that the 3rd cervical was in lesion. There was a senior student present whom the "Old Doctor" directed how to use the proper technique. There was

a sharp pop, the vertebra evidently went into right relation, the twitching stopped. I understand the patient has had very little trouble since.

Injuries, exposure and strains to the spine may have antedated an innominate lesion and caused weak joints, muscular and ligamentous tension, local inflammations and partial immobilization of joints. All this would have its modifying effects upon the manifestation of secondary lesions from the innominate abnormality. This makes the study of the bony relations very complex and the effect upon the numerous blood vessels, nerves and other soft tissues still more complicated.

The Cilio-spinal Center

Following osteopathic examination and giving proper importance to lesions below the fourth dorsal vertebra, we must remember a special significance to be attached to lesions of the **upper dorsal** in relation to the eye.

Almost any author on nervous diseases or diagnosis will discuss this center. Many of us have it not sufficiently impressed, hence I repeat some known relations. The **cilio-spinal** center consists of a nuclear group of cells in the lateral horn of the last cervical and two upper dorsal segments of the spinal cord. From this nucleus fibers pass to the anterior division of the eighth cervical and first and second dorsal nerves and become the white rami communicantes which are efferent in their function. These fibers pass to the **inferior cervical sympathetic ganglion**, thence upward with the sympathetic trunk through the **middle** and **superior cervical sympathetic ganglia**, along the carotid plexus to the vessels of the face and eye, to the glands of that region, to the unstriped muscular fibers of the levator palpebræ superioris and to the **dilator pupillæ muscle**.

Any strong feeling or emotion (which of course is perceived and interpreted by the brain cortex) will cause a dilatation of the pupil of the eye. The cervical sympathetic being cut, dilatation does not take place. The rami of the cervical, first and second dorsal cut, the phenomenon stops. It is evident the cilio-spinal center is under the influence of a center or centers in the brain. Bing says "There is even an idiomotor mydriasis, which may be brought about by a very vivid mental conception of darkness."

It has been noted that paralyzing lesions of the cervical sympathetic, of the last cervical and two upper dorsal segments of the cord, and of the anterior roots and rami communicantes of the same, will result in myosis.

The efferent rami are also vasomotor, secretory and trophic. It must necessarily follow that congestive and inflammatory conditions, secretory perversion of the lachrymal, Meibomian, Zeissian and perspiratory glands, and disturbance of the normal nutrition of any of the orbital tissues may result from lesions of the lower cervical and upper dorsal vertebrae.

Osteopathically we know that such a lesion may not be sufficient to be paralytic in its effect, but stimulatory. In this case we may note a pupil habitually too wide and more or less photophobia from a superabundance of light. The unstriped muscle fibers in the levator palpebrae superioris may be unduly contracted making an appearance of a slightly bulging eyeball when it is only a wide open eye.

One who has eye strain from a refractive error, overuse of the eyes, or unbalanced muscles will as a rule have tenderness at some spot in the region of the **cliospinal** center. A mechanical lesion at that part of the spine may or may not exist in such conditions, but I believe the soreness is there every time. This is one of the diagnostic points in differentiating **headache** of eye strain from other conditions.

White rami are only in the dorsal region and to the second lumbar and from the second, third and fourth sacral. It has been noted that lesions of the cervical vertebrae do not have as profound an effect upon the eyes as do lesions of the first three dorsal vertebrae. The plausible explanation of that is that the cervical vertebrae have no white rami from their corresponding nerves in the bulbo-spino-sympathetic-ciliary are as have the upper dorsal.

From all the foregoing statements one can readily contemplate the intricate complexity of our osteopathic problems in relation to the eye. Combine this logic of the lesions outlined and the ramifications of the structures with their normal and perverted functions and combine it with contributing causes, such as infection, exposure, irritants, etc., and amidst the great diversity we reduce much miscellaneous, unclassified material to a degree of simplicity. Many otherwise unexplainable conditions become reasonably clear.

Dr. Louisa Burns under "The Experimental Demonstration of Osteopathic Centers" has this to say:

"Somatic Reflexes"

"In the first series of experiments, the electrodes were placed upon the nasal mucous membrane of animals under anesthesia. The muscles near the third thoracic vertebra were at once strongly contracted....

"The electrodes were then placed upon the conjunctivæ. The muscles near the second vertebra were then contracted. There were also slight and inconstant contractions of the cervical muscles....

"The electrodes were placed upon the eye ball. The muscular contractions were sometimes noted near the second thoracic vertebra, but the reaction was not constant. The cervical muscles were scarcely contracted at all.

"The electrodes were placed upon the outer surface of the eye lids. The facial muscles were contracted very quickly and forcibly, but no contraction of the muscles of the upper dorsal region were noted....

"The **superior cervical ganglion** was exposed to view, and the electrodes placed upon it. The pupils became greatly dilated, the conjunctivæ became lighter in color, and the mucous membranes of the nose and throat were also lightened....

"The **Gasserian ganglion** was exposed to view. The ganglion was stimulated directly. The upper thoracic muscles were very strongly contracted, and the blood vessels in the area of the distribution of the fifth nerve were immediately and strongly contracted. Some of the sympathetic fibers are carried by way of the fifth nerve. In order to exclude the effect of the direct stimulation of these fibers, the fifth nerve was cut, and the central end was stimulated by the electrodes. The muscles of the upper thoracic region were contracted, as before. The vessels in the area of distribution of the fifth nerve were contracted after latent period of a minute or so....

"The stimulation of the central end of the cut fifth nerve caused strong muscular contractions in the upper thoracic region, and also constriction of the vessels in the area of distribution of the fifth. Direct stimulation of the superior cervical ganglion produced effects identical with those produced before the mutilation.

"The spinal cord was cut above and below the superior cervical ganglion. This cut was made from behind, and the sympathetic chain was uninjured. The effects noted after both operations were the same, and can be described as one.

"The stimulation of any cranial structure failed to cause reflex contraction of the muscles in the upper dorsal or the cervical region.

"Stimulation of the cranial structures did not produce any vascular changes except those which might be referred to the direct effects of the electricity upon the vessel walls.

"Direct stimulation of the **superior cervical ganglion** produced the effects noted before mutilation.

"Therefore the cervical portion of the spinal cord is an essential element of the reflex arc by way of which sensory impulses from the cranial structures are able to affect the condition of the upper dorsal muscles, and also in the path by which these impulses are able to affect the size of the blood vessels of the cranial structures themselves....

"Mechanical stimulation of the tissues near the second thoracic spine was followed by a contraction of the blood vessels of the cranial mucous membranes and the conjunctivæ, by a dilatation of the pupils, and an increased secretion of saliva. These effects were practically invariable....

"The superior cervical ganglion was subjected to mechanical stimulation by the manipulation of the tissues over it. In animals, this maneuver was followed by dilatation of the pupils and by a contraction of the cranial vessels, which was soon followed, if the stimulation continued, by a dilatation which was rather persistent.

"After the **extirpation** of the **Gasserian ganglion** without the injury of the sympathetic nerves, the mechanical stimulation of the tissues near the second and third thoracic vertebræ caused the same vaso-constriction and **pupilo-dilation** as was observed in the animal before mutilation.

"After the destruction of the cervical portion of the sympathetic chain, and after the extirpation of the Gasserian ganglion in most animals, the mechanical stimulation of the tissues in the upper dorsal region did not produce any perceptible effects....

"Mechanical stimulation of the tissues near the second and third thoracic spines caused dilatation of the pupils and contraction of the vessels of the cranial mucous membranes.

"Inhibition, or the maintenance of an artificial lesion, caused dilatation of the vessels of the nasal mucous membranes and of the conjunctivæ. The eye ball was also somewhat congested. The pupils were dilated in this case also."

The Nose and Throat in Eye Trouble

An examination of the eye would not be complete without a careful inspection of the **nose and throat**. The same nerve and blood supply that go to the eye is tied up so definitely with the nose and throat that when there are lesions of the nose and throat the eye is often affected

secondarily. Just recently a case of **dacryocystitis** came into my office. After I had carefully examined her eye, spine, nose and throat, she informed me that she had been to three eye specialists before and not one of them had ever looked at her nose and throat, not to mention the spine. She had cervical and dorsal lesions, and **diseased tonsils**. The **inferior turbinate** on the side of the dacryocystitis was curled out so that it lay against the external wall of the nose almost if not altogether blocking the entrance of the **lacrymal duct** to the inferior meatus. This was evidently the predisposing cause of her dacryocystitis.

In **neuralgia** of the eye, **blepharitis**, **obscure pain**, **conjunctivitis** and often deeper troubles you will find a bad condition of the **nasopharynx**, such as adenoids, vegetations, pus pockets, adhesions in the fossa of Rosenmuller, contraction of the soft palate, disturbed relations of the septum and turbinates, sinus trouble, poor drainage, exostoses and polyps. In eye disease all these things should be discovered if they are present, in order to get best results and in order to make a careful diagnosis.

Examination of the Eye by Special Methods

The first thing after the family history, personal history, inspection of the eye and the osteopathic examination, is to find out how well the patient can see. To test the acuteness of vision certain test letters are used. Snellen's Test Letters are good. The normal eye can read 3-8 inch letters at twenty feet. The test letters on the cards usually range in size to be read at 10, 15, 20, 30, 40, 50, 70, 100 and 200 feet. The most desirable distance is 20 feet. If at the distance of twenty feet he reads the 3-8 inch letters his acuteness of vision would be marked 20-20 or normal. Always use the distance between patient and chart as the numerator of the fraction and the number above the letters which he reads as the denominator. If he is twenty feet away, the numerator remains twenty and the denominator changes according to the line of letters seen on the test cards thus: 20-15, 20-30, 20-70, or 20-200 may express the vision. If the patient could not see the 200 feet letters at 20 feet he must be brought nearer, say 10 feet, for him to see the large letters; his vision would be 10-200. These fractions representing the acuteness of vision may be expressed in meters. Some charts have letters numbered that way.

If the vision is good enough for small objects to be clear, the near point should be taken. This would show the amount of accommodation of the eye. This is expressed in diopters.

A **dioptr** is the unit of measurement of the **refractive** power of lenses. **Lenses** are numbered by their refractive power in dioptrers. A lens that has a curvature that will refract parallel rays of light and bring them to a focus at one meter distance is said to be a one dioptr lens. This unit of measurement for the refractive power of lenses was proposed by Nagel in 1866. It soon became quite generally used.

The focal distance of a lens decreases as the strength of a lens increases. One dioptr lens (written 1D) has a focus of one meter (1 M) or 100 cm distance. A 2 D lens has a focal distance of 1-2 M or 50 cm. A 4 D lens has 25 cm focal distance and a 1-2 D lens has $100 \text{ cm} \div \frac{1}{2} = 200$ cm distance or 2 M. Trial cases have in them lenses varying in strength from .12 D or .25 D to 20 D of the spheric form. We will not discuss the trial case here.

Accommodation in the Eye

Accommodation in the eye is the ability of the eye to vary its focal point. When the normal eye (emmetropic) is at rest its focal point is at infinity so far as parallel rays are concerned. This is called the far-point or the "**punctum remotum**" (P. R.).

When the eye looks at letters twenty feet away it scarcely accommodates at all to get a focus, or so little that it may be disregarded in ordinary practice. Now if one brings fine print close to the eye he will find a point so close that it becomes indistinct. This point is the near-point of focus or the "**punctum proximum**" (P. P.). The range of accommodation is the difference between the refractive power of the eye when it is at rest and when the accommodation is exerted to the utmost, the difference between the P. R. and the P. P.

If one must accommodate one dioptr to get a focus at one meter or forty inches distance, at thirteen inches or reading distance one must accommodate at least 3 D in order to see the letters clearly. If 3 D were the total of his accommodation he could not read at that distance but a few minutes; because the accommodation could not be held at its maximum for long at a time. Eye strain with its train of symptoms would result. Hence it is quite important to find the near-point or punctum proximum in order to judge in regard to eye strain in an emmetropic eye. If there is a refractive error, allowance for it must be made accordingly.

As a person gets older the accommodation in the eye becomes less and less until at 45 years of age he can only use 4 to 5 D of accommodation. This is so close to the amount required for reading that he has some eye strain. He begins to hold his paper farther away from him so

he requires less accommodation. This condition we call "old sight" or **presbyopia**. An emmetropic eye at forty-five to fifty years of age requires a plus glass to make up for some accommodation in reading.

Frequently there are latent disturbances of equilibrium of the extrinsic muscles of the eye. This is **heterophoria**. If it is a latent convergence it is **esophoria**; if a latent divergence it is **exophoria**. The latter is more frequent. Hyper- and hypophoria are used for upward or downward tendencies. Normal muscular balance is **orthophoria**.

Cause the patient to fix on an object about thirteen inches away with both eyes; push a sheet of paper in front of one eye and watch behind the paper, the eye thus covered. If heterophoria exists the eye will move slightly from its point of fixation since it no longer sees the object. In orthophoria it will remain fixed as long as the other eye sees the object; the innervation to the different muscles is properly distributed.

A Maddox rod found in any complete trial case may be placed before one eye. Have the patient fix on a candle flame, say twenty feet away. The flame appears drawn out into a luminous line. This line can not be fused with the candle flame as the other eye sees it if there is heterophoria. The amount and kind of disturbance is somewhat indicated by the distance and direction of the luminous line and the flame. The exact amount can be measured by the use of a prism that will cause them to fuse.

Next the patient should be taken to the dark room and a careful inspection of the anterior segment of the eye should be made with oblique illumination. First use the unaided eye, then use a lens that magnifies. The 20 D plus lens from your trial case will suffice for the magnification. Note the transparency or lack of it in the cornea and crystalline lens; the depth of the anterior chamber and the appearance of the pupil and iris. Now we are ready for the ophthalmoscopic examination.

The Ophthalmoscope.—This is an instrument that commands great respect. Any one who is interested in eye troubles must have and use the ophthalmoscope if he expects to be efficient in diagnosis, upon which, of course, intelligent treatment must forever depend. One must try and try again in order to become proficient in the use of the ophthalmoscope.

A Schematic Eye is of great assistance to a beginner who does not have clinics or patients on whom to practice. Such an eye with full directions can be obtained at almost any optical goods store. It will make the study of ophthalmoscopy easy and interesting. The pupil can

be regulated to any size and the eye can be made short (hyperopic), long (myopic) or normal (emmetropic) for study.

The efficient use of the ophthalmoscope makes the diagnosis of internal diseases of the eye as easy as the diagnosis of external diseases of the eye. Only some rare conditions will puzzle, and that is true of any part of the anatomy.

The ophthalmoscope is a simple instrument; its chief function is to illuminate the interior of the eye. The value of ophthalmoscopic findings depends on their correct interpretation by the examiner.

The ophthalmoscope has a mirror to reflect the light into the eye. It has two discs on which are mounted convex (plus) and concave (minus) lenses. The larger disc has seven plus and eight minus lenses. To these may be added the lenses in the smaller disc making many combinations.

A drop of a 2% solution of cocaine or homatropine may be used as a mydriatic where one can not otherwise see clearly the fundus. If no mydriatic is used a somewhat weak illumination should be employed in order not to arouse the accommodation to much activity and make the pupil small. If there is any opacity in the media a strong illumination should be used. The room should be dark; the darker the better.

There are two methods of using the ophthalmoscope. The **indirect** and the **direct** methods. One is more useful at one time and the other at another time. By the indirect method we view the whole field of the fundus more readily but less in detail. With the ophthalmoscope before his eye the examiner's face is twelve to fifteen inches from that of the patient. When the "**red reflex**" of the eye is seen a plus 13 or 16 D lens is interposed near the patient's eye. This magnifies the field. The image is inverted. As a rule it is best seen with a +4 D lens in the aperture of the ophthalmoscope.

This method is especially more satisfactory in high degrees of myopia and astigmatism. The **optic disc** is the objective point. One may see a retinal vessel first; this should be followed to its emergence from the disc. From this point view all parts of the fundus by having the patient look in different directions. This is better by the indirect method than for the examiner to vary his position.

The direct method of ophthalmoscopy is better for detail work and in all cases except high degrees of myopia and astigmatism. It is also better in determining errors of refraction. The patient looks straight across the room. For a beginner it may be essential to dilate the pupil, hence the schematic eye as suggested.

If the examiner has a refractive error, he should wear his own glasses or correct by throwing in front of his eye proper lenses in the ophthalmoscope. Face the patient and sit on the side of the eye to be examined. Use left eye to examine the patient's left eye and right eye for the patient's right. Examiner and patient keep both eyes open. The examiner may not be able to suppress the image of his other eye and may have to close it part of the time. Catch the "red reflex" some 15 to 18 inches away and move close to the patient's eye. The "red reflex" color varies with the error of refraction, the transparency of the media, the degree of pigmentation and the size of the pupil. A blood clot will make it redder, some exudates will make it gray or yellow.

The examiner may approach as close as half an inch from the eye to be examined. Find the optic disc and examine all points of the fundus from it. Rotate in glasses to correct the patient's refractive error if he has any. The strongest plus glass with which the fine retinal vessels can be clearly seen will represent the **hyperopia** of the eye. This is true only if the examiner's accommodation is at rest. The weakest minus glass with which the fine retinal vessels can be clearly seen represents the **myopia**.

A Normal Fundus.—The color of the fundus is due to the blood vessels of the retina and choroid and the connective tissue of the choroid and sclera. Variation is due to the pigment. In the albino it is light pink. In the negro it is dark reddish. There are all gradations between the two.

The **optic disc** is the end of the optic nerve as it comes into the eye; it is circular in shape, pink in color, and sharply defined. It is about 1-16th of an inch in diameter; about 15° to the nasal side of the pole of the eye and slightly above the horizontal. There may be a dark **choroidal ring** around the disc or part way around. There may also be a white ring caused by the sclera. As a rule there is a depression in the center of the disc out of which the retinal vessels emerge and spread out over the fundus.

The **fovea centralis** or point of clearest vision is located two and a half disc diameters to the temporal side of the disc. Around this is a circular area of light yellow, the **macula lutea**.

The subject of ophthalmoscopy has been touched upon somewhat in detail because of its great importance to the general practitioner. Every osteopathic physician should know the ophthalmoscope well enough to recognize the ordinary lesions inside the eye. When we take up pathological conditions of the eye we will have occasion frequently

to refer to the ophthalmoscopic appearance. Without the use of this instrument all of our clinical field research on internal diseases of the eye is valueless. Many have told me they have cured cataract with osteopathic treatment, some say they have cured specific neuroretinitis with no sequelæ, others testify to opacities and blindness from various causes. Invariably we ask if they used the ophthalmoscope in their diagnosis and with it watched the progress of the case. Almost invariably the answer is "no, it looked like it," "the symptoms indicated it," or "Dr. so and so, an oculist diagnosed it as such." Fellow Osteopaths! we can not base our claims on this kind of data. With a little study and practice the ophthalmoscope can be mastered. Not till then can we get reliable statistics on internal diseases of the eye in our case reports. Osteopathy has much to reveal to us in this field and for the sake of the science and our patients we appeal to every one to do the work here set forth.

Diseases of the Eye

OSTEOPATHIC MANIPULATION FOR EYE DISEASES

A general correction of lesions should be made in order to give perfect alignment and equilibrium. Lesions that affect the nerve and blood supply will be found from the fourth thoracic to the occiput; more often at the occiput, atlas and axis in the cervical region and the second and third thoracic in the dorsal region including the ribs.

Correction of these lesions must have specific attention in every case of eye disease that shows any tendency to chronicity or in repeated eye disease and exacerbations.

A thorough upper spinal treatment to insure good mobility of all joints and establish freedom of fluids and forces is recommended.

The **nose, throat** and **sinuses** should be examined for pathology. If the tonsils and pharynx are not normal the cotted index finger should be introduced into the mouth until the anterior pillar of the fauces is reached. A mouth gag may or may not be used. Massage the tonsil through the anterior pillar then move to the top and press down on the tonsil with a pumping motion. Repeat this from below the tonsil and posteriorly. Slip the finger under the soft palate and stretch it thoroughly. Clean out any adhesions and vegetations in the vault of the nasopharynx and fossa of Rosenmuller. Stretch the pillars of the fauces by pressing down on each side at the root of the tongue.

If the sinuses are diseased they should be drained. If the nose is diseased and has abundance of secretion, first use irrigation for cleanliness.

Manipulation in the nose will be of great benefit in some eye diseases as pathology there frequently has an important bearing on diseases of the eye. The nose is often too narrow and contracted. The first inch of the nose is muscular and cartilaginous; it is of even more importance to dilate the nose in contracted conditions than it is the sphincters at the lower end of the rectum. The great benefit derived from rectal dilatation has been recognized for years.

In dilating the contracted nose a wide blade nasal speculum may be used. The cotted and oiled little finger may be used where it is properly adapted in size. The dilating can be done with practically no pain and no damage to membranes or other tissues. It should not be extended beyond the cartilaginous and muscular part. Manipulation of the turbinates and tissue further back may be done if needed, by the use of instruments. The Edwards turbinate adjuster instrument (Aloe Co., St. Louis) or the Ruddy Nasal Third Finger (Sharp and Smith, Chicago) are the best instruments so far devised for this operation.

A thorough stretching of the **eyelids**, manipulation of the **eye ball** and the points of the fifth nerve are indicated in many diseases.

The lids may be stretched by pulling them from side to side. The cotted forefinger well oiled (sterile vaseline) may be slipped into the conjunctival sac back of either lid and with the thumb on the outside the lid may be massaged or stretched in any direction. The points of the fifth nerve may readily be influenced at their respective exits about the orbit. The eye ball and deeper contents of the orbit can be profoundly treated by pressing the finger into the orbit above, below and at the sides of the bulb and pushing it in all directions as far as possible. The Ruddy eye finger instrument was devised for this deep manipulation of the orbital and bulbar structures. It is of high value. One finger may be laid on the closed eye and with a tapping motion with the other hand a vibration or oscillation of the orbital structures may be had. This is a useful treatment.

The wise selection and skillful use of these various methods of treatment for the eye will solve most of our difficulties.

This short survey of osteopathic methods will aid us in the more specific discussions to follow.

Neuralgia

A considerable number of people seem to be subject to attacks of pain in one or both eyes. These attacks of pain come at varying intervals; in some cases several times a day, in others as far apart as one or two weeks. The pain will suddenly start almost without warning and

with very little provocation, and last from one to twenty-four hours. It is very severe and the patient frequently thinks something terrible is wrong. Something terrible is wrong so far as his comfort is concerned. But in these cases to which I am referring there is no organic trouble with the eye. The patient does not need glasses. There is no sign of inflammation. Vision is not disturbed. Local examination of the eye with the ophthalmoscope reveals that the fundus of the eye is normal. There is no symptom connected with the eye except pain, occasionally accompanied by a slight redness. I have had several cases in my own practice and my attention has been directed to cases of other physicians.

These cases differ from *tic douloureux* in that there is no muscular spasm. In fact, motor nerves do not seem to be involved. The involvement seems to be largely in the **fifth cranial nerve**, usually the supra-orbital, or other smaller branches of the ophthalmic division of the fifth cranial. Sometimes we note slight dilatation of the pupil with more or less congestion. This would indicate an involvement of the sympathetic branch to the eye.

The lesions discovered in these cases have been a subluxation of the occiput upon the atlas or an upper cervical lesion and frequently some involvement at the second dorsal. There has been noted also trouble in the nasopharynx such as contractures of the muscles of the soft palate and adhesions in the fossa of Rosenmuller.

Misplacements of the uterus have also been found in some cases.

Treatment

Nearly all these cases are curable with from one week to six weeks treatment. Of course the treatment must be intelligently directed after a correct diagnosis as to the cause. The cause can usually be removed. One case to which my attention has been directed was that of a woman about forty years of age who had very severe pains. With all the local treatment of the eye and otherwise she got practically no results until she had replacement of the uterus, which brought immediate relief. Other cases have no trouble on that kind but have lesions of the cervical region and on correction of these lesions the neuralgia disappears. Other cases have had the nasopharynx cleaned out by the finger operation and the stretching of the soft palate which relieved the neuralgia immediately or in a few days. Numbers of cases have been to medical physicians and had various eye remedies administered locally with no permanent benefit. Of course the treatment was administered at the wrong place.

The ramifications of the sympathetic and fifth cranial nerves are so complex and far-reaching that we must keep in mind that one or more of many causes for the trouble may exist and be quite remote from the seat of the pain.

Diseases of the Eyelids

Occasional factors are bee stings or insect bites, which completely occlude the palpebral fissure. We may have some palpebral edema from lid abscesses, chalazion, hordeolum, dacryocystitis, panophthalmia and so forth. In **hemorrhagia subdermalis** there is so much spongy tissue beneath the skin about the eye that the blood extends easily and far. The red tint will soon change to a reddish blue and then become dark, what is known as a black eye (ecchymosis). This frequently results from a blow. The skin is sharply attached around the orbital margin by tense connective tissue so the area of the hemorrhage is limited to the region of the orbit. There may be spontaneous rupture of some of the vessels by hard sneezing or coughing, especially in young children. In older people it may indicate a fragile condition of the vessels, arteriosclerosis or some trouble with the kidneys. The diagnosis of the eye condition is not difficult but the cause of the hemorrhage in that region might be investigated further. Local treatment is of some value in these conditions. They may be soothed by cold compresses. In bee stings and insect bites use an alkaline compress. Manipulation about the eye and osteopathic treatment of the neck with a view to directing a better circulation to that region will aid much.

Herpes Zoster Ophthalmia

This affection of the supraorbital branch of the fifth cranial nerve may extend to the eyelids. It may not go beyond the stage of blistering and redness with some edema. However, it is possible for it to become gangrenous and even extend to the conjunctiva and cornea. I had one case of herpes zoster gangrenosa of this region. There were several gangrenous spots as large as a dime on the forehead and extending down in the region of the eyelid. The process extended to some extent on the cornea and in healing left a condition of irregular astigmatism.

Treatment.—The prognosis in herpes zoster is always favorable under osteopathic treatment. Lesions of the cervical region will almost invariably be found interfering with the sympathetic connections of the fifth cranial nerve causing the trophic disturbance to the region. Osteopathic treatment applied to these conditions will always hasten normalization. The affected part might be kept covered with some soothing lotion to keep the skin soft.

Hordeolum

This is commonly known as a **sty**. It is due to suppurative of the **glands of Zeiss**. It is a harmless affection but causes pain and inconvenience.

Diagnosis.—Swelling and pain with a small inflamed nodule in the palpebral margin is quite diagnostic.

Treatment.—The circulation is obstructed in this region. The effort should be made to open the circulation before pus has formed. This can frequently be done and the hordeolum aborted by carefully picking up the eyelid and rolling the nodule between the fingers. This will cause some pain but if it is kept up for a moment or two about every hour through the day with an occasional thorough treatment of the neck the sty will usually be aborted. If pus forms it should be opened as soon as it points and then the squeezing and rolling process may be employed again, which will aid rapidly in the freeing of the circulation.

Chalazion

This is a **Meibomian cyst** in the eyelid. It shows as a circumscribed swelling on the inner side of the lid. It frequently becomes large enough to produce some deformity of the lid. A chalazion is movable on the tarsal cartilage. It is a chronic condition and the cyst may become as large as a bean. There may be more than one in the same lid.

Treatment.—When a chalazion is small and not of long standing it can frequently be cured by osteopathic treatment. Introduce the finger into the conjunctival sac under the lid, and with the thumb externally, grasp the chalazion between the finger and thumb; roll it thoroughly. Squeeze and massage it two or three times a week for awhile. This, combined with a thorough treatment of the neck, will result in a cure. If at the end of six weeks the condition has not disappeared surgery should be resorted to.

Blepharitis

This is an inflammation of the eyelid. It is either **acute** or **chronic** according to the cause. Acute blepharitis may be due to heat or injury. Chronic blepharitis affects the glands of the lid causing a perversion of the secretions. There is usually the formation of crusts and scales. This condition is known as **blepharitis sicca**. In some cases infection will form little pustules at the roots of the cilia. There is soreness and aching. There may be photophobia. The nasal region may be in-

volved. Osseous lesions of the cervical region are usually present. Refractive errors frequently exist in these cases. Occupation or environment may expose to dust or wind sufficient to keep up the irritation.

Treatment.—Change environment. See that there is thorough cleanliness of the lid. Rub or pick away all scales. Use a bland ointment. Correct any cervical or upper dorsal lesions.

Ptosis

This is **congenital** or **acquired**. In congenital ptosis operation seems to be the only treatment. Acquired ptosis is amenable to treatment frequently. The cause is some lesion interfering with the passage of proper nerve force to the levator muscle of the lid. The lesion may be at the origin of the third nerve, at the cortical nucleus in the sigmoid gyrus or in the trunk of the third nerve, or a lesion of the muscle itself. Tumor, trauma, syphilis, sclerosis, hemorrhage, gout or rheumatism, or anything that will produce a peripheral neuritis are causative factors. Lesions of the cervical and upper dorsal by reflecting back upon the nerve centers may produce a ptosis.

Treatment.—Remedial measures according to indications. Cases due to osteopathic lesions as indicated will usually yield readily to treatment. Where there are other factors treatment must be varied accordingly.

Trichiasis

This is a condition in which part or all of the eye lashes turn inward and touch the eye ball, due to cicatricial contractions in the conjunctiva and tarsus. Many of the cilia are so small in these conditions that it is very difficult to see them. A loupe or a magnifying glass must be used in order to discover them.

Dystrichiasis is a condition where the cilia come in irregularly growing in all directions, some of them turning in toward the eye ball and causing irritation.

Treatment.—An epilatory should be used to extract all of the wild hairs. Care should be taken to get out the finest ones as they will frequently cause irritation if not removed.

Entropion and Ectropion

Entropion is a turning in of the eyelid and **ectropion** is a turning out. These conditions may be spasmodic and temporary. Entropion is more often due to cicatricial contraction in old blepharitis or trachoma conditions. In some cases the condition may be corrected by the use of

strips of adhesive plaster. In cicatricial conditions operation is the rule. Spasmodic ectropion may be corrected sometimes by curing the conjunctivitis. Bandaging may be resorted to. In paralytic ectropion osteopathic treatment may serve to produce a complete cure. Operative procedure should be a last resort.

Diseases of the Lachrymal Apparatus

Dacryocystitis

Dacryocystitis is an inflammation of the lacrymal sac. It is due to some lesion in the nose, malposition of the inferior turbinate or a poor blood and nerve supply to the lacrymal region as determined by cervical lesions. The sac becomes infected and we have a **dacryocystoblenorrhoea**. Pus and tears are regurgitated into the eye through the puncta. There is irritation and the conjunctiva may become infected at any time, also the cornea. It is a dangerous and annoying affection.

Treatment.—Osteopathic measures have something to offer along this line. The medical idea seems to be completely surgical in recent years. The first and only thing to be done surgically is to obliterate the sac or dissect it out and curette the nasal duct, completely destroying the apparatus. Lancing does not affect a cure. By treating for a good nerve and blood supply to that region, the irrigation of the nose and a thorough squeezing of the sac each time with a view to forcing the solution in the sac down through the nasal duct into the nose, a cure may be effected in many cases. If these cases can be gotten before infection has taken place, in the state of epiphora or the backing up of the tears into the eye, thorough treatment along the lines just indicated will in nearly all cases result in a cure.

Boric acid solution should be used to wash out the sac when pus is present. The attempt should be made to force it into the nose. Probing properly done is of value in many cases. These cases should be followed up with great care.

Treat the neck thoroughly and spring the inferior maxilla.

Diseases of the Conjunctiva

Conjunctivitis

The conjunctiva is a mucous membrane that coats the posterior surface of the eyelids and the anterior surface of the eye-ball. It forms a sac, which is slit open in front in the line of the palpebral fissure.

The conjunctiva consists of three parts (1) the conjunctiva tarsi, the part on the lids; (2) the conjunctiva bulbi, the part on the eyeball,

and (3) the conjunctiva fornix, the part connecting the first and second; it is the retrotarsal fold or the region of transition, often called the fornix. The first part can be seen by everting the lids. It is adherent to the tarsus. It is covered with a laminated cylindrical epithelium. The membrane contains an abundance of lymphocytes similar to adenoid tissue. This increases with every inflammation of the conjunctiva. This is why **chronic conjunctivitis** often results in thickened lids.

The **blood supply** of the conjunctiva of the lids is from the muscular branches of the ophthalmic artery. The **nerve supply** is from the ophthalmic division of the 5th cranial and the sympathetic.

The bulbar conjunctiva continues over the cornea. It is covered with layers of pavement epithelium. Its blood supply comes from the posterior conjunctival vessels about the retrotarsal fold, and the anterior ciliary arteries which accompany the tendons of recti muscles; these two systems anastomose in the conjunctiva. Conjunctival injection or congestion shows a superficial net work of larger or smaller vessels that move with the conjunctiva. The color is scarlet or brick red. Ciliary injection occurs as a rose red or pale violet zone around the cornea, spoken of as peri- or circum-corneal injection. It does not move with the conjunctiva and occurs more with diseases of the cornea, iris and ciliary body.

In the **etiology of conjunctivitis** a great variety of germs are considered by different writers. Collins and Mayo give a report of "germs found in normal conjunctiva."

Bacillus Xerosus in 94% of normal conjunctivæ; Staphylococcus Albus in 79%; Pneumococcus in 9%; Diplobacillus in 6%; Staphylococcus Aureus in 6%; Streptococcus in 5%.

If this be true, and I do not doubt their statement, we are practically compelled to say that these germs at least are only secondary in the etiology of conjunctivitis. Just at this point osteopathy comes with its flood of light and makes it easily explainable why some conjunctivæ become inflamed while others do not, when all have germs present. The lesion disturbing the integrity of blood supply and nerve force to the eye is the primary cause while the presence of germs may be the aggravating cause. The lesion prepares the soil in which the germs thrive sufficiently to become an irritant. There are all gradations of this soil preparation. The more fertile the field (i. e. the more profound the effect of the lesion) the more virulent germ life may become; the resistance is proportionately less.

Conjunctivitis is **classified** for convenience in study, diagnosis and treatment as follows:

(1) Catarrhal, (a) acute, (b) chronic, (c) follicular; (2) gonorrhoeal; (3) ophthalmia neonatorum; (4) trachoma; (5) diphtheritic; (6) eezematosa (phlyctenulosa); (7) vernalis; (8) tubercular; (9) traumatic. This is the clinical classification after Fuch.

Treatment of Conjunctivitis

In order to give the best care in these cases it is quite essential that both the primary and secondary causes be given attention. Some good **germicide** or **antiseptic** is to be used with intelligence. This is in harmony with the great principles of antisepsis and cleanliness taught by osteopathy from its inception. The use of the microscope in the **bacteriology** of conjunctivitis aids in more definite diagnosis and the selection of a proper germicide. For the Koch-Weeks bacillus, the pneumococcus and the influenza bacillus silver nitrate 1% or a 25% solution of argyrol is used; for the diplo bacillus (Morax-Axenfeld) zinc sulphate 1 gr. to the ounce is almost a specific.

A good way to prepare the zinc prescription would be:

Boracic acid and water oz. 1.

Zinc sulphate gr. 1.

The boric acid and water of course being a saturated solution. Apply one drop to each eye about four times a day. If one can not have the use of the microscope to make specific the diagnosis, the zinc solution may be alternated with the argyrol as the germicide. Ice cold applications are good in many of these cases.

Catarrhal Conjunctivitis

Acute—mostly affects the conjunctiva of the lids in the light form. If severe it invades the bulbar conjunctiva. There is redness and swelling and increased secretion which dries at night upon the edges of the lids and glues them together. The eyes are better in the morning and worse toward evening. **Corneal ulcers** and **iritis** may arise as complications. Chronic inflammation may result.

Etiology.—Textbooks on the eye give **bacteria** as the chief cause; some scarcely mention anything else. After discussing how the bacteria get there and multiply, they usually bring in some statement to indicate that in many cases no bacteria can be found in the secretions from the conjunctiva. These latter are unaccounted for in the etiology.

Catarrhal conjunctivitis is non-specific in its origin.

The great science of osteopathy will fill in the missing links to works otherwise very exhaustive on the eye.

If the cause is due only to a passing irritant as dust, smoke, pollen or wind the disturbance may vary from hyperemia only, to a severe attack of conjunctivitis. Fuch says the majority of cases are produced by bacteria, but THAT IN NOT A FEW CASES OF CONJUNCTIVAL CATARRH THE EXAMINATION OF THE SECRETIONS FOR BACTERIA PROVES NEGATIVE. He also says that the usual course of the disease is from eight to fourteen days, but NOT INFREQUENTLY THERE REMAINS A CONDITION OF CHRONIC CATARRH PROTRACTED OVER A LONG TIME; THAT NOT INFREQUENTLY THE NORMAL CONJUNCTIVAL SAC CONTAINS PATHOGENIC GERMS.

Some authors divide the **etiology** into (1) specific, (2) non-specific. The first they account for by irritants due to dust, heat, smoke, metal, pollen, cold, wind, glare of light, eye-strain from overwork of the eyes, ametropia and chronic alcoholism. The second they account for by germ life, most often the Morax-Axenfeld diplobacillus or the Koch-Weeks bacillus, the latter germ being found in the so-called "pink-eye." It is contagious. This is one condition for which the zinc sulphate ($\frac{1}{2}\%$ to 2% solution) is almost a specific.

No doubt the irritants and the bacteria mentioned, with others, do cause much of our catarrhal conjunctivitis and that one who fails to consider properly the local conditions in practice will be sadly lacking in best results.

On the other hand many cases, treated for local conditions only by very competent men who used the best antiseptics and germicides, have very indifferent results. The acute condition would continue and gradually become chronic. From observation, study and experience there are causes aside from local irritants, ametropia, bacteria, syphilis, rheumatism or measles. There is some disturbance to the integrity of the **spino-ciliary sympathetic arc**. In many cases of eye disease note lesion and tenderness at the upper dorsal, the removal of which will cause improvement of the eyes. Many cases of eye strain can be relieved by correction of the first, second or third dorsal, and the use of glasses made unnecessary.

Irritation of the eye will cause more or less tension of the muscles at the second and third dorsal, and stimulation of the tissues near the second and third dorsal spines will cause dilatation of the pupils and contraction of vessels of the cranial mucous membranes; which means vasomotor, secretory and trophic disturbances.

It follows then that an **osteopathic lesion** at the second or third dorsal will cause or tend to cause disease of the eye. There may be all gradations in the effect produced, the lighter being mere tendency, while again it may be enough to set up profound vasomotor, secretory and

trophic changes in and about the eye. The first effect of the lesion may be stimulatory, and later, inhibitory. The normal resistance of the eye would be lowered and naturally, local irritants, bacteria and ametropia would have a more profound effect. This will explain how one can develop conjunctivitis in the absence of a local irritant with no bacteria present, and no eye strain.

All of these causes, or any number of them, may be acting together, and each more virulent because of the influence of the other.

Lesions of the **occipito-atlantal** joint or any of the cervical articulations may cause eye disturbance. There are no efferent rami-communicantes in that region and the course of the physical disturbance must be greater in proportion to the eye trouble produced, than at the upper dorsal. It is important however to make a close examination of the entire cervical region in eye trouble.

What has been said on the osteopathic causes of acute catarrhal conjunctivitis applies with equal force to chronic and **follicular catarrhal conjunctivitis**.

What has been said on the osteopathic causes of **acute** catarrhal conjunctivitis applies with even greater force to the **chronic** form. The great variety of local irritants may account for acute conjunctivitis, and does in most instances; but in chronic conjunctivitis local irritants are more often secondary or incidental while the osteopathic lesion with its effect upon the **bulbo-spino-sympathetic** ciliary arc is the **fundamental** cause. Of course some continuous local irritant, e. g., an uncorrected refractive error, excessive light, heat, dust or germ life in the environment may cause a chronic conjunctivitis. Other causes may be retracted lids (lagophthalmus) leaving the eyeballs too prominently exposed; turning in of the cilia (entropion, trichiasis or dystrichiasis) which impinge upon and irritate the bulbar conjunctiva. **Chronic blepharitis** may spread to the palpebral conjunctiva and then the bulbar. Foreign bodies in the eye, or infarction of Meibomian glands may be causes. The diplobacillus (Morax-Axenfeld) is the most common germ in chronic catarrhal conjunctivitis.

Symptoms and Course.—In mild cases the redness is only moderate. The conjunctiva is smooth and not swollen. Old cases have hypertrophy with thickening. There was a small girl who came into the office recently who had the conjunctiva of the lids decidedly swollen with some hypertrophy. Her eyes were glued shut with pus every morning. Pus pockets were forming along the follicles of the cilia and on the direct edge of the lid. Her troubles started a year ago and got gradually

worse. A few osteopathic treatments were given during three months (she was irregular in coming) and argyrol, 20%, used locally. All pus and debris were cleared off the lids and conjunctiva each time. The swelling all left and the thickening became inconsiderable; the eyes looked almost clear. On pressure there was tenderness at the right side of the second dorsal. No mechanical lesion was apparent there but in treatment that region was thoroughly loosened.

The subjective symptoms are usually worse at night; pain, heaviness of the lids; feeling of a foreign body in the eye; burning; itching and dryness in many cases.

This condition is one of the most frequent of eye diseases in adults; may be senile catarrh in advanced age. It is frequently complicated with blepharitis, ectropion, epiphora and ulcerations of the cornea.

Treatment.—The osteopathic treatment depends on the findings in the osteopathic examination. No case of chronic catarrhal conjunctivitis should be treated without a thorough examination of the whole spinal, rib and innominate mechanism. Careful and detailed adjustment should be made of any lesions that might disturb the ciliary arc, the other nerve connections, the blood supply or the body equilibrium.

This does not mean that local treatment of the eye should be neglected in any way. Any measure that will aid in getting rid of local pathology as quickly as possible should be ours. Where there is abundant secretion, silver nitrate 1% to 2% solution put on the conjunctiva with a brush when the lids are turned, or argyrol 20% to 25% dropped into the eye are among the best antiseptics for local use. If the diplobacillus is present zinc sulphate $\frac{1}{2}$ % solution is indicated.

The nose, nasopharynx and pharynx should never be overlooked in this disease.

Follicular Conjunctivitis

Follicular conjunctivitis is of catarrhal origin. It is characterized by the presence of follicles. There may be only a few or a great many. If numerous they are often in rows on the palpebral conjunctiva. Microscopically they show as circumscribed masses of adenoid tissue. In this they resemble the granules of **trachoma**. Sometimes cases persist for years with little or no inflammatory symptoms. On account of the follicles this disease is frequently confused with trachoma.

We have heard numbers of well meaning conscientious osteopathic physicians testify to curing cases of trachoma with a short course of osteopathic treatment with no pathology remaining. We are absolute

believers in the effectiveness of osteopathic treatment and want to give it full credit for doing all it will; but here we want to enter a plea to the profession that we need more discrimination and definiteness in our diagnosis. Technique is being emphasized and we say Amen! It is proper for us to be thoroughly competent in technique but diagnosis should be made just as emphatic because scientific technique depends upon diagnosis for each individual case.

Diferentiation of follicular conjunctivitis from trachoma.

Follicular conjunctivitis occurs (1) chiefly in the young; (2) the follicles are smaller, more sharply limited, project more above the conjunctiva, are often in rows, and oval in shape; (3) the disease clears up with no bad after effects often without any treatment and the tendency is to ultimately get well; (4) it never leads to shrinking of the conjunctiva, to pannus or other destructive sequelæ; (5) it can arise without contagion and is not considered contagious although, like trachoma, it does attack large numbers of people who are confined in a small place.

Trachoma.—(1) It seldom occurs in children; (2) the follicles are larger, do not have sharp outlines, are less prominent under the conjunctiva, are round in shape and never in rows; (3) tends to lead to more or less pathology and seldom recovers spontaneously; (4) scar tissue becomes a product of the inflammation in the conjunctiva and leads to shrinking of the conjunctiva, causing in turn entropion and trichiasis. Pannus is the sure result of unarrested cases as there is a tendency to infection of the cornea from the infected conjunctiva moving over it and remaining in contact; (5) trachoma has been proved to be contagious. Trachoma bodies which are considered the infective agent have been isolated.

The use of atropine in some instances will cause a follicular catarrh which clears up on stopping the use of the poison.

Parinauds "Infectious conjunctivitis" has granulations but almost always occurs in only one eye and is accompanied with constitutional symptoms.

Treatment of Follicular Conjunctivitis.—The treatment should be directed against the inflammation. The trophicity of the nerve terminals to the conjunctiva may be altered by osteopathic lesions.

Suggestions under chronic catarrhal conjunctivitis apply here. If there is no inflammation the follicles tend to disappear, leaving no trace of pathology, hence a few osteopathic treatments of the lids and the cervical region will hasten normalization.

Gonorrheal Conjunctivitis

This disease is sometimes called **purulent ophthalmia** or **acute blennorrhoea**. It is caused from an infection of the conjunctival sac with the gonococcus of Neisser. Contact with soiled fingers or linen may transfer the germ.

Symptoms.—Within 12-48 hours after inoculation the first symptoms of redness and irritation occur. This is soon followed by much swelling and tension of the lids and chemosis of the conjunctiva. There is much pain and a copious discharge of pus coming from beneath the lids. At first the pus is yellow or yellowish green.

Later the symptoms begin to subside; there is less tenseness and heat; the lids can be more readily everted and the discharge ceases after 6 or 8 weeks. The puckered conjunctiva becomes rough and granular.

In these cases the **prognosis** is always grave; more so than in ophthalmia neonatorum. The eye is almost always marred in some way. One of the great dangers is involvement and destruction of the cornea. If the cornea becomes hazy soon after symptoms begin it is not a good omen. **Ulcers** will likely form and then there is a tendency to puncture the cornea. In mild cases the cornea may escape without injury. In severe cases it is likely to ulcerate. If it perforates, the anterior chamber is emptied and the iris prolapses into the perforation; adhesions take place and there is healing with reformation partially of the anterior chamber. An adherent leukoma is the result with practical loss of vision. There may be a bulging of the cornea known as anterior staphyloma. The iris and ciliary body may become involved, causing iritis and cyclitis, or the whole inner structures may be affected making a **pan-ophthalmitis** with **atrophy** of the eyeball.

The cornea is affected by the infective material direct or the nutrient vessels to the cornea at the limbus may be obstructed by the extreme swelling and pressure.

Complications of arthritis, rhinitis, septicemia and endocarditis may arise. If there is none of these, at least there is a general debilitated condition which needs attention.

Treatment.—The treatment should be **local** and **constitutional**. The diagnosis should be made quickly from the history, symptoms microscopically, and local cleansing begun at once and followed diligently. Excessive discharge should be wiped away with cotton. The conjunctival sac should be thoroughly irrigated every hour or oftener if necessary to keep it clean. This is to be done day and night. A saturated solu-

tion of boric acid may be used, or corrosive sublimate one grain to the pint, or permanganate of potassium solution 1-5000. The irrigation should be followed by the free use of argyrol 25%. This procedure will keep the eye clean and be the means often of saving the cornea from destruction and the eye from blindness.

If there should be ulceration of the cornea a drop of atropine $\frac{1}{2}\%$ should be used in the eye often enough to keep the pupil dilated and the ciliary body at rest.

Osteopathic physicians no less than other physicians should not neglect this local, careful, persistent, antiseptic cleansing of the eye in such cases. The osteopathist can do more. He is not limited to antisepsis even in this kind of work, however important it might be. The unaffected eye should be carefully protected. Buller's shield should be used.

The osteopath should give thorough treatments to the neck and the fifth nerve.

Supporting treatment to the system according to indications should be given e. g., bowels, kidneys, nerves, muscles, joints as in constipation, nephritis, neurosis, rheumatism, arthritis, endocarditis, septicemia, rhinitis etc.

Ophthalmia Neonatorum

This is an **acute purulent conjunctivitis** in the new born. Neonatorum comes from a junction of the Greek word Neos—new, to the Latin word natus—born; new-born. This disease is the bugbear to the obstetrician. He must always be on the lookout for it and act promptly in order to save sight. Every general practitioner should make a careful study of this disease if he expects to treat children.

Sixty to seventy percent of conjunctivitis neonatorum is due to the infection with the gonococcus of Neisser. It usually comes from a gonorrheal discharge from the genitals of the mother. The nurse or anyone who handles the baby might be the agent in the transmission of the infection.

The disease is not always of gonorrheal origin. Some cases are due to the pneumococcus, streptococcus, diplobacillus or one variety of staphylococci.

Thus there are two varieties or types of ophthalmia neonatorum; a severe type which is **gonorrheal** or specific and a mild type which is non-specific.

In some states there is a law which requires the use of silver nitrate in the eyes of all babies at birth. Every baby's eyes should be

thoroughly washed at birth, with boric acid and where there is the least suspicion of gonorrhea silver nitrate 1% or argyrol 25% should be used. A routine use of one of the silver salts would be good practice.

Symptoms.—Gonorrheal cases begin usually the third day after birth, non-gonorrheal, on the fifth or sixth day. Both eyes are usually involved, one worse than the other. The lids swell much. There is chemosis of the conjunctiva which may put the cornea in a pit. The discharge is abundant. It is yellow or greenish yellow.

The disease gradually declines and the discharge ceases in six to eight weeks. The conjunctiva is thickened and looks granular. May be some cicatricial changes.

The chief danger is to the cornea, more so if it becomes hazy the first two days. Corneal lesions seldom occur in non-specific forms.

If the cornea is involved perforation is likely, with a general inflammation of the eyeball (panophthalmitis) followed by atrophy (phthisis bulbi).

Complications such as rhinitis, meningitis, endocarditis and general septicemia may occur.

Diagnosis is made from the onset, character, symptoms and course with the use of the microscope.

Prognosis.—Delayed or improper treatment in these cases will likely be fatal to sight as sloughing of the cornea will occur. With prompt and proper care the prognosis is favorable.

Treatment.—Mild cases (non-specific) are treated in the same manner as simple conjunctivitis. In severe cases (specific) clean the eye carefully and apply cold compresses of gauze 15 to 20 minutes at a time every hour or two. Keep the gauze on a block of ice and change every few minutes. If the cornea is involved heat may prove more satisfactory. There must be constant removal of the discharge. Wipe away the excess and irrigate freely with boric acid at least every hour day and night and more often if necessary. After each washing use a solution of argyrol 25%. Once a day silver nitrate 1% solution may be used and washed out with a salt solution.

If the cornea should ulcerate the treatment need not be altered.

The attendants should be carefully instructed as to the importance of the care and the contagious nature of the pus.

Antisepsis and cleanliness here is more essential, effective and exclusive than in any other disease of the eye. Wisdom in the use of antiseptics is a strong point in the armamentarium of every progressive osteopath.

Trachoma

This disease is known as **granular lids** or **granular conjunctivitis**. Although the germ has not been discovered, we know this is an infectious disease. A roughness and hypertrophy of the conjunctiva develops. There is development of follicles or granulations. Later these products are absorbed and cicatrization of the tissues follows.

Cause.—Trachoma is found most common in Egypt and Arabia. It spreads easily in crowded institutions. It is in many instances a mixed infection with the Morax-Axenfeld bacillus, Koch-Weeks bacillus and the gonococcus.

“Trachoma bodies” have been discovered which are claimed by some to be a causative factor in the disease. These small bodies are not found in all cases however.

Spinal lesions of the cervical and upper four thoracic vertebræ will disturb the blood and nerve supply to the eye which will predispose to the disease should some of the virus or germs of trachoma be present. In practically all these cases there is tenderness if not an actual twist at the second and third thoracic.

Symptoms.—A small boy came to our clinics complaining that his left eye was smaller than the right. No inflammation or swelling was prominent. The eye looked normal except slightly smaller than the right. On turning the lid granules in the fornix of that eye were readily noticed. Trachoma had a good start. The tissues were so hypertrophied in that region that the eye could not be opened quite as wide as the other one, hence the impression that that eye-ball was smaller. The granulation often develops so insidiously that the victim may have the disease for months before he realizes he has a bad eye. When symptoms appear there may be photophobia, lachrymation, gluing of the lids from a scanty secretion, pain, and blurring of vision. The granules are gray, translucent and roundish under the conjunctiva.

Hypertrophy increases to a certain height when cicatrization and contraction begin. The duration may be years. The more the hypertrophy the longer the duration and the greater the contraction. (Note here that treatment should be directed toward combatting the hypertrophy by establishing circulation).

Sequelæ. I merely mention the sequelæ here: pannus, ulceration of the cornea, trichiasis, dystrichiasis, entropion, ectropion, symblepharon, xerosis, corneal opacities. For the explanation, pathology and

treatment of these sequelæ not covered in this treatise, see any good works on diseases of the eye as Weeks, Fuchs or De Schweinitz.

Treatment of Trachoma.—In reporting cases of trachoma treated and cured by osteopathy we should be sure of our diagnosis.

The treatment is antiseptic, hydrotherapeutical, osteopathic and operative. A saturated solution of boric acid should be used. Argyrol 20% is good if there is much secretion. Nitrate of silver 2% and copper sulphate are still used in some cases to advantage as claimed by some physicians. The osteopath should count on careful cleanliness.

Hot compresses over the eyes are often very agreeable.

Operations are often performed for trachoma. The granules are rolled out with Knapp's roller forceps, and other methods.

Grattage is practiced with some wonderful results. It is done as follows: Get some fine sand paper and cut it in strips about one-half inch wide by three or four inches long. Put it in alcohol in a vessel for ten to fifteen minutes. Pour off all the alcohol except a few drops that will cling to the vessel by capillary attraction. Touch a match to the residue. This will burn just enough to make the sand paper absolutely sterile without burning the latter. Put the patient under somnoform. Use a small artery forceps to grasp the edge of the eyelid, roll the lid back over the artery forceps to expose all granulations clear to the fornix. Use a protector to the eyeball. Now with the sandpaper quickly scrape or curette away all of the trachoma bodies and granulations. Repeat the process on the other eye if it is involved. Wash out well with a saturated solution of boric acid and bandage the eyes for a few hours. This will cause considerable swelling and inflammation. Use cold applications and keep the eyes disinfected. I have seen some very good results from this method.

Osteopathic.—Following the sand paper operation a thorough treatment of the cervical and upper dorsal region would add considerably to the rapidity of the patient's recovery and sense of well being. General tonic treatment is of special benefit in nearly all trachoma cases as they are subnormal in their general health.

One form of technique which has been used by myself and others to advantage in these cases is as follows: Sterilize the fingers carefully, lubricate with vaseline or K. Y. the forefinger of the right hand. With the left hand raise the upper lid and introduce the forefinger of the right hand with the thumb above. Catching the lid between the thumb and finger squeeze and massage the whole structure clear to the fornix as thoroughly as possible. Repeat the process on the other eye.

A technique used by Dr. Edwards of St. Louis is as follows: After sterilizing and lubricating the forefinger lift the lid and introduce the finger as far as possible into the orbit pushing the fornix back into the orbit. This stretches all the tissues around the fornix, opening up a better conjunctival and palpebral circulation. The ciliary vessels and nerves are stretched and stimulated. It is rather surprising to one who has not tried it, how far the finger can be introduced into the orbit.

One set of nerves that should be especially studied and considered in trachomatous conditions is the cere-brobulbo-spino-sympathetic-ciliary arc. This has already been elaborated. All spinal lesions should be carefully diagnosed and corrected.

Dr. T. J. Ruddy's third finger eye instrument is very useful in these conditions in restoring normal circulation about the orbit.

See that the nose and throat are normal.

Phlyctenular Conjunctivitis

By some this disease is considered an **eczema** of the conjunctiva. This will at least enable us to get an idea of the conjunctival pathology. What is said of phlyctenular conjunctivitis applies largely to its corresponding disease of the **cornea-phlyctenular keratitis**. Serofulous ophthalmia is applied by some because so many of these phlyctenular patients have **scrofula**. Herpes conjunctivæ is used as a name because of the small blisters or blebs that form in the beginning stage. Little red eminences develop near the limbus (sclerocorneal junction). They are cone shaped, slightly elevated about the surrounding tissue. There may be one or several, usually not more than one or two. After a few days the cone breaks and on top appears a small gray ulcer. There is further breaking down and the cone disappears leaving an ulcer on level with the conjunctiva. Vessels are congested about it. There may often be noted an area of small vessels, fan like in shape, running from the outer region of the conjunctiva to the ulcer or phlyctenule.

Etiology.—This is a disease of frequent occurrence in children, mostly among the poor classes. Such things as eczema, dirt, adenoids, scrofula, rhinitis, malnutrition, abuse of tea and coffee and exanthematous disease are mentioned by oculists as causes. I have no doubt any or all these conditions predispose to phlyctenular conjunctivitis.

De Schweinitz in "Diseases of the Eye," 1916 edition, p. 242, says: "The exact cause of ocular lesions, or phlyctenular eruption, has not been determined."

I have met Dr. De Schweinitz and heard him lecture on the eye. I consider him one of the best eye specialists in the country. His experience and study with the eye dates over many years and his book has gone through eight editions. He is professor of ophthalmology in the University of Pennsylvania; Ophthalmic Surgeon to the Philadelphia Polyclinic Hospital, the Philadelphia General Hospital etc., etc.

His opinion represents the summary of the investigation of the ophthalmic profession the world over and through all the past down to the present time. "The cause of phlyctenular conjunctivitis is not known."

Bacteriology.—At times in the ulcers have been found the staphylococcus pyogenes aureus and albus. They are also found in a normal conjunctival sac. They could not with logic be taken as a causative factor; at least they would be only secondary.

If oculists and other students of the eye all had a good deep osteopathic vision to throw light upon these problems many causative factors would take on a new meaning. Such supposed causes as have been mentioned, e. g. eczema, adenoids, rhinitis and malnutrition may easily be secondary to the osteopathic lesions. Micro-organisms may be enabled to act because of trophic and circulatory disturbances to the conjunctiva through disturbed nerve connections from lesions in the cervical and upper dorsal regions. Herpes zoster is purely a trophic nerve disturbance manifestation on the skin as blebs or blisters with more or less neuritis. Any lesion that would affect the integrity of the function of the fifth cranial nerve might easily manifest itself as herpes of the conjunctiva.

We believe the osteopathic lesion is primary and fundamental in the causation of most of our phlyctenular conjunctivitis. Of course insatiation, scrofulous diathesis and the exanthemata play their roll. A good diagnostician should figure out the relative importance. The history, onset and examination will usually eliminate these conditions.

Symptoms.—Lachrymation, photophobia, blepharospasm and injected vessels are the chief symptoms. There is pain as well as fear of light. The child fights examination.

The attack subsides in ten to fourteen days unless there is multiplicity of blebs. Some patients have repeated attacks for months or years. Many of these cases in medical clinics keep coming for months with repeated attacks. Never leave out careful osteopathic treatment.

Prognosis.—This is favorable for a final cure. If there should be multiple blebs and frequent recurrence and the cornea is invaded, the prognosis is not good for perfect sight. The pathology goes deep enough

to affect Bowman's membrane of the cornea disturbing the substantia propria. This causes a macular condition of the cornea which impairs sight.

Therapy.—Diet should be bland; the eyes should be protected from irritants; yellow oxide ointment should be used in the eye once a day or 10% argyrol. The ointment is preferred. Moist warm compresses on the eye are comforting. A boric acid wash in almost all conjunctival trouble is good. If there is much irritation giving a suspicion of iris involvement a drop of atropine $\frac{1}{2}\%$ should be used. The general regimes of living should be regulated.

Osteopathic treatment should be directed toward building up the general health and correcting all lesions, especially that may have a specific bearing on the eye trouble. Such lesions will be found more often at the first, second and third thoracic, but may be anywhere from there to the occiput.

Vernal Conjunctivitis

This disease is known by many as **vernal catarrh** or **spring catarrh** of the conjunctiva. It is a chronic inflammation which sets up changes in the conjunctiva and tarsus. This disease may be confused with trachoma unless one observes closely. There are broad flat papillae on the conjunctiva. These papillae may readily be taken for granulations. They are larger than the granules in trachoma. They somewhat resemble the arrangement of cobble stones. The conjunctiva has a bluish-white filmy appearance called by some, milky shimmer.

The disease was thought at first to appear only in the spring, hence the name vernal. Many cases continue through the year with exacerbations in the spring. It occurs more often in boys. Both eyes are attacked. It may heal and leave no trace. It may last from four to twenty years.

Causes.—Almost all works on the eye say the cause is not known. De Schweinitz says, "Definite information in regard to the cause of this disease is lacking." There may be a micro-organism which has not been discovered.

I wish to call the attention of the osteopathic profession to the great fact that there are numbers of diseases of the eye as well as of other parts of the body about which the medical profession are entirely "at sea." This gives valuable ground for scientific research by our profession.

My experience with this disease is not sufficient for me to speak with any positiveness or finality as to its cause. The altered trophic parts

and the very chronic condition existing leads me to the firm belief that we will ultimately find the cause as a mechanical lesion affecting the trigeminal or sympathetic (or both) nerve connections. Glare of light and local irritants act only as secondary causes. Nasal disease may be associated and act as a cause.

Symptoms.—There is photophobia, some mucus, slight pericorneal injection, redness of the conjunctiva of both the bulb and lids; that of the lids is thickened and of dull pale color due to sub-epithelial hyaline thickening. The fact that there is no pannus, and flat granulations and recurrence with spring, marks it from trachoma.

Prognosis.—Under medical treatment it is unfavorable; may last twenty years. Slight opacity of the cornea may develop.

Treatment.—The eyes should be protected with dark glasses. Cold compresses give some relief. Boric acid is good as a wash. Yellow oxide of mercury ointment may be of service as an antiseptic and alternative. If nasal disease exists, it, of course, should be treated according to indications. Fundamentally the lesions in the spine in the cervical and upper dorsal regions should be specifically corrected. When enough cases of vernal catarrh have been observed and treated osteopathically much light and benefit will be brought to bear upon this obscure and intractable disease of the conjunctiva.

Diseases of the Cornea

Anatomy

The cornea with the sclera forms the outer coat or tunic of the eye ball. The cornea is in front and forms one-sixth of the envelope. It is a segment of a smaller globe than that of the sclera. It is about 12 mm. horizontally and 11 mm. in the vertical diameter. Its thickest part is at its junction with the sclera where it is about 1 mm. This junction is called the limbus. The cornea is inserted into and rests on the sclera like a watch crystal. The fibers of the cornea pass continuously into the sclera, however. The normal cornea is transparent. Most morbid changes of the cornea cause a diminution in this transparency. In old age a narrow gray line near the corneal margin makes its appearance. This is known as the **arcus senilis**. There is a little strip of perfectly clear cornea between the arcus senilis and the limbus.

The cornea has five layers. These layers should be noted with care, as in wounds of the eye, foreign bodies in the cornea and ulcerations, the results depend much upon which layers are affected.

1. The **anterior epithellum** consists of pavement cells of several layers. This layer of the cornea may be damaged or scratched off in large patches and still it will heal readily leaving no trace of the injury.

2. The **anterior elastic lamina** or **Bowman's membrane** is very thin and homogeneous; it is just beneath the epithelial layer and forms a resisting sheath to prevent damage to the next layer.

3. The **stroma** or **substantia propria**. This layer composes about nine-tenths of the cornea. It is composed of minute connective tissue fibers between which lie some stroma cells or corneal corpuscles. Some of these cells are fixed while others are motile. The motile ones are the white blood corpuscles which move about in the lymph passages of the stroma. They increase in any irritation of the cornea.

4. **Descemet's membrane**. This is a tough homogeneous hyaloid membrane back of the stroma. When the stroma is diseased and breaks down Descemet's membrane may be sufficient to prevent a puncture of the cornea.

5. The **Endothelial layer** is a single layer of flattened cells which coat the posterior surface of Descemet's membrane.

The margin of the cornea is in relation with three membranes, the conjunctiva, the sclera and the uvea (iris and ciliary body). In a disease of the cornea, a conjunctivitis, an iritis or a cyclitis is easily started.

The cornea contains no vessels. It is nourished by imbibition. At the limbus there is a rich network of marginal loops supplied by the anterior ciliary vessels. From these loops the blood plasma passes into the stroma of the cornea.

The nerves of the cornea come from the ciliary nerves and the nerves of the bulbar conjunctiva. These are from the trigeminus and the sympathetic. The nerves extend numerously in the stroma passing forward through Bowman's membrane into the epithelial layer. This makes the cornea very sensitive to the touch.

Examination of the Cornea

Note the size and form. Both may be modified by morbid processes. Note the surface with regard to curvature, evenness and smoothness. In **keratoconus** the curvature is greatly increased. Noting the reflex images in the cornea and comparing these with those of a normal cornea will show any variation in curvature. Also any **unevenness of the surface** may be noted by the irregularity or distortion of the images. Uneven spots on the cornea may be **depressions or elevations** from loss of substance; **wrinkles or collapse** from lowered tension.

If the smoothness or polish of the cornea is lost it looks like glass that has been breathed upon or greased. It is lusterless and dull.

Note also the transparency of the cornea and determine the form, extent and density of the opacity; whether it is diffuse or in spots; in the deep or superficial layers. A magnifying glass should be used in the study of opacities. According to the density of the opacity of the cornea it is known as a **nebula** or a **nebulous opacity**, a **macula** or a **leucoma**. The nebula is the least noticeable and the leucoma is the densest opacity. A leucoma is a condition of complete opacity. The cornea looks white.

Defects in the corneal epithelium may be made to show clearly by the use of a 2% solution of fluorescein which stains them green.

Note the sensitiveness of the cornea by touching it with the end of a thread, a little cotton or a shred of paper. The sensitiveness is diminished or lost in glaucoma and some other diseases.

Diseases of the Cornea

Almost all diseases of the cornea have some form or degree of inflammation. **Keratitis** is the word generally used for inflammation of the cornea. In order to aid clearness in discussion there are various subdivisions of keratitis made by different writers. Suppurative and non-suppurative are the principal types. In **suppurative keratitis** there is always some destruction of corneal tissue which on healing leaves an opacity with partial loss of vision. Germs gain entrance into the tissues usually from the exterior and some form of ulceration results.

The following classification is taken from Fuchs:

Suppurative Keratitis.—(1) Ulcer of the cornea; (2) Serpiginous ulcer; (3) Keratomalacia or Xerosis; (4) Keratitis neuroparalytica.

Non-suppurative Keratitis.—(A) **SUPERFICIAL:** (1) Pannus, or keratitis with blood vessels; (2) Phlyctenular, or keratitis with vesicles. (B) **DEEP:** (1) Parenchymatous or interstitial.

In keratitis there is first an infiltration or the increase of cells in the substantia propria or the parenchyma of the cornea. This is the exudate of the inflammation. It causes the cornea to look more or less dull or cloudy. The disease may clear up at this point or go on to suppuration. If it clears up it is known as **resorption**. If the lamellæ of the substantia propria are not destroyed by the process, resorption takes place with no loss of substance. The exudate disappears and there is perfect transparency of the cornea again. There may be slight damage of the stroma preventing perfect transparency. Resorption of the

exudate may not be quite complete which may become partly organized and left permanently fixed in the cornea. Cases resorbing without destruction of the stroma are forms of the non-suppurative keratitis group.

If the stroma breaks, suppuration occurs. This is the second stage and is associated with a localized destruction of the cornea. These cases are known as **suppurative keratitis** or **ulceration of the cornea**. The disintegration begins in the most anterior layers of the cornea. A slight depression in the cornea can be noticed. The infiltration is all about the ulcer, getting less as it is more remote from it. If the floor and walls of the ulcer are foul with the infiltrate it is known as a **progressive ulcer**. **Sloughing** may continue to spread the ulcer.

If the cloudiness around it disappears and the ulcer acquires a smooth transparent base and edges it is known as a **retrogressive** or clean ulcer.

The disintegrated areas of the cornea may be replaced by newly formed tissue. This is the third stage or that of **cicatrization**. This new tissue is connective tissue. It is opaque, leaving a permanent opacity.

Stages of keratitis:

Suppurative—(1) Infiltration; (2) Suppuration and (3) Cicatrization or Reparation. The suppuration is progressive or retrogressive.

Non-suppurative—(1) Infiltration; (2) Resorption.

In the diagnosis of a keratitis one should look at it very carefully. A loupe which has thick plus sphere lenses will magnify the field and may be of great assistance in observing closely the condition.

If the cornea is clouded and dull the trouble is recent and if there is no loss of substance it is an infiltrate (first stage). If there is loss of substance it is a progressive ulcer (second stage.)

If the surface is lustrous but cloudy the trouble is an old one and if there is loss of substance it is a retrogressive ulcer; if no loss of substance it is a cicatrix.

Frequently blood vessels grow in from the margin in ulcerations of the cornea. This is usually a process of healing of the corneal ulcer. The advent of the blood vessels is favorable. After healing the blood vessels gradually disappear. They never entirely disappear from large cicatrices.

In some cases new vessels accompany the inflammatory process and like the exudate are a part of the clinical picture of the disease as in parenchymatous or interstitial keratitis. Pannus also has vessels. They are not in the cornea but are in new tissue deposited upon it.

Symptoms appearing in keratitis:

1. **Ciliary injection** or a red area encircling the cornea. If the keratitis is severe there will be considerable inflammation of the conjunctiva which may hide to some extent the ciliary injection.

2. **Iritis or iridocyclitis** may set in. The iris and ciliary body are in such intimate relation with the cornea that these structures are very subject to involvement in any severe keratitis. With iritis would come danger of **synechiae** or adherence of the iris to the anterior surface of the lens.

3. **Hypopyon**.—In suppurative keratitis there is some exudate into the anterior chamber of the eye. This exudate drops to the bottom of the chamber and looks like pus had gathered in the bottom of the aqueous. This condition is called hypopyon.

4. Other symptoms which are frequently prominent are **diminished vision, pain, photophobia, excessive lachrymation and blepharospasm**. Edema of the lids and conjunctiva may occur.

Intelligent treatment of keratitis of course is based upon the exact conditions present. Great care in diagnosis and treatment should be exercised.

Ulcer of the Cornea

Inflammation of the cornea sets in from some cause. There is an infiltrate into the substantia propria. A spot becomes cloudy and the surface over it becomes dull; at this point the epithelium breaks down or exfoliates and the loss of substance in the parenchyma is the beginning of an ulcer.

Cause.—The cause may be constitutional or local. The causes usually thought of from the medical standpoint may be noted in such books as "Diseases of the Eye" by De Schweinitz or Weeks. I wish especially to call attention to the fact that there is frequently a primary and underlying cause of corneal ulcers not mentioned in any medical texts, i. e. the osteopathic lesion. By this I mean more than the spinal lesion although the subluxation lesions that result from the occiput to the fourth dorsal are of most importance. Any tension or change of tissue in the cervical region that may interfere with perfect freedom of circulation of blood to the tracts and centers in the cord, is to be considered. The osteopath of course should take into consideration all causes primary and secondary and govern himself accordingly.

Symptoms and Course.—There is a gray area surrounding the ulcer at first, also the floor is grayish in color. In this condition it is

known as a **progressive** ulcer or a **foul** or **unclean** ulcer. This cloudiness or gray area may increase in size and the ulcer keep spreading, or it may go deeper even to perforation of the cornea.

Some ulcers advance or spread on one side and heal on the opposite side so that they creep along on the cornea—these are the so-called **serpiginous ulcers**.

With corneal ulcers there is irritation, pain, photophobia and increased lachrymation. There is usually some ciliary injection which is an indication of involvement of the iris and ciliary body. If iritis occurs there is contraction of the pupil with slow reaction. **Hypopyon** may develop. With iritis and the exudate there is likely to be adhesions between the iris and the lens known as posterior synechia.

A few corneal ulcers are asthenic and do not have irritative symptoms and yet are dangerous.

When the ulcer begins to heal it is called **retrogressive**. Dead tissue is cast off; other tissue becomes transparent from resorption. We have a **clean** ulcer. Symptoms disappear and cicatrization begins. Vessels extend to the ulcers and soon it is leveled up with the corneal surface. Cicatrization may leave it slightly below the corneal level or above it.

If there should be perforation of the cornea from the ulcer there may be **complications**, e. g. keratocele, loss of aqueous, dislocation and expulsion of the lens, intra-ocular hemorrhage, flattening of the cornea, fistula of the cornea, glaucoma, intra-ocular suppuration, prolapse of the iris into the opening, etc. These complications and sequelæ that occur occasionally will not be considered here.

After healing is complete by cicatrization there is opacity of the cornea in proportion to the depth and size of the ulcer. In months and years of time there is some clearing of the opacity so that small superficial opacities may become invisible.

Treatment of Corneal Ulcers.—Most ulcers of the cornea are quite amenable to proper treatment and the prognosis is favorable. Neglect or wrong treatment is very dangerous. The treatment is local and constitutional. Often the ulcer is kept going by unwholesome constitutional conditions.

Local Treatment.—This varies according to the stage of the ulcer, whether progressive or retrogressive. In a progressive or foul ulcer if due to trauma any foreign bodies should be removed. If the ulcer is a result of pathology of the conjunctiva it is of primary importance to treat the conjunctival condition.

In mild cases of ulcer a dressing over the eye with atropine $\frac{1}{2}\%$ to keep the pupil dilated is sufficient local treatment. The bandage protects the eye from bright light and other environment and the atropine puts the iris and ciliary body at rest preventing complications and giving nature her best chance to work.

If the ulcer is rapidly progressive, warm compresses an hour or two a day are good; iodoform sprinkled on the ulcer or actual cautery may be used. In the retrogressive stage (clean ulcer) healing has begun and we desire to get as near as possible a resistant transparent cicatrix. Yellow oxide ointment is useful at this stage.

Osteopathic.—The local measures just mentioned are not incompatible with osteopathic theory or practice. They are merely adjunctive in getting nature's reaction toward normalization, as also are hot and cold applications. Osteopathy comes in now in a most important and fundamental way with the constitutional and specific lesion treatment. The **bulbo-spino-sympathetic-ciliary arc** has been mentioned and explained. Through this important nerve connection with the eye, profound and wholesome effects on the eye may be gotten by osteopathic treatment. Frequently lesions of the occiput, cervicals and upper dorsals will affect the integrity of the ocular structures through disturbances of nerve and blood supply.

The stomach, bowels, liver and kidneys should be carefully noted in corneal ulcers. Poor circulation, indigestion, constipation and auto-intoxication may have an important bearing on the recovery of the ulcer.

Xerosis or Keratomalacia

This is a disease of the eye in children due to insufficient nutrition of the cornea. Hereditary influences, depleting diseases and lesions affecting the trophic nerves to the eye are causes.

Treatment consists of building up the nourishment of the child, correction of lesions and careful dieting. Hot applications to the palpebral region helps to bring the blood supply to the eye for local effects.

Keratitis Neuroparalytica

This disease is due to a paralysis of the 5th cranial nerve. The cornea becomes slightly cloudy. The epithelium gradually sloughs away. An ulcer may or may not form. Pain and lachrymation are absent because of paralysis of the trigeminus. There is usually ciliary injection.

Treatment.—The most important treatment for this unfortunate condition is manipulation to restore the integrity of the 5th cranial nerve and the blood supply to the eye. Cervical, spinal, nasal, nasopharynx treatment should be given. Spring the inferior maxilla.

A drop of atropine (1%) should be used locally because of the ciliary injection. Warm compresses used locally will help. The healing usually leaves some opacity of the cornea. Keep the eye bandaged to protect the cornea.

Pannus

This form of keratitis is superficial and is characterized by the formation of blood vessels in the cornea. It is caused by some irritative influence. Most often it is a complication of trachoma.

If the irritation can be removed the vascularity gradually recedes, leaving a clear cornea unless the deeper structures of the cornea have been involved.

Phlyctenular Keratitis

This disease is an involvement of the cornea with an eczematous process similar to phlyctenular conjunctivitis. There is more likely to be ciliary injection and iritis, in which case atropine should be used. The treatment is the same otherwise as for phlyctenular conjunctivitis.

Parenchymatous or Interstitial Keratitis

This is shown by a diffuse inflammatory infiltration of the substantia propria of the cornea. Part or whole of the cornea of one or both eyes may be involved. Very fine blood vessels may invade the deep structures of the cornea.

Cause.—Syphilis, tuberculosis, rheumatism, diabetes and rachitis are systemic diseases found back of this trouble.

Symptoms.—Irritation, lachrymation, photophobia with ciliary injection are the chief symptoms.

Treatment must be local and constitutional.

Locally atropine should be used. Dark glasses should be worn or the patient must be kept in a dark room. Treatment to the trigeminal nerve and tissues of the orbit should be given.

Constitutional treatment should be spinal with the idea of arousing all the forces of the body to greater activity. Careful dieting should be followed according to indications.

The infiltration and blood vessels will ultimately disappear. Sometimes enough may remain to cloud the vision.

Diseases of the Iris and Ciliary Body

The iris and ciliary body have the same blood and nerve supply. That is, they are supplied by the same set of vessels and nerves. For this reason it is practically impossible to have an iritis absolutely independent of a cyclitis or some inflammation of the ciliary body. If the iris is the primary seat of the trouble there are certain symptoms that may indicate such a state. However, when we are treating the iris or diagnosing conditions of the iris we must remember that the ciliary body is very likely more or less involved and may be the primary seat of the trouble.

In **iritis** there are some symptoms which are caused from the hyperemic condition of the eye, such as a slight change in color. The pupil becomes rather inactive, there is some ciliary injection with photophobia, lacrymation and pain. In case of an exudate in the iris there may be thickening, and the exudate in the anterior chamber of the eye will form a **hypopyon**. Sometimes the small vessels will break and there will be a little bleeding which will be mixed with the debris in the bottom of the anterior chamber. This is known as hyphemia. There are likely to be adhesions between the iris and the anterior capsule of the lens known as posterior **synechia**. The pupil is more or less irregular. If atropine is dropped into the eye to dilate the pupil, parts of the edge of the pupil will be adhered while the other parts dilate making it very irregular.

In case of cyclitis there is an exudate from the ciliary body into the posterior chamber. This may cause a total adherence of the iris to the crystalline lens. With the ophthalmoscope, opacities in the vitreous may be noticed. These are exudates. The tension of the eye is liable to increase a little at first but as the exudates absorb there is more or less softening. Vision is low. Also in cyclitis there is ciliary injection, photophobia, lacrymation and pain, similar to that of iritis. Pressure on the eye ball will reveal a very tender condition around the sclerocorneal junction or over the area of ciliary injection.

The causes of iritis, cyclitis or iridocyclitis frequently are systemic conditions and infection such as syphilis, rheumatism, gonorrhea, tuberculosis, infectious diseases and metabolic changes. It may be of traumatic origin or sympathetic. Fuchs says "There are many cases of iritis for which no cause can be discovered and therefore which cannot be placed under these causes." We agree with him and advance the theory of cervical and upper dorsal lesions or trouble in the sinuses, nose,

nasopharynx or throat. No doubt osteopathy can throw some important light on the causes of diseases of the iris and ciliary body. The nose and throat should be examined in all these cases.

Treatment.—Atropine must be used in the sore eye to put the iris and ciliary body at rest and dilate the pupil to draw it back from the lens so that adhesions may not form. Warm compresses will give much comfort. Sweating should be brought about. All fluid should be reduced to a minimum. Diet should be very moderate and the bowels kept unusually free. The eye should be protected by dark goggles. Thorough treatment of the neck and upper dorsal region with attention to the nose and throat should be given. Constitutional treatment should be given according to the indications mentioned under causes. If annular synechia or total posterior synechia form or there is atrophy of the eyeball operative work may be needed. Also for injuries, tumors, anomalies and so forth of the iris see the latest medical works on this subject.

Diseases of the Choroid

The **choroid** is the vascular tunic of the eye. With the iris and ciliary body it forms the **uvea**. The iris and ciliary body are rich in nerve terminals and when inflamed; pain is a prominent symptom. The choroid has no sensory nerve terminals. When it is involved alone; pain is not present however severe the pathology. Embryologically Descemet's membrane is a part of the uvea. When the uveal tract is diseased we frequently note symptoms of a descemetitis as a turbidity of the anterior chamber and spots on Descemet's membrane. When one part of the uvea is inflamed the tendency is to pass to the other parts because of the intimate blood supply.

Choroiditis

There are many forms of choroiditis given by writers according to the clinical picture and the pathology.

Symptoms.—No pain is experienced unless there are complications. Vision is altered in some degree. The use of the ophthalmoscope may reveal opacities in the vitreous. Pigmentation spots and exudation may be noted in the fundus. In disseminated choroiditis spots of exudate appear in the fundus which go on to atrophy, leaving irregular circular light patches.

Treatment.—In all forms of choroiditis careful diagnosis of constitutional conditions should be made and treatment given according to indications.

Nasopharynx and orbital treatment as outlined under manipulation for diseases of the eye should be given.

Rest and protect the eyes. Secure free elimination.

Panophthalmitis

By injury or otherwise pathogenic germs are introduced into the eye. The trouble begins as a **suppurative choroiditis** and rapidly spreads to all the eye structures. The vitreous chamber becomes filled with pus.

Symptoms.—Pain is severe and sight is lost early. The conjunctiva and lids are much swollen. There is a mucopurulent discharge. The cornea becomes gray and may slough. In about two weeks the inflammation subsides and the globe passes into atrophy.

Treatment.—Elimination must be thorough. Spinal treatment for keeping up strength. Cervical, upper dorsal and nasopharynx treatment for the eye. Moist hot compresses to the eye. Operation, incision for drainage, or evisceration may have to be performed.

Sympathetic Ophthalmia

The other eye may become inflamed by the process from the panophthalmitis passing around through the circulation or the continuous structures. All symptoms of a general inflammation appear and vision gradually diminishes.

Treatment.—In panophthalmitis of one eye always watch the other eye closely. If it becomes irritable or shows any signs of being affected the diseased eye should be promptly removed, especially if vision is lost in that eye. If no irritation occurs, continued conservative treatment of the panophthalmitis may result in a subsidence of the disease without the well eye becoming affected.

Sympathetic inflammation rarely develops earlier than a month after injury to the exciting eye. Sooner than that or even a few minutes after injury there may be some signs of sympathetic irritation and the symptoms continue with no evidence except a slight circumcorneal injection. It should be treated like iritis. A thorough toning of the system by spinal treatment should be given. Order a limited diet. Secure free elimination.

Glaucoma

Glaucoma is essentially an increase in the intraocular pressure. All other symptoms of the trouble may be traced to this condition.

In **Primary Glaucoma** the increase in pressure sets in without any discoverable antecedent disease of the eye.

In **Secondary Glaucoma** the increase in pressure is due to some other disease of the eye. It is a symptom, a complication or accessory and is confined to the eye diseased.

Primary glaucoma affects both eyes, but not always at the same time. Fuchs says primary glaucoma constitutes about 1% of all eye diseases. It is often mistaken for iritis or iridocyclitis and treated with atropine which is contraindicated. It may be regarded as beginning cataract and time lost in expecting it to become ripe. These delays and wrong treatment have caused much blindness.

Palpation with the finger or the use of the tonometer may readily detect any increase in tension. A correct diagnosis must be made early and proper treatment instituted if vision is to be saved.

Primary glaucoma may or may not have signs of inflammation. If the tension rises suddenly inflammatory symptoms develop (acute) while if the increase in tension develops gradually these symptoms are lacking (simple).

Acute primary glaucoma—Symptoms.—First stage, rise in tension, vision obscured, sees a colored ring around lights, cornea dull, pupil dilated and sluggish, some ciliary injection. The attack may clear up for a day or for weeks. Gradually the symptoms become permanent after repeated attacks. Second stage, when the attack comes there is much pain, visual power fails rapidly, may be edema of the lids and chemosis of the conjunctiva, all symptoms become much exaggerated, the cornea becomes cloudy. After a violent attack the vision is more or less permanently damaged. Third stage, after many attacks the optic nerve becomes excavated and atrophy takes place.

Simple Primary Glaucoma

Symptoms.—Tension comes gradually; no inflammatory signs; pupil somewhat dilated and sluggish, the cornea may look slightly smoky. With the ophthalmoscope a cupped disc may be noted. There is gradual diminution of sight, which begins by contraction of the field.

There are many theories advanced as to the cause of intra-ocular tension in glaucoma. (Fuchs, Weeks, De Schweinitz).

Treatment.—Eserine is used instead of atropine. The object is to contract the pupil and draw it away from the side wall of the eye ball so the sinus (Schlemm's canal) and the pectinate ligment (the filtering angle) may become free. The good effect of this is more marked in inflammatory glaucoma. In simple primary glaucoma miotics do little good.

Reports from osteopathic treatment of this condition have been favorable in a number of cases. Careful manipulation of the structures of the orbit with the finger or with Dr. Ruddy's third finger eye instrument is good in restoring better circulation of the lymph and blood. Special attention to the venous drainage should be given. Treat the points of the fifth nerve, the nasopharynx and cervical region, spring the jaw. Treat second dorsal.

Have the patient avoid strong emotions or excitement. Keep the bowels free and use only a very bland diet.

Iridectomy is considered the best operation in glaucoma.

In the treatment of secondary glaucoma the other diseases or complications must be considered in conjunction with the foregoing treatment.

Diseases of the Lens

Opacities or Cataract

Symptoms.—Beginning opacities can best be recognized with the ophthalmoscope. Advance opacities can be seen at a glance with the naked eye.

Vision is disturbed according to degree and location of the opacity. If the opacity is in the center of the lens and the periphery is transparent they see better when the pupil is dilated. When the opacities are in the periphery of the lens they see better by day. *Muscae volitantes* and *polyopia* are present until increasing opacity closes up all clear areas shutting out these visual perversions.

There are many clinical varieties of cataracts which may be studied in works on ophthalmology.

Causes.—Some interference with the nutrition of the lens accounts for the condition. Heredity is supposed to play a part in some cataracts. Rickets, convulsions, traumatism, old age, some drugs (ergot), inflammation of iris, ciliary body and choroid are given as causes. Cervical and upper dorsal lesions and disease of the throat, nasopharynx and nose will interfere with perfect circulation and drainage of the orbit, and may well have much to do with many idiopathic cataracts.

Treatment.—Many cases have been reported cured by osteopathic measures. Correct lesions and treat to establish free nerve force and circulation of blood and lymph to the orbit. Manipulation of the orbital tissues and mild vibration of the bulb are measures of value. More hope may be held in symptomatic, toxic, secondary and progressive cataracts. The process may be stopped and in many cases there is hope of a clearing.

Diseases of the Retina

The retina lines the back part of the eye ball. It comes forward to the ora serrata. It consists of ten layers which have been demonstrated microscopically. One layer of it passes over the ciliary body and back part of the iris to the pupil. The fibers of the optic nerve spread out over the retina. The point of entrance of the optic nerve is the papilla. It is to the inner side of the posterior pole of the eye. The retinal vessels emanate there. The macula lutea is the yellow sensitive spot at the posterior pole of the eye. The fovea is the center of the macula. The rods and cones constitute the external layer of the retina. This layer is the light perceiving stratum. For vision to be perfect all the other layers must be perfectly transparent. The visual purple is a chemical substance in the rods that gives the retina a purplish-red color. The light shining into the eye forms images which are converted into nervous stimuli by chemical action of the visual purple and by physical changes and fibrillations in the rods and cones.

Retinitis

Symptoms.—The ophthalmoscope must be used in diagnosis. There is at first cloudiness of the retina; the outlines of the papilla become indistinct. We may note light patches of exudates. The vessels are more tortuous and often there are hemorrhagic spots. Opacities in the vitreous due to the exudate may be seen. Vision is disturbed in proportion to the inflammation. Weeks or months are required for recovery. Atrophy may set in and cause blindness.

Cause.—Many general diseases are found back of this trouble, e. g. albuminuria, diabetes, leukemia, syphilis, gout and arteriosclerosis. Idiopathic cases occur with none of these diseases present, which gives a field for osteopathic research.

Treatment should be directed against the general disease when present. For local effects treatment should be given to all the centers and localities that affect the trophism, nerve supply and circulation to the eye. Protect the eye by dark glass or confinement to a dark room and complete rest. Keep the bowels free and produce diaphoresis.

Optic Neuritis

This disease when manifest in the eye ball is called papillitis. If back of the bulb it is **retrobulbar neuritis**.

Symptoms of papillitis.—Pupils are dilated and sight diminishes. The color of the papilla is altered to a white, reddish or gray and may

show extravasation of blood. The papilla is swollen (choked disc), the arteries are thin and the veins are engorged. It takes months for the inflammation to clear. Atrophy is likely to occur.

Causes.—Brain diseases are the most frequent cause, e. g. tumors. Syphilis, febrile diseases, nutritive disturbances, lead poisoning, heredity and growths in the orbit are cited as causes.

Symptoms of Retrobulbar Neuritis.—There is little or no change in the papilla. The diagnosis must be made mostly from the way the vision is affected. The rule is a central scotoma in the field of vision. The first colors to disappear are red and green. In the acute form there is quick disturbance of vision. The eye looks normal outside and shows practically no change inside.

Cause.—Toxemia, cold, influenza; nasal, nasopharyngeal and sinus disease (ethmoids), and infectious diseases are causes. Idiopathic inflammation of the optic nerve is noted by most oculists. Here the profound effects of spinal lesions upon the eye adds some important light.

Treatment of Papillitis and Retrobulbar Neuritis.—In each individual case the treatment requires consideration of the causal factor. There may be required constitutional treatment in many cases. In others the cause may be found in the nose, nasopharynx, or spine. Effort should be made to remove the lesion in each case. Diaphoresis will aid in acute stages.

Atrophy of the Optic Nerve

There are many causes for this condition such as optic neuritis, meningitis, acute infectious diseases, locomotor ataxia, arteriosclerosis, nasal disease, syphilis, traumatism, alcoholism, exposure, embolism of the central retinal artery, diabetes and poisoning. Diagnosis must determine the original cause.

Treatment.—I have mentioned conditions in the nose as frequently accounting for various eye troubles. If these atrophies of the optic nerve can be gotten early, many of them will be influenced very favorably by osteopathic treatment. Spinal treatment to direct the circulation to the area of the orbit at the base of the brain is beneficial. Regulation of the patient's diet, habits, methods of living and so forth is important. Excessive mental strain, excessive sexual intercourse and stresses of every kind should be prohibited. Special treatment should then be given according to the causal factors entering into the case.

Eye Strain and Its Reflexes

For the subject of refraction and refractive errors such as the different forms of hypermetropia, myopia and astigmatism the reader is referred

to the many excellent works on ophthalmology which cover these subjects quite thoroughly. They are only used here in the relation to eye strain and its reflexes. The osteopathic logic here given should be combined with a reading of the refractive errors in such works as Fuchs, Weeks, De Schweinitz and others.

Asthenopia

Eye-strain, weak sight or asthenopia embraces the group of symptoms dependent upon fatigue of the ciliary muscles or of the extraocular muscles.

There are three varieties of asthenopia. (1) Retinal or nervous, (2) muscular and (3) accommodative.

The symptoms are headache—frontal, fronto-temporal or fronto-occipital. It may extend into the neck between the shoulders. Eye balls may be tender, diplopia at times, may be photophobia, lachrymation, congestion of the eye, itching and burning of the lids.

Accommodative Asthenopia.—In this form the ciliary muscle is fatigued. The cause is usually over-use of the eye when hyperopia and astigmatism exist; sometimes in myopia or presbyopia.

Treatment.—In this form the treatment is the proper fitting of glasses and improvement of the general health.

Muscular Asthenopia is due to tiring of the extraocular muscles, usually the internal rectus. This may result in a phoria or a non-paralytic squint.

Ametropia may exist but asthenopia may come even in emmetropia due to over-use of the eye.

Treatment.—Correct ametropia if present, with glasses. Exercise the weakened muscle. Correct the nerve supply to the weak muscle. Treat cervical and upper dorsal. Manipulate tissues of the orbit. Spring the jaw. Correct any nose and throat pathology.

Nervous, Neurasthenic or Reflex Asthenopia—The cause is supposed to be some functional disorder, more often found in females. May be due to too dim or too bright light, over-use of the eyes. Hysteria may follow ametropia.

Treatment.—Often the treatment is troublesome and the case is very obstinate according to old school methods. Rest, hygiene, general health and habits are looked after. The cause must be found or the treatment cannot be specific.

These are the different forms of eye strain as ordinarily classified. Now as we study the reflex symptoms from these and attempt to trace

out the reflexes from an osteopathic point of view, we may find some more definite causes of these conditions and consequently some methods of treatment not found in standard text books might naturally suggest themselves.

Reflex symptoms that have been traced to eye strain by ophthalmologists are as follows:

Constipation, indigestion, heart-burn, nausea, vomiting, nervous attacks, fear of impending calamity, irritability, despondency, insomnia, restless sleep, epilepsy, nervous twitchings and enuresis. All these symptoms have been seen to disappear after eye strain was corrected. There is no absolute way of proving that all these symptoms have existed because of eye strain. The existence and disappearance of some of them at the time of treatment for eye strain may be a coincidence. It is evident that eye strain in varying degrees may produce a train of symptoms similar to many above mentioned.

A patient, nervous, anxious, uneasy, and despondent, constipated, and having some indigestion, showed on examination contractures and tenderness at the third dorsal. It was found he was suffering from eye strain from over-use of glasses that were too strong for him. The eyes were refitted. He was wearing a

(R)+4.50 D. S.=+.50 cyl. Ax. 180.

(L)+4.50 D. S.=+.50 cyl. Ax. 90

for close work and a (R)+2.00 D. S.=+.50 cyl. Ax. 180

(L)+2.50 D. S.=+.25 cyl. Ax. 90

for distance. The new glasses were—Reading—

(R)+3.00 D. S.=+.25 cyl. Ax. 180

(L)+3.00 D. S.=+.25 cyl. Ax. 180

Distance:

(R)+1.50 D. S.=+.25 cyl. Ax. 180

(L)+1.50 D. S.=+.25 cyl. Ax. 180

He was fitted two years previously. At that time the stronger glasses were correct. Eyes change more or less constantly, especially between the ages thirty-five to fifty-five years. When glasses are fitted, a weak ciliary muscle after a rest may become stronger and allow weaker glasses to be worn.

If a young person is fitted for myopia, in a few years he may discard his glasses as presbyopia develops. A person fitted correctly, who has a strong ciliary muscle may not be able for awhile to see as well with the glasses as without them. After they are worn awhile the ciliary muscle will cease its efforts to accommodate so much and the glasses

give the desired effect. In some cases the doctor's reputation to fit glasses properly may suffer at the hands of such people who sometimes refuse to take glasses, or after getting them refuse to wear them.

In the case of the man just mentioned a refitting quieted the nervous symptoms—he became more cheerful and ceased to worry. Indigestion and constipation improved. The soreness and contractures were overcome in a few treatments.

Now let us ask the question, why is it that eye strain will cause nausea and vomiting? Also why will indigestion affect the eyes by causing "spools" in the vision?

A little osteopathic logic, based as it always is or should be, upon anatomy and physiology, may throw some light on this subject. No doubt every one of us has demonstrated many times clinically that indigestion from over-eating will cause soreness and contractures at the third and fourth dorsal, the nerve center in the spine for the stomach.

The reflexes between the viscera and the eye are complex and difficult to follow. In giving the probable course of the nerve reflexes from the optic nerve to the third nerve Dr. Louisa Burns suggests the following: "The nerve elements of the retina start the impulse; it passes over that portion of the optic nerves which enter the anterior quadrigeminales, the cells of the quadrigeminales where the impulses are coordinated, then by axons of these cells to the lateral or visceromotor nucleus of the third nerve, thence to the cells of the ciliary ganglion, and by the non-medulated (sympathetic) fibers of these, the short ciliary nerves to the non-striated muscles concerned, viz: the ciliary muscle, some fibers of the levator palpebræ and the sphincter of the iris."

The third nerve arises in the floor of the aqueduct of Sylvius from two nuclei; a lateral nucleus which is a visceromotor group of nerve cells, and a central nucleus or a somatomotor group of cells. The somatomotor nucleus supplies all the extrinsic muscles of the eye except the external rectus and superior oblique which are supplied by the sixth and fourth respectively. The nasal branch of the ophthalmic division of the 5th sends fibers to the ciliary muscle. Association fibers connect the nuclei of the 3rd, 4th, 6th and 7th. The evidence is in favor of the 10th or pneumogastric having such association fibers.

We noted four places in the brain to which the optic tracts go before the radiations reached the center of sight in the occipital lobe. If we cannot follow all the reflexes through the brain and cord at least with the facts we have it is not difficult to imagine abnormal impulses coming over the third nerve from a straining of the ciliary nucleus, thence over

viscero-motor fibers in the lateral horn of the cord, over the white rami-communicantes, through the sympathetic ganglia, over the splanchnics to the stomach, producing abnormal peristalsis, nausea and vomiting. In turn we would have the somato-motor nerves to the muscles affected as before described, contraction and congestion of muscles of the spine.

When we have patients consult us and describe a train of symptoms like nausea, vomiting, nervousness, frontal and occipital headache, we should have eye strain in mind and inquire for lachrymation, photophobia, itching and burning lids and congestion of the eye. Any of these things should make us think of testing for ametropia in its various refractive errors, as well as a careful spinal and a nose and throat examination. General physical and laboratory diagnosis should not be neglected.

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- Diseases of the Eye, Jackson.
- Ophthalmic Surgery, Meller.

DISEASES OF THE EAR, NOSE AND THROAT

By J. DEASON

Diseases of the Ear

Methods and Technic of Examination.—The external ear may be examined by direct inspection with or without the aid of artificial light. The external auditory meatus may be examined by means of a simple conical ear speculum and reflected light from a head mirror. This method requires considerable practice but efficiency can and should be attained because it can be used under all conditions and therefore is a reliable method.

The Holmes electric auroscope which we use and recommend for examining the meatus and ear drum, is very efficient but like other electrical equipment is not always dependable. There are many electrical equipments for examining the ear, but so far I have found none other than the one above mentioned that is worth space in an instrument cabinet.

To examine the meatus, grasp the pinna and draw it firmly upward and backward. This tends to straighten the canal so that the aural speculum may be inserted well into the external canal. It must be remembered that the auditory canal is always sensitive and while there is really little danger of doing any harm by exercising ordinary care, the patient is always afraid of being hurt and one can accomplish better results by practicing careful technic.

If the electric auroscope is used, the eye should be placed very close to the lens and every part of the canal, walls and drum membrane carefully examined. The Holmes auroscope has a small tube and bulb, pressure upon which will vary the air pressure in the meatus and cause the drum to move. This must be done very carefully because in very thin, atrophic membranes there is some danger of rupturing the drum.

Diseases of the Auditory Meatus

Inspissated Cerumen, or hardened ear wax is one of the most common affections of the meatus. The cause in some cases can be traced to lesions of the mandible, but in many cases the cause is unknown.

Treatment.—Protect the clothing by means of a towel or rubber neck piece. By means of a soft rubber ear syringe, wash the canal thoroughly by forcing warm soap solution into it. I prefer concentrated

liquid castile soap (any good soap will do) diluted about one to four in water as warm as the patient can bear it. The soap solution is contained in a pus bowl held tightly against the neck under the ear. There is little danger of using too much force with the soft rubber syringe.

In most cases the hardened cerumen will be dislodged by the syringing only. If this cannot be done, it may be well to discontinue the treatment until the following day. The solvent action of the soap solution will further reduce the hardened mass and it usually can be removed by syringing the following day. This method is preferable in many cases because patients dislike the pain which usually accompanies the use of a curet.

The dull loop curet is the most efficient and safest instrument for removing hardened cerumen that the syringe may fail to dislodge. This instrument must be used with great care because the membranes, long protected by the covering of cerumen are hypersensitive and bleed easily.

After removing the cerumen, the canal should be thoroughly dried and lubricated with some non-irritating lubricant. It is also well to place a small pledget of absorbent cotton into the external opening to protect the sensitive membranes from the cold, air and dust.

In drying the canal I prefer to use a small aluminum applicator, twisting a small piece of absorbent cotton on the end in such a way as to cover the tip well, thus making any injury from its use impossible.

Atrophic Meatus

Sensitive or itching ears as the patient commonly describes it, is a very common disease caused by any atrophic condition of the membranes of the auditory meati and frequently found in common with auditory or other cranial nerve deficiency or degeneration. The direct cause of the irritation is the collection of particles of dry cerumen.

Treatment.—The local treatment consists of syringing with warm (118° to 120°F) soap solution until all of the scaly cerumen has been removed. The canal is then dried and lubricated as described above. Several such treatments may be required after which I prefer the use of the continuous irrigating ear cup, using salt mixture instead of the soap. The same salt mixture as is recommended for nose and throat irrigation is satisfactory. After such irrigations the application of phenol-glycerine (10% phenol in glycerine) seems to be an efficient treatment.

The local treatment must, of course, be accompanied by corrective treatment to the mandible and upper cervicals.

Furunculosis

There are three acute affections of the ear which may usually be diagnosed from their points of tenderness or pain. Pain upon moving the lobe or pinna indicates furunculosis. Pain on pressure posterior to the angle of the jaw or externally in front of the ear indicates middle ear infection and pain on pressure over the mastoid region suggests mastoiditis.

Probably the most common of the painful diseases of the external meatus is furunculosis, which is a sub-cutaneous infection of the lining membrane of the meatus. The point of swelling may usually be seen but in some cases the entire canal is closed.

Treatment.—In all cases of occluded pus, drainage must be obtained, but in the early stages of furunculosis, it is not always possible to determine the place of "pointing" or the most desirable point to lance. As soon as the place of "pointing" can be located it is advisable to lance deeply by means of a curved paracentesis knife. The parts are thoroughly cleansed and anesthetized by applying phenol and neutralizing with alcohol. The external parts are first painted with alcohol to prevent "burning" from any phenol which may be dropped upon them. A small cotton applicator is used, applying the concentrated solution of phenol or the crystals (using only a small amount of phenol) to the affected parts and immediately neutralizing with alcohol. Care must be observed not to apply any phenol to the drum membrane and the operator must be sure that the action of the carbolic acid is completely neutralized by a liberal application of alcohol.

The knife blade is placed beyond the furuncle, its curved point turned outward and quickly drawn forward through the furuncle, cutting deeply. The canal is then packed with a pledget of cotton dipped into phenol-glycerine.

If the place of pointing cannot be seen, palliative treatment may be applied by thoroughly cleaning the meatus, drying and applying a phenol-glycerine pack. Heat may be applied by means of a therapeutic lamp. Any electric light bulb or the dry electric pack will do. The external parts are well lubricated with paraffin oil and the heat applied continuously or intermittently until the pain is relieved.

Infection of the Meatus

Infections of the meatus are frequently secondary to, or accompanied by furunculosis. The treatment, therefore, is similar to that of furunculosis.

Always try to locate the point of infection, lance or curet, apply phenol or other chemical germicide, neutralize, dry and pack with phenol-glycerine. After the point of infection has been thoroughly drained, cleanliness and protection from dust or further infection is all that is necessary.

In all cases of infection of the external meatus, suspect middle ear abscess as a cause. There may be a pin-point opening through the drum, from which the infection has originated and is being maintained.

Otomycosis or fungus infection of the auditory meatus is rare. It usually resembles other infections symptomatically, but often without pus. A microscopic examination will serve to diagnose the condition.

The treatment consists of thorough cleansing, drying and the free application of alcohol. Alcohol is dropped into the ear until the canal is full and a pledget of cotton applied to retain it. Usually two or three applications are sufficient to effect a cure.

Eczema of the auricle and meatus is of two types, the squamous or scaly form and the sclerotic form. Both forms are chronic and may be readily diagnosed by the appearance.

Treatment.—Some cases are very difficult to cure but we have had excellent results with the following treatment: Careful adjustment of cervical and mandibular lesions; thorough treatment of any local infections of head or neck; direct application of phenol-glycerine, local cleanliness and protection from irritation.

Diseases of the Middle Ear

Clinically the middle ear consists of the tympanic cavity and its contents, the eustachian tube and the mastoid cells.

Acute Suppurative Otitis Media

Acute infections of the middle ear result from acute naso-pharyngeal affections such as colds, influenza, measles, mumps, whooping cough, etc. Bathing in contaminated water often results in infection to the middle ear through the eustachian tube.

Diagnosis.—Earache, pain on pressure under the angle of the jaw and sudden deafness are the symptoms. (There are also the common febrile symptoms.) The chief physical signs are: redness and bulging of drum membrane, and contraction and tenderness of upper cervical muscles.

Treatment.—If the patient is seen before the drum has ruptured it is seldom necessary to lance the drum if the proper treatment is given promptly.

Drainage must be obtained and maintained by catheter aspiration through the tube irrigation of the naso-pharyngeal cavity, irrigation of the meatus by means of the continuous ear irrigator and application of dry heat over the affected part. Heat is best applied by means of a therapeutic lamp. (Any lamp with reflector that will furnish proper heat is efficient as there is no virtue in colored light.) The skin surface over the ear, side of face and mastoid region is first well lubricated with some mineral oil to prevent blistering and the heat is applied either constantly or intermittently. A pledget of absorbent cotton dipped into phenol-glycerine is placed in the meatus and forced loosely against the drum. This should be removed every few hours and a fresh pledget put in.

The neck and upper dorsal muscles should be kept relaxed and adjunctive treatment given frequently.

Under this treatment the pain should be relieved and the bulging of the drum should disappear in from two to twelve hours. If this is not accomplished or if the condition grows worse, the drum should be lanced. See some text on otology for technique. In my experience, very few cases have required paracentesis.

It must be remembered that treatment should be continued regularly and for some time after the pain and other symptoms have been relieved or a recurrence is probable. Patients should have daily treatment until the physician is sure that no complication or recurrence is likely to result.

If the patient is not seen until after the drum has ruptured, the same treatment may be applied except the irrigation or syringing of the meatus. This, in case of ruptured drum, may force pus into the mastoid cells resulting in mastoiditis. Instead of syringing, the auditory meatus is cleaned by means of a cotton applicator or by aspirating with a catheter. At all times drainage through the meatus must be maintained until the drum begins to heal.

Acute Mastoiditis

Acute mastoiditis results from acute or chronic otitis media. In some cases the otitis media may have been only a mild attack.

Diagnosis.—There is no one symptom that is positively diagnostic but a number of signs and symptoms must be considered as follows:

1. Always suspect mastoid complications in acute otitis media and watch for this complication daily. Most cases have some mastoid inflammation.

2. Pain or swelling over mastoid. Pain may not be present, but usually is, sometimes radiating over temples and eye on affected side.

3. Tenderness on pressure not always present. May be very marked. Tenderness extending to tip or above ear means extension of infection. If persistent tenderness over tips with marked swelling and discoloration—operation is indicated.

4. Swelling, not always present, but sometimes very marked. If extreme swelling and bluish discoloration—usually means operation.

5. Temperature varies from normal to 104° or 105° F. Temperature of more than one or two degrees means systemic absorption and suggests surgical drainage. Streptococcus or staphylococcus infections cause higher temperatures and require drainage earlier than other infections.

6. Transillumination not positive, but of some value. Like X-ray, usually shows dark, because of inflammation, but must rely upon symptoms, as above.

7. **Microscopic.**—Stain for pus, bacteria and bone debris. Hematoxylin stain shows dark bone particles if there is bone disintegration.

8. **Blood Count.**—If absorption, there will be some variation in proportions of leucocytes. Any high leucocytosis shows systemic absorption and the natural attempt to overcome the infection.

Non-Surgical Treatment.—1. Drainage must be maintained from middle ear through tube or drum or both. Catheter aspiration through tube. Sometimes gentle inflation to clear the tube, followed by aspiration is effective.

2. If drum is ruptured, aspirate middle ear by catheter or by Moore's method or both. **This is very important.** If no aspirating machine, use syringe and pump meatus and tube persistently. Dry meatus and keep well open.

3. Patient should be kept in bed if symptoms are marked, with light diet and bowels well open.

4. **Heat.**—Apply oil or other lubricant over whole side of face and head and apply heat by means of "therapeutic" lamp intermittently. Thirty minutes light on and fifteen minutes light off. The light-heat (any electric lamp with reflecting shade will do) is much better than hot water bottle or electric pad or sand bag. The heat must be kept going day and night if symptoms are marked until the pain has entirely subsided. Heat is most efficient in the early stages. After symptoms are well marked, the ice pack is more desirable.

5. If drum is not ruptured, heat may be applied by means of Dea-

son's continuous irrigating cup. Start at 116° F. and gradually increase to 123° F. if patient can bear it.

Surgical.—If drum has not ruptured and symptoms continue, it is best to make free incision of drum,—keep open and apply (2) above.

Indications for Mastoid Operation.—There are no definite signs, symptoms or tests that will determine positively when operation should be done. If the above non-surgical methods are practiced, few cases will require operation, but many will develop into chronic mastoiditis and so it is very difficult to decide whether a mastoid operation should or should not be done. It is best to explain thoroughly the possible complications to the patient and relatives and request them to assume responsibility. Mastoid operations are attended by very little danger when properly done.

Signs and Symptoms Suggesting Operation.—Acute otitis media with mastoiditis.

(1) Persistent pain and swelling not relieved by non-surgical treatment.

(2) Marked protruding of posterior wall or meatus.

(3) Marked tenderness, swelling and discoloration above ear or over tip of mastoid.

These with temperature of more than 102° usually are enough to demand immediate drainage.

(4) Any evidence of extension of pus under skin of neck below tip. A positive indication for drainage.

(5) Any indications of brain or meningeal involvement such as very marked and persistent headache, partial or total loss of consciousness, etc.

(6) Indications of labyrinthine involvement such as marked vertigo, etc.

(7) Sudden cessation of discharge means obstructed drainage from middle ear or from mastoid into middle ear and if drainage cannot be restored by aspiration, this means operation.

(8) The whole clinical picture must be carefully considered at all times. Take no chances. Advise operation before someone else finds it too late.

Chronic Mastoiditis

Cause.—Always from unsuccessfully treated acute form or from chronic suppurative otitis media.

Non-surgical treatment.—See chronic suppurative otitis media. We have had a few cases that were seemingly permanently cured by non-surgical treatment, but believe they are rare.

Indications for Operation.—1. Recurrent exacerbation of acute or chronic otitis media.

2. Constant discharge which resists treatment for chronic suppurative otitis media.

3. Continued pain or recurrent pain and swelling following acute otitis media.

4. Open sinus into mastoid either external or through meatus.

5. Cholesteatoma.

6. Symptoms of labyrinthine or brain involvement following acute otitis media.

7. Definite evidence of bone disintegration in mastoid.

As stated above, none of these are definite indications. The whole group of signs and symptoms are to be considered.

Chronic Suppurative Otitis Media

Etiology.—Chronic suppurative otitis media usually results from an unsuccessfully treated acute otitis media. If in acute otitis media there has been bone erosion or extensive destruction of the mucous membrane by a virulent infection, chronic suppuration is likely to result. A persistent mastoid infection following otitis media is likely to result in chronic otitis media and this is strong argument for early mastoid operation.

1. Otitis media resulting from some virulent infection such as the recent influenza pandemic or scarlet fever is always more likely to result in mastoiditis and chronic suppuration of the middle ear.

2. Such infectious agents as streptococcus, staphylococcus, long-chain pneumococcus or bacillus influenzae are likely to result in chronic suppurations.

3. Lowered vitality from any cause.

4. Inefficient drainage from failure to aspirate the Eustachian tube, delayed perforation or failure to lance drum sufficiently early.

5. Mastoid necrosis, which maintains drainage into the tympanic cavity.

6. Abnormal granulations, polypi, etc. in tympanic cavity.

7. Chronic inflammation with suppuration of the epipharynx or Eustachian tubes.

8. Cholesteatoma resulting from perforated drum and growths of epithelium extending into the middle ear cavity.

Diagnosis.—The diagnosis is easy because nearly every case of discharging ear without pain is chronic suppurative otitis media. The

determination of the exact nature of the condition present is not only very important but very difficult.

Differential diagnosis consists in determining the nature of the infecting organism and the nature and extent of the pathology.

1. Direct examination of the external meatus after drying with cotton applicator usually determines the location and extent of perforation of the drum and the general nature of the discharge, whether purulent or mucopurulent. Very rarely one finds a serious discharge which means a very slight infection or discharge from non-infective inflammation. The presence of whitish or greyish pus, mucoid and stringy, usually means pneumococcus infection. Greyish, purulent non-mucoid discharge usually indicates streptococcus or bacillus influenzae infection. Yellow, purulent discharge suggests staphylococcus infection. The general appearance of the discharge, however, cannot be considered of important diagnostic value because most chronic suppurations are mixed infections, because of long exposure to external contamination.

2. After cleaning the meatus, several smears should be made directly from the opening in the drum. By staining with methylin blue or gentian violet, the nature of the bacterial infection can be determined and this is very important.

By staining another smear with hematoxylin and washing in water, any dark irregular particles, bone debris, may be found, which means bone disintegration. This too, is very important.

3. Transillumination is sometimes of value. The mastoid may be transilluminated by placing a good rubber covered transilluminating lamp over the mastoid and observing the external meatus through an aural speculum. If the mastoid is free from infection the light will pass through and illuminate the meatus.

4. The X-ray plate is, of course, the best means of determining the nature and extent of mastoid involvement.

Treatment.—This is certainly one of the most difficult diseases of the ear that one is ever called upon to treat and the physician should be cautioned against offering a favorable prognosis. Perhaps the most difficult thing about its treatment that the doctor has to learn is that practically none of the so-called antiseptic washes do any good, but on the other hand they often do harm. Certain general principles are important and the treatment must depend upon the nature and extent of the infection and pathology present in each case.

The constitutional treatment consists of everything that will increase the patient's general resistance and certainly all lesions of the cer-

vical, upper dorsal and mandibles must be properly adjusted, but this is not enough. All spinal lesions that may exert an influence on metabolism and elimination are of important consideration. The diet, habits and environment of the patient must be considered.

A careful examination of the naso-pharyngeal tract may reveal some other focal infection, such as chronic tonsillitis, pharyngitis or sinusitis, which is maintaining the infection through the Eustachian tube. There may be a focal or general infection of some other part of the body, which is reducing resistance or causing a hematogenous infection of the tympanic cavity or mastoid cells.

Drainage must be maintained in all cases, both through the Eustachian tube by catheter aspiration and through the drum by aspirating and drying. If the perforation in the drum is small or in the middle or upper part, it should be opened down to the floor so that the contents may be more easily removed and better drainage established. It is well first to thoroughly cleanse the meatus and tympanic cavity by syringing with salt mixture (salt 3 parts, borax 2 parts and soda 1 part, a teaspoonful to a half pus bowl of water) at from 116° to 118° F. After syringing, the meatus is carefully dried, and the middle ear cavity aspirated through the tube and drum opening. The advantage of this simple treatment is thorough cleanliness and drainage with the minimum of irritation. This treatment given daily or thrice weekly will often cure the case.

Staphylococcus and streptococcus infections usually respond to the following treatment: After thoroughly cleansing as above, the meatus and tympanic cavity is syringed with a one to four or one to five dilution of Dakin-Carrel solution (Hyclorite may be used instead) followed by aspiration, the fluid being drawn through the tube, thus preventing reinfection from that source.

Pneumococcus infections do not respond to either of these methods of treatment. The pneumococcus, because of its capsule, is not affected by antiseptics, but on the other hand the irritation of the tissues caused by their use, only gives the infective agent a better opportunity for growth.

In pneumococcus infections we have found the following method efficient: Thoroughly cleanse the meatus and middle ear cavity by salt mixture syringing, aspiration and drying. The meatus and tympanic cavity is then filled with a neutral mineral oil. The oil is also pumped through the Eustachian tube. It is the purpose to fill the entire cavity and its openings so thoroughly that no air can enter. In some cases

we have used bismuth paste after the oiling with excellent results. The pneumococcus is aerobic and if all air can be kept away for a considerable time, it furnishes an unfavorable culture environment with little irritation to the membranes.

Surgical treatment.—The presence of bone debris indicates bone disintegration in the tympanic cavity or mastoid cells. If the mastoid cells are thus involved there is little chance for direct treatment. If such cases do not respond in a short time to any of the above methods of local treatment, ossiculectomy or mastoid operation may be necessary. Some specialist surgeons claim from 80% to 90% favorable results from mastoid operation in such cases.

Non-Suppurative Otitis Media—Catarrhal Deafness

Deafness is any impairment of normal hearing and is that symptom next to pain and chronic discharge that causes the patient to visit the doctor. If acute diseases of the ear, nose and throat could always be successfully treated, there would be little trouble from the symptoms of chronic pathology. It must be understood that catarrhal deafness is a symptom of chronic otitis media and is, therefore, seldom of recent origin.

Etiology.—Chronic otitis media is nearly always the result of the extension of infection through the Eustachian tube and has come from some acute or chronic nasopharyngeal infection. Chronic colds, pharyngitis, tonsillitis, sinusitis, etc., resulting in acute or chronic otitis media either with or without suppuration, constitutes the beginning of catarrhal deafness.

Symptoms.—There is seldom any pain with this disease. Some cases have an occasional acute attack with pain and other symptoms of acute otitis media.

Deafness, varying with the progress of the pathologic changes, is always present. The patient in the early stages will seldom admit that he suffers from deafness and often he is honest because he may not realize that he cannot hear normally until his otitis media has progressed to the second or third stage. Most patients, in fact, do not become alarmed about their hearing until it is too late to restore normal hearing. For this reason, physicians should be on the look-out for such conditions and should advise special treatment early.

The human species in its present environment, depends much less upon the organs of special sensation than do the animals of the wild, and

they may therefore be very deficient in sight, hearing, smell, etc. without actually realizing this loss.

In addition to deafness there are other symptoms such as occasional or constant fullness or feeling of "stiffness" as the patients express it, due to partial or complete occlusion of the Eustachian tubes. Tinnitus aurium or head noises is very common and often the most annoying symptom. Autophony, or the loud sound of the patient's voice to himself, which often causes him to speak low and indistinctly, occurs in the later stages. Presbycusis, or the inability to adjust the hearing apparatus to variations in pitch, commonly occurs in the second stage and is evidenced by the fact that the patient does not hear when more than one person is talking. Paracousis or perverted phenomena of hearing, such as the better hearing of some persons in a noisy environment, is a symptom of the third stage of otitis media and often means an unfavorable prognosis, so far as marked improvement in hearing is concerned.

Pathologic Stages.—For convenience of discussion we may consider chronic otitis media in three stages.

The First Stage.—The active pathology is limited to the pharyngeal portion of the Eustachian tube with some inflammation of the membranes of the tympanic cavity. Closure of the tube followed by absorption of the oxygen causes a decreased pressure in the tympanic cavity and thus a retraction of the drum, decreased movement of the ossicles and a general decrease in function of all tympanic structures. Deafness in this stage may be very marked, especially if the Eustachian occlusion has occurred from some nasopharyngeal acute inflammation. There may be pain but there is always a characteristic "fullness" and sometimes dizziness. Deafness in these cases varies with weather changes. If proper treatment is had in time, the progress of the pathology can be stopped and every case can be restored to normal hearing.

The Second Stage.—The active pathology has extended throughout the Eustachian tube causing marked occlusion and some stenosis. There is further inflammation of the tympanic structures with an increase in the symptoms of the first stage. The drum membrane is less movable but there is no fixation of the ossicles. Pressure upon the bulb of the auroscope causes movement of that part of the drum to which the malleus is attached. The drum is thicker, more retracted, and less movable than in the first stage. Presbycusis is common and often marked, but there is no paracousis. More than 90% of these cases can be materially improved and many can be made to hear normally if proper treatment is given in due time.

The Third Stage.—The active pathology in the third stage consists of an involvement of the entire mucous membrane lining the Eustachian tube and tympanic cavity. These membranes are all chronically hypertrophied. The Eustachian tube, however, is sometimes fairly well open, but the ossicular attachments are more or less fixed by hypertrophied tissue and adhesions and the drum is markedly retracted, thickened and usually very immovable. The deafness is usually quite marked, head noises are commonly present and often very annoying. Patients usually do not notice a variation in their hearing from weather changes. Presbycusis is present in 80% of cases and their hearing for low tones is much reduced.

Unless there is a complicating nerve affection these cases hear well by telephone, which means that they can also use an electric hearing instrument to advantage. These cases can never be restored to normal hearing, but many of them (30% of my cases) can have some improvement and in most cases I believe the progress of the pathology can be stopped, and this is always well worth while because their hearing is likely to be entirely lost if something is not done.

Psychologic Stages.—There are three rather distinct psychologic stages in catarrhal deafness. The first, the period in which most patients refuse absolutely to admit that they are deaf even to the aurist upon whom they call for treatment. They insist that they hear perfectly if people would only speak distinctly. This is partially true, because up to the third stage of deafness the voice can be fairly well heard if people would only articulate clearly. In the second stage patients admit that they don't hear well, but insist that they are going to recover normal hearing and often resort to various kinds of injurious treatment. In the third stage they give up all hope of ever regaining their hearing, become morose, and avoid company. These psychic stages do not always correspond with the pathologic stages given above.

Diagnosis.—The external auditory meatus, drum membrane and ossicular chain, constitute the apparatus whose function is that of conduction of sound waves to the perception apparatus of the inner ear. The function of the conduction apparatus varies inversely with the progress of pathologic change in these structures. The perception apparatus, the structures of the inner ear, are not necessarily affected by middle ear pathology, but on the other hand, sounds transmitted by bone conduction not only seem louder but they last longer because the "escape of the excess" of sound thus transmitted is hindered by deficient

conductive mechanism. This explains why such persons hear well by telephone and why the tuning fork, whose base is held to the mastoid (provided there is no nerve affection) may be heard for a greater time than normal. Likewise the prong of the vibrating tuning fork when held near the concha is heard for a shorter time than normal, because of the deficient function of the conduction mechanism.

Tuning forks are known by their number of vibrations per second, such as 16, 32, 64, 128, etc. Three or more forks are required to make an accurate measurement of the conduction and perception functions—a low fork about a 32, for the low tones, 128 or a 512 for the medium tones and a 2048 for the high tones.

A good set of forks should be selected and standardized, i. e., the normal bone and air conduction of each fork determined by testing it on a number of persons whose hearing is known to be normal. For the general practitioner who cares only to get a general idea of the extent of the pathology, one fork of medium pitch such as a 128 or 512 will be sufficient.

To measure the function of hearing, the fork is set into maximum vibration, its base held against the mastoid and the patient is asked to state when he no longer hears it. This length of time in seconds is recorded as "bone conduction." The fork is then held near the concha and the patient again states when he does not hear it. This length of time in seconds is recorded as air conduction.

Normal Hearing

Tuning Fork Test.—The normal time rate in seconds set of forks is as follows:

Fork	32	64	128	512	2048	4096
B. C.		25	30	30	20	10
A. C.	tone	70	90	90	40	20

The tuning fork test, carefully made, is the only known method of measuring the functions of the various structures concerned in audition.

The Whisper Test is made by producing a clear whisper from residual air only, which should be heard about twenty feet by a normal ear.

The Watch Test is made by using some loud ticking watch (I prefer an Ingersoll), holding it first near the ear until the patient recognizes the tone, and then taking it beyond the hearing distance and approaching the ear until it is heard. I prefer also to move away from the ear until the limit is reached and strike an average of this with the above results.

The average eighteen size Ingersoll watch can be heard for from 100 to 150 inches by the normal ear.

The practical test for the patient is his hearing from the spoken voice, and is the most reliable so far as permanent results are concerned.

Low Tone Limit.—The lowest limit of hearing is about sixteen double vibrations per second, but the lowest practical limit is about thirty-two. There are few people with normal hearing and with musically trained ears who can recognize a definite tone lower than this, so I consider the thirty-two fork sufficiently low for all practical tests.

Conduction Deafness.—Low tones are lost in tympanic involvement or conduction deafness, and are diagnostic in such cases, but are of no particular value in nerve deafness except when that is complicated by catarrhal deafness.

Practical Hearing Limits.—The human voice varies from about 60 to 150 double vibrations per second, and most sounds that we really need to hear are less than 700 vibrations per second. This is the reason for using the low forks, 64, 128 and 512.

Measurement of Nerve Force.—To measure auditory nerve force, the fork (say the 128, whose normal B. C. is 30 seconds) is set into vibration and held gently and with even pressure against the mastoid and the patient is asked to tell or signal the doctor when he ceases to hear the tone. Two or more tests may be made to determine the patient's personal equation, but the use of control forks (the 64 and 512) will show any such error. Granting that there is no complicating pathology, tympanic or labyrinthine, the number of seconds of hearing over 30 will be the patient's auditory nerve force. For example, if he hears the fork 30 seconds his hearing will be thirty-thirtieths or normal. If his hearing is 25, 20, 15 or 10 seconds, his auditory nerve force will be respectively 25-30, 20-30, 15-30 or 10-30.

By means of this method an accurate measurement of the functions of hearing can be made and a definite prognosis can be given. I never use any of the various named qualitative fork tests for hearing, because they have no value to one who employs this system.

FOOT NOTE—In the chart T is used, meaning that tone is heard, while S indicates sound but no tone.

FOOT NOTE—It is not the purpose to give any detailed or differential methods of diagnosis because if one cares to treat these diseases he will of course, study a special text on this subject. The methods here given are only for the general practitioner who wishes a general idea of the condition present.

Summary of Diagnosis of Different Stages of Catarrhal Deafness**First Stage**

1. Fork	32	128	2048
B. C.		35	20
A. C.	T	70	40

2. The drum is only slightly retracted but freely movable.

3. Whisper heard from five to twenty feet.

4. Ingersoll watch heard from 30 to 150 inches.

Second Stage.

1. Fork	32	128	2048
B. C.		40	20
A. C.	T	60	40

Note that the tone of the 32 fork is heard, the 128 fork has increased in bone conduction and reduced in air conduction but that the bone-air ratio is direct, that is the patient hears longer by air than by bone conduction. Note also that the high fork is still normal.

2. The drum will be found retracted but that part to which the malleus is attached is still movable when tested with the auroscope.

3. The whisper is heard from two to ten feet.

4. The Ingersoll watch is heard from six to sixty inches.

5. Presbycusis but not paracusia, is present.

Third Stage.

1. Fork	32	128	2048
B. C.		45	15
A. C.	S	20	30

The typical diagnostic points in third stage catarrhal deafness are:

1. Tone for the 32 fork is lost. 2. There is an inverted bone-air ratio for the medium fork. The drum is retracted and the malleus fixed. 4. The whisper may be heard at less than one foot or not at all. 5. The Ingersoll watch is heard less than six inches from the mastoid. 6. Paracusis Willisiani is present.

For the general practitioner this is important because he can make a rather definite prognosis.

Treatment.—The treatment will be given briefly because space would not permit of lengthy discussions of details of methods and technic.

A careful examination should be made for some source of focal infection about the nasopharyngeal tract. Chronic or subacute tonsil-

Foot Note.—Note that the patient hears the tone of the low fork, that the 128 fork has its bone conduction slightly increased (30 to 35) that the air conduction is slightly decreased (90 to 70) and that the high fork remains normal.

litis, pharyngitis or sinusitis or root abscess are often a cause, and not much will be accomplished in improving the otitis media until these focal infections are found and properly treated. The original cause of these focal infections may have been some bony lesion, but to successfully correct such lesion now does not mean that the source of infection will be removed.

Auto-intoxication from gastrointestinal disease is common. In my cases, 80% of the third stage have chronic constipation or other chronic gastro-intestinal affection.

In many severe acute affections of the naso-pharynx the inflammatory process has left the Eustachian tube occluded or stenosed and the pharyngeal fossa filled with adhesive bands. It is not uncommon to find the epipharynx and pharyngeal fossa filled with partially atrophied adenoid tissue or if the curet method has been used for removing adenoids, there is often connective tissue adhesions and any or all of these may prevent the normal ventilation of the tympanic cavity by way of the Eustachian tube.

In such cases surgical removal of these obstructions and dilation of the tube is necessary. My practice has been to give a general anesthetic (nitrous oxide or somnoform will be sufficient in many cases) and by means of an adenotome (La Force or Gradle, I never use a curet) remove all adenoid tissue. Then by means of the finger I carefully remove any adenoid tissue in the posterior nares and pharyngeal fossæ that the adenotome may have failed to get and also dilate the pharyngeal portion of the tube by inserting the finger.

This operation if carefully and thoroughly done and if preceeded and followed by the proper surgical cleanliness and supportive treatment, will when indicated, accomplish excellent results. The after treatment is even more important because if this is not well done, no results or even unfavorable results may occur. The after treatment consists of daily irrigations of the nasopharynx, thorough attention to upper thoracic, cervical and mandibular lesions, aspiration of the Eustachian tubes and other local treatment to the nasopharyngeal membranes. After the operation has been done it is best to do no digital manipulation of the pharynx for from three to six days. After this time digital treatment, gentle dilation of the Eustachian orifice to maintain its patency, stretching of the soft palate to re-establish proper nerve function and the application of deep pressure in the pharyngeal fossæ to stimulate the otic ganglion is important. This treatment is not massage in any sense but definite, purposeful, manipulation and if carefully done will be followed by excellent results.

Since the origin of this method of treatment, there has been much comment on its value and many have tried or at least they thought they tried it with unfavorable results. The causes of failure are, attempting treatment in cases impossible of cure, or poor diagnosis, improper technic of operator or incomplete operative procedure and inefficient supportive treatment.

It must be understood that not all cases of otitis media even in the beginning stages require the above method of treatment or will be benefited by it. Those cases which have resulted from other causes than acute pharyngitis seldom require such radical methods of treatment.

In every case, the cause must be found and consistent treatment given. In my experience, the radical method of treatment has not been found necessary in more than twenty per cent of cases of chronic otitis media. In the other cases the treatment consists of removing sources of focal infection (about forty per cent) and normalizing nasopharyngeal reflexes by osteopathic and local treatment (about forty per cent). In all cases, the treatment must be complete. To remove thoroughly all obstruction from the epipharynx and leave a source of focal infection in the tonsils will accomplish little, or to remove carefully all pharyngeal obstruction and all sources of focal infection will not restore normal functions of the middle ear structures if the osteopathic lesions and gastro-intestinal perversions are neglected. Surgery in itself, even though carefully and thoroughly done, is not efficient treatment and this is why the medical specialists fail in this disease. After the necessary surgery has been done, then normal tone must be restored to the various tissues involved. Normal reflex mechanisms must be re-established and this can be done by thorough and efficient osteopathic corrective work and the proper local treatment directly to the structures affected.

Meniere's Symptom Complex

This is a form of catarrhal deafness with all the characteristic pathology of the first or second stage, but in which, due probably to sudden tubal occlusion, there results a marked variation in the intralabyrinthine pressure and there are, therefore, the symptoms of conduction deafness combined with labyrinthine involvement somewhat resembling Meniere's disease. There is dizziness or even vertigo, with head noises, but not the marked prostration and nausea which characterizes Meniere's disease.

Treatment.—The treatment is the same as in the first stages of catarrhal deafness and the prognosis is always good. The labyrinthine

symptoms are usually completely relieved as soon as the middle ear is ventilated.

Diseases of the Inner Ear.

Acute Suppurations.—Acute suppurative diseases of the labyrinth occasionally result from the extension of infection from the tympanum but they are certainly very rare. Such conditions may result from acute suppurative otitis media in which there has been an excessive collection of pus without rupture of the drum or drainage through the tube but this very rarely occurs and after drainage has been established, labyrinthine infection is hardly possible.

Diagnosis.—Labyrinthitis is of several forms but in general, there are the symptoms of labyrinthine involvement such as: nystagmus, vertigo, nausea, vomiting, headache, earache, deafness and febrile symptoms. When labyrinthitis is suspected, an aurist of much experience should be called into consultation at once.

Treatment.—Suppurative labyrinthitis is not in itself a fatal disease but dangerous complications may result because of the close proximity to so many delicate structures. Threatened meningeal infection requires surgical drainage, but unless meningeal infection is imminent, surgery is contraindicated. Since the mortality, considering dangers of complications, is not high (about 10%) and since such operations are very complicated and require great surgical skill, we may conclude that surgery is generally contraindicated.

Nonsurgical treatment consists of keeping the patient quiet in bed, liquid diet, and good elimination. Drainage through the middle ear or Eustachian tube must be maintained.

Deep manipulation of the cervical structures will help to maintain lymphatic drainage but any treatment which necessitates much movement of the head should be avoided until the symptoms of vestibular irritation have ceased.

Non-Suppurative Labyrinthine Diseases.

Meniere's Disease.—This disease is caused by hemorrhage into the labyrinth with the following symptoms: There is sudden and intense vestibular irritation such as vertigo, marked tinnitus, nausea, vomiting and complete deafness on the affected side. There may also be cerebral disturbances and loss of consciousness.

The Prognosis depends upon the extent and severity of the pathology. It is probable that those cases in which recovery occurs quickly are not true cases of Meniere's disease but have some causes other than

labyrinthine hemorrhage. Such cases are perhaps Meniere's Symptom Complex.

The Treatment consists of complete rest in bed, light diet, and good elimination until the marked irritation has passed. It has been my practice to carry out further treatment similar to that of the treatment of nerve deafness to be given later. Many of these cases will make complete recovery.

Nerve Deafness.

The term "nerve deafness" is generally used very carelessly to apply to any chronic or non-suppurative process of the labyrinthine structures other than those mentioned above, which cause impaired hearing.

Nerve deafness is not an uncommon disease. In my cases of deafness there has been some involvement of the labyrinthine structures or auditory nerve in 27% of the cases examined. I think the reason for most authors putting the percentage of nerve deafness much lower than this is because of inexact methods of diagnosis. The above percentage is based upon the actual measurement of nerve force. See measurement of nerve force under non-suppurative otitis media above.

A careful study of cases by the method of actual measurement of nerve force, shows that there are two distinct forms of nerve deafness. In one there is only a deficient function of the structures of the labyrinth, due perhaps to some perverted physiologic function, and this form we may call auditory nerve deficiency. The other form of nerve deafness, due probably to an actual degeneration of the nerve or its end organs in the labyrinth, may be properly known as auditory nerve degeneration.

Auditory Nerve Deficiency.—A study of our case reports shows that in 64% of the cases in which the nerve force was 16-30 or higher (more than half) favorable results were obtained, provided that there was no complicating labyrinthine affection. These cases have been classed as "nerve deficiency" and the pathology as functional. A favorable prognosis (64%) may be offered.

Example of tuning fork findings:

Fork.....	32	64	128	512	2048	4096
B. C.		18	20	20	20	10
A. C.	T	50	60	60	40	20

In addition to the tuning fork findings the voice and watch test will be reduced to from one-tenth to two-thirds normal. The patient often complains of itching meati and dry nares. There are usually no signs or symptoms of labyrinthine affection.

Treatment.—The treatment consists of local treatment to the nasopharynx, tubes and meati as described under the treatment of chronic otitis media. Everything should be done to build up the patient's general health and improve the local nutrition. It is highly essential to search the entire system for sources of focal and general infection. Autointoxication from chronic gastrointestinal disease was found in 90% of our cases. Any treatment therefore that will restore normal gastrointestinal function is indicated. Recently we have had some excellent results from colonic irrigation and the proper adjustment of diet in such cases. Any source of focal infection must of course receive proper attention.

The osteopathic corrective treatment consists largely of careful attention to lesions of the splanchnic area because of the importance of normal digestion, metabolism and elimination. This is certainly a most important part of the treatment and should never be neglected. Upper cervical and mandibular lesions have much to do with the local nutrition to the ear structures and these must not be neglected. The fact that we almost constantly find evidence of deficient nutrition to the meati and drums in this disease together with lesions of the mandible, suggests a local osteopathic cause.

Auditory Nerve Degeneration.—In those cases in which there is a measureable deficiency of nerve function of less than half the normal we have found that very few respond to treatment. (See table above.) The cause has therefore been attributed to a structural pathology and the condition called auditory degeneration.

Example Table:

Fork.....	32	64	128	512	2048	4096
B. C.....		10	12	8	5	2
A. C.....	S	20	25	15	7	5

There is usually very marked impairment of hearing for voice and all other sounds. The Ingersoll watch may be heard five or ten inches, but usually not at all, and the whispered voice heard only a few inches or not at all. There are nearly always signs and symptoms of labyrinthine deafness and evidence of tone islands. The deafness in these cases is usually progressive regardless of any treatment.

In this disease there is nearly always an associated affection of the labyrinth as shown by the high forks. The fractions represented by the high forks will agree in proportion provided there is no labyrinthine involvement.

Our results in auditory nerve degeneration have been measurable improvement in only 2% of the cases treated. The prognosis is therefore very poor and I believe we should always tell our patients frankly that there is almost no chance for improving their hearing in such cases. The treatment is the same as that given for nerve deficiency and because of the general good that may be had from treatment, that is, the improvement of the general resistance, it is often well for the patient to have such treatment to stop the progress of further special sensory degeneration.

It should always be our purpose to treat the patient rather than to treat some particular organ only and if this method is followed, our general results will surely be much higher.

Diseases of the Nose

Method of Examination.—For use in nasal examinations and treatment, a suitable chair with adjustable head rest is of much value because if the patient is not comfortable and in a convenient position, the work is very difficult. A few instruments, such as the following, are very essential: A sterilizer for instruments, head mirror and reflecting lamp, nasal speculum, tongue depressor, tonsil pillar-retractor, a nasal packing forceps and a few aluminum cotton applicators. These instruments are few and comparatively inexpensive, but are of more practical value than a lifetime collection of electrical apparatus. Any physician can readily learn the use of these instruments and the methods of examination by attending the clinical sessions of our conventions. Methods and technic of treatment, however, require much practice and experience to develop efficiency.

Acute Rhinitis

This disease, commonly known as a "cold in the head" is one of the most common, and because of the complications which so commonly result, a disease which really requires careful consideration.

Etiology.—The predisposing cause is reduced resistance and individual susceptibility to air borne irritants and infective organisms.

Direct exposure of some insufficiently protected part of the body such as the feet in cold, damp weather, exposure of some unprotected part of the body to draughts or exposure of the whole body to slightly reduced temperature for a considerable time, are the common causes. In cold weather, it is very important that the proper indoor humidity be maintained, because the drying of the mucous membranes renders them sus-

ceptible to infection. This disease is not only contagious at times but may even become endemic from some specific and virulent organism.

The complications which may and often do follow such infections are laryngitis, bronchitis, pneumonia, etc. and any one or more of the focal infections, such as sinusitis, tonsillitis, or middle ear infection. A focal infection thus caused may become chronic and render the patient constantly susceptible to head colds. In fact in those persons who suffer from chronic head colds, there may nearly always be found some focal infection, such as the above named, and it is often impossible to get permanent relief until such sources of focal infection have been properly treated.

The influence of gross structural lesions, osteopathic lesions of the cervical and upper thoracic region, vertebrae and ribs must not be overlooked because they exert a powerful influence upon the blood supply, particularly the venous and lymphatic drainage and upon the autonomic nervous mechanism, which regulates the physiologic control of such functions.

Gross structural abnormalities of the intranasal chambers, such as deflected septum, enlarged turbinates or cellular turbinates, which cause deficient or abnormal breathing space, may cause and maintain head colds.

Diagnosis.—The diagnosis is usually easy. Nasal congestion with the usual “stuffy” feeling of the head, sneezing, headache, etc. are well known symptoms. On direct examination the nares are congested, there is a watery discharge and all of the membranes of the nasopharyngeal tract are congested.

Treatment.—If there is ever a demand for good, thorough and specific osteopathic work, certainly it is demanded in such cases. I am an advocate of thorough, deep relaxing treatment followed by specific adjustment in such cases.

Complete rest in bed with light diet and careful attention to the elimination are very essential. Perhaps the most difficult problem is to convince the patient that a head cold is really a serious disease and demands thorough and prompt treatment. Every ear, nose and throat specialist has had ample opportunity to know that most of the really serious complications of the head and neck result from the lack of prompt and proper attention to head colds.

The local treatment consists of irrigation of the nasopharynx followed by oil spray to protect from further irritation and the maintenance of proper drainage from the sinuses and middle ears. I am not an advocate of the so-called “antiseptic sprays” because they neither destroy bacteria sufficiently to be effective nor do they maintain drainage.

In all cases, the physician should be ever watchful for the complications and should not hesitate to call consultation of a specialist when such symptoms develop.

Purulent Rhinitis

Persistent inflammations of the nasal membranes are usually of a purulent nature or at least have had such a cause in the beginning.

Etiology.—Purulent rhinitis may be a result of an unsuccessfully treated infection of the nose or throat following some disease of childhood or early life. It may be due to infection at birth. Commonly there is a subacute or chronic sinus infection that maintains the infection of the nasal mucosa. Polyps, enlarged or cellular turbinates, adenoids or adhesions in the epipharynx, often retain the secretions and cause chronic rhinitis. In many cases I have found that osteopathic lesions of the cervical or upper thoracic region are effective causes of chronic rhinitis.

The Pathology consists of hyperemia, hypertrophy and exfoliation of the cellular membrane. The turbinates and all membranes become enlarged and thickened and the breathing space is usually greatly decreased.

The Symptoms are nasal obstruction, and mucous or mucopurulent discharge with usually hypersensitiveness, which causes sneezing and other symptoms common to "head colds."

Treatment.—The same treatment as given above for acute rhinitis applies here. A thorough examination should be made for all of the various causes given above and the proper corrective treatment given for any or all such causes.

Chronic Hypertrophic Rhinitis

Etiology.—Chronic rhinitis is usually a result of an infective rhinitis and has for its cause any one or more of the various causes given above under purulent rhinitis.

Pathology.—The pathology in chronic rhinitis varies with the cause, but is usually characterized by a series of changes beginning with infection and hyperemia and followed by an actual and usually marked hypertrophy of the interstitial tissue. The posterior ends of the inferior or, less often, the middle turbinates are usually enlarged and extend backward into the pharynx.

The Symptoms are much the same as in purulent rhinitis, except that the purulent discharge is often not present. These cases usually suffer from chronic head colds, headaches and persistent nasal

obstruction. The senses of smell and taste are usually impaired and there is a nasal twang to the voice.

Treatment.—In these cases, it is common to find osteopathic causes which prevent proper drainage from the head and neck and this is important because, if all the local causes are properly corrected, this is not sufficient to effect a cure.

Surgical treatment for the removal of polyps, synechia, adenoids, adhesions, correction of septum, or hypertrophied or cellular middle turbinates is often essential and certainly infected sinuses must be properly drained. We have had cases in which root abscesses seemed to be active causes, but it must not be thought that surgery and surgery alone is likely to cure chronic rhinitis, and I want to caution against the wholesale removal of turbinates for such conditions. The mere fact that the turbinates are enlarged is not sufficient reason for their removal. There has been a cause for this enlargement and turbinotomy or turbinectomy does not remove this cause. Cautery is worse, because it seldom accomplishes more than very temporary results and often leaves the membranes worse than before. Cautery destroys mucous membrane, leaving a dry and easily irritated surface which is often impossible to normalize.

The proper surgery, carefully done, followed by efficient osteopathic corrective work and thorough irrigation of the nasopharyngeal tract with the necessary oil spray protection after irrigation, will constitute efficient treatment. Treatment, thorough and long continued, will in due time restore nutrition, drainage and normal reflex nerve control to the tissues. Treatment after surgery is essential.

Intranasal Treatment.—Many cases are caused by the retention of secretions under the turbinates and in the superior vault. In all cases, therefore, it is essential to thoroughly free all possible retention cavities by means of a small cotton-wound probe before irrigation. The intranasal membranes are adrenalized and anesthetized and a thorough examination is made using a good reflecting lamp, nasal speculum and cotton tipped probe. Every part of the intranasal region is inspected for sources of purulent discharge, mucus collections, synechia and for hypersensitive areas. The probe is curved at the end and passed under each turbinate and drawn forward and backward with considerable pressure to insure that any collection of foreign matter is thoroughly removed. Every part of the intranasal region should be thoroughly treated in this way. The hiatus semilunaris must be kept well open to permit free antrum drainage and all other sinus openings should be kept free from any obstruction that may block the drainage.

This particular technic requires great care and practice, but it is very effective and so commonly we have found that this work thoroughly done will reduce much and in some cases all of the turbinate hypertrophy rendering surgery unnecessary.

Atrophic Rhinitis

As the term suggests, this disease is just the opposite from hypertrophic rhinitis in that the membranes are shrunken, the nares are wide open and usually the membranes are coated with a mucopurulent discharge, accompanied by a bad odor. It is a chronic disease and progressive in nature.

Etiology.—Deficient nutrition, systemic or local, or some degenerative infective process constitutes the cause. Some cases may be traced to syphilis, but this is certainly not always the cause. Chronic sinusitis, the cause of which is some virulent infection, is often the cause. Too much or incorrect surgery and cautery is certainly a cause in many cases.

Pathology.—The marked atrophic appearance, the retracted turbinates, the excessive purulent or mucopurulent foul discharge are characteristic and diagnostic.

The tissues underlying the mucous membranes are shrunken, and atrophic and this tissue has usually been replaced, sometimes almost completely, by connective tissue, and thus the blood supply is markedly deficient.

Treatment.—In chronic cases, those in which the atrophy is well progressed, there is no hope of restoration to normal conditions, but I believe that the progress of practically every case can be stopped and that, in most cases, a permanent cure can be effected under proper treatment.

Every possible source of focal infection, such as sinusitis, pharyngitis, tonsillitis, etc. should receive proper attention promptly. After this has been done and sufficient time allowed for normalization, a blood count may reveal some other source of focal or general infection, which may be reducing the general resistance.

Auto-intoxication from some gastro-intestinal affection is commonly a cause and must receive proper attention. The general health of the patient must be restored and maintained.

Thorough osteopathic treatment must be given for any cause of lowered nutrition, local or general. The failure, I believe, in medical practice (They admit failure in this disease) is due to the lack of attention to the restoration of normal nutrition. Why drain a sinus and leave an atlas or upper thoracic lesion which decreases the local nutrition and leaves these membranes susceptible to further infection?

Before and after surgical drainage, irrigation of the nasopharyngeal tract. Thorough irrigation to cleanse every part. Hot irrigation (one gallon of salt mixture solution, salt 3 parts, borax 2 parts, and soda 1 part, a tablespoonful to the gallon at 118°F. to 123°F.) to cleanse, to free all parts from infection and to restore blood supply to the affected parts. Frequent irrigation, daily for a sufficient time to thoroughly sterilize and restore circulation. After each irrigation, an oil spray (any non-irritating petroleum oil) is applied freely to protect the membranes from irritation and further infection.

Before each irrigation a thorough probe treatment, as described under hypertrophic rhinitis, should be given that the membranes may be thoroughly freed from all retained secretions.

After the membranes are once clean, the sinuses free from infection and the blood supply reestablished, the treatment may be reduced in frequency to three times weekly, but the treatment must be continued for months or even years to effect a permanent cure. The patient can be taught to do his own irrigation after the disease is well under control. All irritating sprays, chemical cauteries, etc. must be avoided. The so-called "antiseptic sprays" do harm by irritating the membranes and certainly do no good, because they do not cleanse the parts. They only serve to deodorize, but actually accomplish nothing in the way of cure. It has been my experience that iodine and the silver salts in any of their various preparations are not efficient but that they actually do harm. My experience indicates that practically every case can be cured if the proper treatment is given for sufficient time.

Pharmacodynamics

If I may be pardoned for discussing things pharmacological in a text on practice, I want to urge that chemicals as such, are usually a failure in treatment. My results from various series of experimental work both laboratory and clinical, show quite conclusively that there are very few, if any, chemical substances that have actual value by virtue of their chemical properties alone. There are, however, cases in which chemical agents may be used to advantage to obtain desirable physical results and physiologic reactions.

The salt mixture mentioned above increases the solvent power of the water for mucus, pus, and other collected material and it also renders the water less irritating to the mucous membranes. Other than this, it has no value so far as I know. This solution is certainly not antiseptic or germicidal, further than that cleanliness may be considered an antiseptic procedure.

The phenol-glycerine (10% phenol and 90% glycerine) which we have recommended, is somewhat germicidal, non-irritating, except to the nasal mucosa, is a protectant to inflamed membranes in some instances and is also somewhat hygroscopic. These virtues to the limited extent that they may be of advantage, depend chiefly upon physical qualities.

Adrenalin in high dilutions (1 to 5000 to 1 to 10,000) is of value in retracting the erectile tissues of the nares for purposes of examination and for obtaining better drainage, etc. It also constricts the small blood vessels and thus reduces the chances for hemorrhage or absorption of narcotic drugs which may necessarily be used as local anesthetics. The effects of adrenalin are very temporary and it is, therefore, of little value in treatment.

Following irrigation I have used the petroleum oils (liquid petrolatum) to advantage as a protection to the mucous membrane. One half gram each of menthol and camphor and two or three drops of cinnamon oil to the pint of this oil, is readily dissolved and produces a pleasant, soothing effect to inflamed membranes, but further than this, the added substances have no particular value. The above named chemical agents constitute, except in rare instances, my stock of "drugs" for treatment purposes.

Hyperesthetic Rhinitis—Hay Fever

There is perhaps no disease in which there has been more speculation concerning the etiology than in hay fever, and while osteopathy has accomplished a wonderful advance in the treatment of this disease, I am not sure that the cause or causes are yet thoroughly understood.

Etiology.—The theoretic causes of this disease may be expressed in the various names which have been given to it as follows: The term Hay Fever suggests that it is a febrile condition caused by hay pollen irritation. Peach cold, Rose cold, Rose fever, Rose catarrh, Rye fever and Ragweed fever suggest similar specific causes. Idiosyncratic coryza means nothing and this probably expresses what the theorists know about its cause better than any other name. Hysterical rhinitis suggests a probable psychic cause, which certainly does exist in some cases. If I may be pardoned, and I know I never will be, let me suggest just one more name—"Respiratory Reflex Inefficiency."

Intoxications.—Autointoxication from focal infections or from gastro-intestinal perversions certainly have an important influence either directly or as predisposing factors and should always be carefully considered in treatment.

Osteopathic Lesions.—Osteopathic lesions, such as interosseous, muscular and ligamentous, seem to function as predisposing causes by their general effects upon the system. It seems probable that their effects upon the organs of metabolism and elimination are of greater importance than any direct or specific effect in causing the immediate symptoms. In practically all cases lesions of the upper thoracic vertebrae and ribs and of the cervical region are present. It is my opinion that such lesions are more often secondary than primary.

Respiratory Reflex Inefficiency.—Measurement of nerve force in these cases shows that none are really possessed with "an excess of nerve force," but that practically all vary from two-thirds to four-fifths normal, showing that probably all cases are deficient in nerve force.

This instability of the nervous system can be explained, I believe, in the theory of peripheral reflex insufficiency. As evidence of this the following facts may be cited:

1. It is known that peripheral irritation of almost any nature, to the mucous membranes of the nasopharyngeal tract, will excite an attack in susceptible individuals.

2. That any treatment which tends to increase the resistance of these membranes will prevent or relieve an attack.

3. That peripheral inhibition to these surfaces will temporarily relieve an attack.

4. That complete normalization of these membranes will make the patient resistive to the so-called specific irritants, such as pollen, dust, etc.

5. That the mucous membranes of the entire respiratory and gastro-intestinal tract react to irritants to bring about "the hay fever state" and that any treatment which tends to normalize these membranes, renders the patient more resistive to hay fever attacks.

Exciting Causes.—There is no doubt that various air-borne irritants, such as pollen, dust, chemical fumes, emanations from animals, etc., act as exciting causes of acute attacks, and yet there are cases that develop acute attacks out of season or at a time when it seems that there could be no air-borne irritation. From evidence which will be offered later (see prognosis) I am led to believe that probably all susceptible cases can be made entirely resistive to the air-borne irritants.

Pathology

Functional Pathology.—Certainly in this disease there is ample evidence of marked perversions of function or functional pathology.

Kyle believes that in many cases the cause of local irritation lies in "some chemical change in the constituents of the mucus-secreting glands," and "it is a well known fact that in many cases of hay fever the irritation is not limited to the nasal mucous membrane. The eyes and mucous membrane of the stomach and bladder, and even the intestines may be markedly irritated."

These chemical changes in the secretion of the mucous membranes, together with the excess of uric acid would seem to point either to a general perversion of the secretory mechanism or to a deficient elimination, or to both. The periodic occurrence may be accounted for by assuming that the systemic strain is sufficient to initiate the symptoms. The fact that the attack is actually delayed or hastened in susceptible individuals by the late or early beginning of hot weather, and that these cases get relief by going to a more moderate climate is further evidence of this.

Again we are reminded of Dr. Still's teaching, that the body maintains its own chemical laboratory which adjusts or tends to adjust its work to the needs of that body, but under abnormal strain this adjustive mechanism may fail to meet all of the demands of function. It seems here that the osteopathic concept may easily include all environmental causes as well as internal causes in the predisposition to deficient function or disease.

Structural Pathology.—During the attack there is a general catarrhal inflammation of all nasopharyngeal membranes, accompanied by a watery discharge and marked swelling of the turbinates. Sensitive areas may be found on the middle turbinate and opposite wall of the septum. Probably it is this hypersusceptibility to irritation that causes the attack from the air-borne irritants.

The pseudo-membrane which may be found covering a part or all of the mucous membranes of the nares probably results from this irritation and is formed for the purpose of protection.

Clinical Types.—Clinically, three rather indefinite types of hay fever may be recognized, viz.: Vernal, those cases which have their attack sometime during May, June or July; Autumnal, in which the attack occurs in August or September and usually lasts until the beginning of cold weather, and an indefinite or pseudo form occurring at any time of the year, with no characteristic attack, as in the other forms, but with indefinite symptoms resembling hay fever.

Symptoms and Diagnosis.—Patients usually go to the physician self diagnosed. The characteristic sneezing, the watery discharge from

the nose, and the irritation of all membranes of the naso-pharynx and conjunctiva will serve to make a diagnosis in most cases. Direct examination will reveal the nasal congestion and other characteristic pathology as described above.

Termination.—Most cases of the autumnal form, unless successfully treated, continue with equal or increased severity until after the first or second frost, when they usually terminate in asthma, bronchitis or sinusitis, which lasts for several weeks or months. Each year the attack lasts longer and is more severe and the asthma occurs earlier and is more severe.

Treatment

Intranasal Surgery.—Intranasal abnormalities, such as deflected septum, spurs on the septum, hypertrophied turbinates, polypi, etc., which materially reduce the breathing space, usually demand surgery. Nasal surgery, carefully and properly done, is always a great aid and often absolutely essential to the successful treatment of hay fever and asthma, but nasal surgery carelessly done frequently does more harm than good.

The correction of a deflected septum or the removal of a spur on the septum by submucous operation often aids materially in the prevention of pressure irritation, increases the breathing space and normalizes drainage from the sinuses.

Surgery is therefore very essential in many cases of hay fever, but surgery is never the all essential part of the treatment, because if the proper after treatment is not given, the surgery alone will seldom result in either temporary relief or cure.

Focal Infection.—The importance of focal infection of the sinuses, tonsils, teeth and occasionally other parts, such as the nasal cavities, epipharynx, middle ear and mastoid cavities cannot be overestimated. Such conditions may be effective in causing hay fever, by causing direct infection of the membranes of the naso-pharyngeal tract or by auto-intoxication.

Digital Surgery, for the removal of adhesions in the posterior nares and pharynx, is in my opinion, very essential, and this work should be done thoroughly. Massage of the soft palate or pharyngeal walls is of no particular value. All adhesions and adenoid tissue must be removed because this removes an effective source of constant irritation and focal infection and tends to normalize the direct and reflex nerve mechanism.

The practice of the radical intranasal technique as originated by

J. D. Edwards, D. O., is indicated, I believe, in some cases in which the crushing of cellular middle turbinates, or the breaking of adhesions is indicated, but I am not yet ready to accept this theory of "curetting" the mucous membrane by radical digital technique. The fracture of the turbinates is not necessarily a bad technique provided they are properly readjusted as Dr. Edwards does it, but to fracture and not readjust is a dangerous practice. The efficiency and safety of any method depends upon the operator's definite knowledge of what needs to be accomplished and how it is to be done.

There are contraindications to digital, as well as any other kind of nasopharyngeal surgery, such as: (1) Acute infection of any part of the nasopharyngeal tract; (2) evidence of sinus involvement; (3) septal deflections, spurs and hypertrophied turbinates, which would not permit such work without undue trauma.

There are certain other precautions such as thorough cleanliness of the parts to be treated; aspiration of the sinuses before and afterward, and the use of a finger of sufficient size which will not produce undue trauma. In my opinion very few doctors have such fingers.

Failure in accomplishing results is due to three things, viz., (1) Insufficient knowledge of diagnosis and prognosis; (2) insufficient knowledge of what should be accomplished and the technique of doing it, and (3) the necessary additional or supportive treatment.

It is a great mistake to think that the removal of adhesions in the pharynx or nares is sufficient, because if this is not followed by the proper supportive treatment, no results or even bad results will frequently occur. This treatment is not a massage in any sense, but a definite operative procedure and requires as much care and skill as the removal of adenoids or tonsils.

Space will not permit an explanation of the digital technique and the radical treatment should not be attempted without some definite knowledge of the methods and technique.

Intranasal Treatment.—The intranasal method of treatment as explained above under hypertrophic rhinitis is very effective and if carefully and thoroughly done is in most cases just as efficient as intranasal digital surgery. This treatment followed by irrigation and oil spray and nasal packing will be found effective in most cases if the treatment is properly done.

Nasal Packing.—Thorough packing of the nasal cavities after all sources of focal infection have been removed and after thorough cleans-

ing has been done, by means of long strips of absorbent cotton is effective in reducing the swelling and irritation.

The Radical Packing Method.—This method can be done best in a hospital. The nares are prepared as for surgical operation, by complete retraction of all erectile tissue, thorough cleansing by irrigation and the application of a local anesthetic. Anesthesia need not be complete. A careful examination is then made for any synechia, or focal infections. Packing should never be done until the doctor is sure there is no sinus involvement. The entire nasal cavity is then packed very firmly with sterile gauze. This is best done by means of a special packing instrument or long nasal packing forceps, using narrow gauze contained in tubes. In some cases the nasal cavity is lubricated before packing.

The packing should be done early in the morning and removed just before bed-time, so that the patient may sleep. This treatment is repeated daily until all signs and symptoms of nasal irritation are gone and then replaced by irrigation and oil spray.

If this treatment is properly done, there will be a complete sloughing of the pseudo-membrane followed by a restoration of normal and resistive tissue. The results of our two years' experience (we have tried this on only a few patients each year) are very encouraging. Relief from the symptoms are very prompt and seemingly more permanent than from other methods.

Treatment of Auto-intoxication.—All sources of focal infection are thoroughly treated. Sinus infection is very common and must receive proper attention before any other treatment can be effective.

Our experience shows that many cases have auto-intoxication of gastro-intestinal origin. The hospital care of such cases makes possible the thorough cleansing of the colon by irrigation and the reestablishment of an acid producing flora which seems to prevent fermentation.

Osteopathic Corrective Work.—Thoroughness of treatment for the removal of all causes is the secret of success. To successfully remove the immediate sources of auto-intoxication by treating a sinus infection or by thoroughly freeing the colon from fermentation products means only temporary results if the underlying causes are not corrected. A thorough osteopathic examination is necessary to determine such causes and certainly such treatment should not be neglected.

Correction of all cervical and upper thoracic lesions and particularly the clavicles and ribs is important. These lesions seem to be the result rather than the cause, but normal respiratory functions seemingly cannot be maintained unless such treatment is done.

Sinuitis

Acute or chronic inflammatory disease of the nasal accessory sinuses with or without suppuration is more common, I believe, and is responsible for more complications and chronic affections of the nose and throat than is generally known.

Etiology.—The cause in most cases lies in unsuccessfully treated acute infections involving the nose and throat. Abnormalities of the nasal respiratory passages such as deflected septum, enlarged or cellular turbinates, adhesions resulting from cautery or careless surgery, causing deficient drainage, constitute the local causes. Underlying some of these direct causes, lesions of the cervical region which impair the nutrition to and drainage from the head are to be considered.

Symptoms and Diagnosis.—Acute or chronic headaches and neuralgic pains of the head are common symptoms. Acute sinuitis of the frontal sinuses is accompanied by marked and persistent frontal headache and pain in the eyes. In infections of the maxillary sinus there is usually pain over the affected part, but there is often referred pain to other parts of the head. Sphenoidal sinuitis usually causes general headache with no definite location.

By direct examination of the nasal cavities a purulent or mucopurulent discharge may be seen and the source determined. In many cases, however, the pus may be retained or insufficient in amount to detect by direct examination.

Transillumination in a dark room by means of a good transilluminator will usually show a darkened area over the affected part. The average battery equipments commonly sold for this purpose are of little value. The X-ray plate when properly done, is more dependable than the transilluminator.

In some cases, all of these methods fail to locate the affected sinus and the cause can be found only by opening into the sinuses, aspirating with a catheter and making microscopic examination of the aspirated material. The microscope is indispensable for this work. Every suspicious discharge should be stained until pus is found and except in well defined cases, this is the only practical method of positive diagnosis.

Treatment.—Local treatment of the nasal cavities by retracting the turbinates and irrigation will be successful in many cases, but unless there is a large normal opening the pus will not drain sufficiently and probe treatment is required. In acute cases in which the pain is marked, osteopathic treatment of the cervical region, deep relaxation of the sub-

maxillary structures and the application of heat over the affected part, together with the local nasal treatment should be given, but if this does not relieve the pain within twenty-four hours, the sinus should be opened and thoroughly drained. If efficient drainage is not established early the symptoms will usually increase until the pain is almost unbearable and serious complications may result.

In practically every case of acute sinusitis, I believe it is best to make a good, free opening into the affected sinus first and secure complete drainage by catheter aspiration. If this is properly done every case will recover much more quickly and without complications or danger of chronic infection.

Non-Suppurative Sinuitis

Cases of non-suppurative sinus involvement are not at all uncommon. The so-called "Vacuum sinusitis" which results from a closure of the normal opening, resulting in inflammation without pus formation, is responsible for many of the complicated cases of referred pain, which are so often improperly diagnosed. Chronic headaches and the various symptoms of fifth nerve affections, the neuralgias of the head, are frequently caused by non-suppurative sinus involvement.

Treatment.—The treatment consists of establishing good drainage and proper ventilation of the affected sinus or sinuses followed by thorough intranasal treatment as explained above. The osteopathic corrective work must not be neglected.

Syphilis of the Nose

In osteopathic practice syphilis is not a common disease. The occurrence of syphilis of the nose is still more rare but certainly should be recognized.

Diagnosis.—The local lesions of the nose are of two types, those of acquired syphilis and of congenital syphilis.

There are three characteristic manifestations of acquired syphilis as follows. The primary lesion or hard chancre is a firm, indurated ulcerated mass with only slight discharge. Chancre of the nose is exceedingly rare. In secondary syphilis there is the mucous patch, the result of mucous membrane necrosis. In tertiary syphilis the local lesion is the gumma or more commonly, the ulceration left from necrosis of the gumma. These lesions may appear from a few to many years after the initial infection, but they never follow immediately. The lesions may appear on almost any part of the intranasal structures. They resemble

the lesions of atrophic rhinitis but in atrophic rhinitis there is never the extent of destruction that so frequently results from tertiary syphilis.

Treatment.—It has been my practice to refer all suspected cases to Dr. F. J. Stewart for differential diagnosis and treatment and his method of the use of salvarsan has proven efficient.

Epistaxis—Nose Bleed

The causes of nose bleed may be divided into two general groups, local and constitutional. The first group consists of trauma directly to the nose either external or internal, from nasal operations and other causes. The presence of a cluster of thin-walled veins on the anterior part of the septum which readily rupture from slight cause, constitutes perhaps the most common cause of nose bleed. The ulcers of atrophic rhinitis or syphilis occasionally cause bleeding. Malignant growths of the nose may cause frequent and profuse hemorrhage. The constitutional causes of epistaxis are, the acute fevers, cardiac and arterial diseases, which cause excessive tension; and cases of altered composition of the blood such as the anemias, malaria, purpura, chlorosis, hemophilia, etc.

Diagnosis.—Direct examination of the nose will usually reveal the cause. If there are no signs of trauma or rupture of the anterior group of vessels and the bleeding does not respond quickly to packing of the affected side, there is either a rupture of a large vessel, which requires long continued packing, or it belongs to the class of constitutional disease.

If there is evidence of some necrotic disease of the nose or if there are areas of exposed bone or cartilage from careless surgery, these may usually be seen and the point of bleeding located.

Treatment.—Cold applications, irrigation of the nares with cold normal salt solution and the application of an absorbent cotton or gauze pack is usually sufficient to stop the average case of epistaxis from any cause. The direct application of cold to the lower cervical region will cause capillary restriction.

There are many cases in which the membranes of the nose have lost their tone due to various irritants or from deficient nutrition to the parts. These are cases of a wholly different type from that of the well known necrotic diseases such as atrophic rhinitis and syphilis. Hay fever is a result of such a cause. The treatment in such cases consists of removing any local causes or osteopathic lesions and then normalizing the resistance of the membranes by the methods described under the treatment for hay fever.

The treatment for those cases of epistaxis due to constitutional disease depends wholly upon the causative factors and the proper treatment of these. Any local treatment in such cases will be expected to produce only temporary results.

Diseases of the Nasopharynx

The nasopharynx may be the location of acute or chronic inflammations, neoplasms, malignant or nonmalignant, processes of atrophy or hypertrophy, adhesions, etc. It is important to remember that the nasopharynx admits the Eustachian tubes and supports four superficially located ganglia of the fifth nerve.

Acute Nasopharyngitis.—Acute inflammatory processes of this region may result from rhinitis, infections of the lower pharynx, focal infections of these parts or from direct involvement of its own structures.

The symptoms are post nasal tenderness and mucus dropping. Some patients experience the sensation of a foreign body in that location. The thick, adherent collections of mucus are difficult to dislodge and sometimes are so persistent that they cause nausea. There is usually occlusion of the Eustachian tubes, resulting in partial deafness, tinnitus and often dizziness.

The Treatment consists of thorough cleanliness by irrigation and osteopathic corrective work to the cervical region. It is also essential to keep the anterior neck structures particularly those of the submaxillary region, thoroughly relaxed to maintain efficient drainage.

Chronic Nasopharyngitis

This is one of most common diseases of the nasopharyngeal tract, causative of many complications and yet perhaps the least recognized in proportion to its significance. The frequent occurrence of adhesions of the pharyngeal fossae, hypertrophied membranes, enlarged spongy extensions of the inferior and middle turbinates (the posterior turbinate bodies) occlusion of the orifice of the Eustachian tubes and chronic, excessive secretion of thick mucus all show that this disease has either gone unrecognized or at least has not received proper treatment.

Treatment.—Complete surgical removal of all abnormal growths, adhesions, etc. as described under the treatment of chronic non-suppurative otitis media and this followed by thorough irrigation and other methods of local treatment described above are efficient. The successful treatment of this disease requires time. There has been a partial or, in some cases, almost a complete loss of the normal functions of the nerve reflex

mechanism of these parts, peripheral reflex inefficiency and this must be restored. Efficient and long continued treatment of the lesions commonly found in the cervical and upper thoracic regions will do much to restore these normal functions, but this alone without the surgical treatment will never effect a permanent cure. Neither will the surgery and local treatment alone effect a cure. The whole treatment is required.

Adenoids

Adenoids are the hypertrophied lymphoid tissue of the nasopharynx. They occur commonly in children, as a result of acute inflammations. Possibly the suckling process of the child produces a partial vacuum of the epipharynx and thus causes excessive blood supply to the part and therefore excessive growth of these soft tissues.

Adenoids, however, are not confined to children but frequently occur in adults. In all cases they are a source of much annoyance and often the cause of acute and chronic disease.

Symptoms and Diagnosis.—Mouth breathing, head colds, partial deafness, etc. are the common symptoms. The flattened nose, the high arch of the hard palate and the stupid appearance of the face are diagnostic. By direct palpation to the nasopharynx the nature and extent of the adenoid mass can be determined and this is the best method of diagnosis.

Treatment.—Many methods of non-surgical treatment have been employed, but there is nothing as satisfactory as complete surgical removal. Adenoid tissue has no known function different from that of other lymphoid tissue and there is always sufficient to perform any necessary function without excess of adenoid growth. The excessive adenoid growth is in every case a detriment to normal development, because it impairs nasal respiration and usually causes chronic nasopharyngitis and thus reduces resistance against all diseases of childhood. There is therefore, no excuse, much less a reason, why excessive adenoid growths should not be removed surgically, provided it is properly and thoroughly done.

The operation for removing adenoids requires in children, a general anesthetic. In adults, a local anesthetic is used by some operators. I have found it best to first break the adenoid mass away from the side walls of the pharynx digitally. A LaForce or Gradle adenotome is then used to remove the adenoid mass. If either of these instruments is properly used it will always remove the greater part of the adenoid mass without undue trauma or injury to any of the pharyngeal structures.

Curets should never be used because they almost never remove the adenoid mass properly, but they usually do injure the pharynx. Many cases of pharyngeal adhesions, Eustachian tube occlusion and nasopharyngitis result from direct injury caused by curets.

After the adenoid mass has been removed the finger is inserted into the pharynx and any adenoid growths in the posterior nares are removed. The pharyngeal fossae are also thoroughly freed from adenoid tissue and adhesions and the orifices of the pharyngeal portions of the tubes are gently dilated. This method insures complete removal of all excessive adenoid tissue, and normal functions of the nasopharynx. Adenoids thus removed do not return.

After the surgical work has been completed the nasopharyngeal tract should be thoroughly irrigated with hot salt mixture solution. This thoroughly cleanses the membranes, hastens healing, prevents hemorrhage and avoids post-operative infection. Irrigation of the nasopharynx should be continued for some days or until all evidences of inflammation have ceased. The pharynx should then be examined to be sure that no adhesions have developed from inflammation, but if the operation is carefully done, complications will never result.

Diseases of the Oropharynx

Acute Pharyngitis

Acute inflammations of the pharynx alone or in common with inflammations of other parts of the nasopharyngeal tract are common. This disease is most common as a result of the acute infections affecting the nose and throat.

Etiology.—The predisposing causes are focal infections of the nasopharynx, such as tonsillitis, sinusitis, etc. Deficient nutrition or anemia of the pharynx or systemic anemia are common causes. Lesions of the cervical, upper thoracic and hyoid are common predisposing causes. Undue exposure of the neck in susceptible persons or too much or too tight clothing about the neck may also predispose to inflammations of the pharynx.

The exciting causes are the acute infections, colds and focal infections. Perhaps the most common exciting cause is tonsillitis, acute or chronic.

Symptoms and Diagnosis.—The characteristic dryness of the pharynx, pain and persistent coughing are diagnostic. Upon direct examination, the reddened, swollen appearance of the pharynx and posterior pillars can be seen.

Treatment.—The treatment should be general and local and should be determined by the causes and conditions present. This disease is usually an acute infection and like other acute infections, the usual systemic treatment should be applied.

The local treatment consists of thorough cleansing of the nasopharynx (by irrigation if the patient can permit) and the frequent (or occasional as required) use of some gargle until the inflammation has subsided. Any cleansing nonirritative solution may be used for a gargle. Equal parts of peroxide, alcohol and glycerine, a tablespoonful to a half glass of very warm water or ten to fifteen drops of phenol-glycerine to a half glass of warm water will make a good cleansing gargle.

The osteopathic treatment consists of corrective work to the cervical, upper thoracic and hyoid and thorough relaxation of the submaxillary musculature to obtain good venous and lymphatic drainage. If sufficient care be taken to avoid trauma, digital stretching of the soft palate and pharyngeal muscles by the use of the finger internally, is very efficacious.

Chronic Pharyngitis

Chronic pharyngitis may be hypertrophic, atrophic or granular. In hypertrophic pharyngitis the pathologic changes have passed beyond the stage of hyperemia and there is always hypertrophy or hyperplasia, usually the latter, of the pharyngeal membranes. These changes in most cases, have extended to and involved all of the nasopharyngeal membranes.

Chronic granular pharyngitis, or so-called clergyman's sore throat, has a similar pathology to that described above, but with swollen and inflamed lymph follicles. This condition seems to be a result of excessive use of the voice.

Chronic atrophic pharyngitis has a similar etiology and the diagnostic signs are also similar to atrophic nasopharyngitis with which it is usually associated.

Etiology.—The causative factors are similar or the same as those of nasopharyngitis. Lesions of the cervical and upper thoracic and chronic focal infections such as tonsillitis, sinuitis, etc. are the common causes.

Treatment.—The nature of the treatment should be determined by the causes found. The nature of the pathology requires long continued treatment and careful attention to all causes. Thorough osteopathic corrective work, the removal of all sources of focal infection, proper at-

tention to any gastro-intestinal perversions which may be causing auto-intoxication and thorough cleanliness of the parts by gargling with some cleansing, nonirritating solution and by irrigation.

In most cases there is a considerable collection of adhesions in the nasopharynx or posterior nares or in both. Enlarged "posterior turbinate bodies" and the extension of the inferior turbinates into the pharynx are also common results of the hypertrophic process. Complete surgical removal of this excess tissue and the after treatment as described above under chronic nasopharyngitis are frequently required to obtain complete and permanent results.

These cases can be successfully treated if the proper attention is given to all possible causes in each individual case. It is the individualization, the specific and detailed attention to the cause or causes, and such treatment continued for sufficient time, that will obtain results.

In atrophic pharyngitis, normal nutrition to the parts and usually to the entire system must be restored. Many such cases are secondary to systemic anemia or to rheumatic intoxication. A careful examination should be made for evidence of systemic causes. In many cases, I believe that thorough osteopathic corrective work applied to the mid and lower spine is the most essential part of the treatment. Other than this the local treatment as described under atrophic rhinitis applies here.

Tonsillitis

There is perhaps no other organ of the body, diseases of which have caused a greater variance of opinion relative to treatment than the tonsils. There are those who believe that every hypertrophied, atrophied, or infected tonsil together with its fellow of the opposite side should be removed. There are also those who believe that no tonsils, regardless of their pathology, should ever be removed. These are the radicals and their views are not at all in keeping with present day facts.

Those physicians and surgeons who have tried to arrive at some safe conclusion on this subject, believe that there are certain methods of non-surgical treatment which are effective in many cases and they also believe that in other cases, tonsillectomy is imperative.

Functions of the Tonsils.—Many and varied functions for the tonsils have been held by various theorists such as: the absorption of the products of salivary digestion; the secretion of an amylolytic ferment; that they are atavistic structures and therefore have no function; that they eliminate systemic toxins; that they serve as culture tubes for the production of vaccines; that they protect the deeper cervical tissues from

bacterial invasion; the theory of internal secretion and a score of other theories which so far, have never been substantiated by either clinical or experimental evidence.

The hematopoietic theory or the theory of blood formation has a rather definite basis because such a function would be possible from the histologic structure. The formation of small lymphocytes has been attributed to tonsil tissue (Flemming) and this view has been generally accepted. Some of the lymphocytes however, find their way through the epithelial walls into the crypts and are discharged as "mucous plugs", while others are carried by the efferent lymphatics into the circulatory system. In this respect, the tonsils, like other lymphoid tissue, produce lymphocytes which are essential constituents of the blood. This function is particularly marked during the growing period, but this function is also highly developed in all lymph nodules during this period, and in the growing child there is an abundance of such tissue and thus it seems that the tonsils, while important to the growing child, would not be at all indispensable structures.

Some physicians claim to have observed deficiencies in growth and development of children whose tonsils had been removed during the first ten or fifteen years of life, but this is not commonly accepted. The tonsils have their greatest cellular activity during the growing period and unless chronically hypertrophied they atrophy during adult life.

Tonsillectomy

We may safely conclude from this evidence, that in the growing child, it may be well to retain the tonsils providing they are not directly affected in such a way as to endanger the general health of the child, but that there is little, if any, danger in their early removal. In adults, there seems to be no reason why they should not be removed in cases in which there is evidence of involvement beyond restoration by treatment or those cases in which there is evidence of toxic absorption.

When surgical removal of the tonsils is indicated, the complete removal or tonsillectomy should always be done. A careful and complete enucleation of the tonsils when properly done will never be followed by any untoward results other than the temporary surgical sore throat. There is never any excuse, much less a reason, for partial removal of the tonsils or tonsillotomy, because such operations never accomplish the desired result and they nearly always require tonsillectomy later.

In association with a reputable vocal teacher I have studied the results of tonsillectomy on the voice. In none of the twenty cases studied

was there any impairment following the operation, but on the other hand sixty per cent were improved either in range of pitch, quality or endurance, in addition to their being more free from laryngitis, pharyngitis, etc. for which the operation was done. Doctors Ruddy, Edwards and Reid of our profession have told me of similar experiences, so I am certain that tonsillectomy properly done will in selected cases, improve the voice.

Acute Tonsillitis

Acute tonsillitis is an acute infectious and often a contagious disease characterized pathologically by inflammation of the tonsils. Some authors differentiate between follicular tonsillitis in which the crypts or lacunæ are involved, and parenchymatous tonsillitis in which the parenchyma is involved.

Etiology.—The predisposing and exciting causes are the same as in other acute infections of the upper air passages except that there is usually a chronic tonsillitis as a result of some previous attack.

Symptoms and Diagnosis.—The symptoms also are similar to other acute infections of the nasopharyngeal tract, with sore throat, variable temperature, headache, etc. By direct examination of the pharynx, the protruding masses with white or yellow patches are readily seen.

Treatment.—Infection, drainage and elimination are three words inseparable in the therapeutics. The local treatment (I doubt if many will agree) in either acute or chronic tonsillitis is essentially the same—radical aspiration drainage. In all cases, except young children who will not permit it, I place a vacuum cup directly over the tonsil and apply as much vacuum as can be obtained. This treatment will, when properly done, empty the crypts of all pus. This accomplished, each crypt is probed with a cotton applicator dipped into phenol-glycerine.

Cervical and upper thoracic treatment and deep relaxation of the sub-tonsil tissues to increase the normal blood supply and to decrease congestion by drainage elimination are essential. The lower thoracic and lumbar should receive due attention for the purpose of increasing general elimination. The diet and other treatment are no different from that in other infectious fevers.

Peritonsillar Abscess

(Quinsy Sore Throat.)

Peritonsillar abscess results from the collection of pyogenic bacteria and pus formation between the tonsil and the pillars of the fauces. It is perhaps a result of the closing of an infected crypt causing deep penetration of the pus.

Diagnosis.—The symptoms are those of acute tonsillitis but usually more marked and with one tonsil decidedly more protruding than the other. In some cases the location of the abscess can be seen and it is comparatively easy to open with a knife or probe, but in many cases the abscess is so situated that it cannot be located except by exploratory probing.

Treatment.—Drainage by direct incision of the abscess pocket is indicated as early as a definite diagnosis can be made. There is no definite technic to be followed except to observe certain general principles. If the "pointing" of the abscess can be located, it is comparatively easy to make a good, free, direct incision and accomplish complete drainage. In many cases the only way to locate the pocket is to employ a probe or small, long, scalpel and explore between the pillar and tonsil until the pus pocket is found. As soon as this is located the pus pours out around the probe and this gives the location. Free drainage by means of a liberal incision should then be made. Aspiration of the pus pocket and filling with phenol-glycerine is effective after drainage has been obtained, but a liberal drainage must be maintained.

The non-surgical treatment as described under acute tonsillitis is to be applied here.

Chronic Tonsillitis

Chronic tonsillitis usually is the result of one or many attacks of acute infections of the tonsils. Occasionally cases of marked chronic tonsillitis occur in which the patient denies ever having had an acute attack.

The pathology consists of hypertrophy of the lymphoid tissue and connective tissue.

Diagnosis.—The purpose in diagnosis is not to determine whether the tonsil is hypertrophied but to determine whether the tonsil is causing any local or general physiological perversions and if so, whether local treatment or surgery should be applied.

The direct examination should be made very carefully, because otherwise a bad tonsil may be readily overlooked. The mere fact that a tonsil is large or has open crypts from which a whitish mass may be expressed does not mean that such a tonsil is directly responsible for local or systemic physiologic perversions.

The examination should be made by means of a tongue depressor, tonsil retractor and a good head mirror and reflecting lamp. Every part of the tonsil and surrounding pillars should be carefully examined. Firm pressure applied against the tonsil from in front and behind will

often force material from the crypts or out around the capsular margin. Any such material thus expressed should be examined microscopically. By probing the crypts with a small pointed cotton-wound probe and staining the material obtained, the condition of the deep parts of the tonsil can be determined.

The symptoms in every case, are to be considered with the microscopic findings, but there are cases in which either of these, together with appearance on direct examination, is sufficient to determine the advisability of tonsillectomy.

In general, we may say that the following factors would indicate tonsillectomy.

1. Chronic, recurrent tonsillitis with or without complications, which does not respond to non-surgical treatment.

2. Positive evidence of arthritis of any form with microscopic evidence of some virulent organism, such as staphylococcus, streptococcus or long-chain pneumococcus, present deep in the tonsillar tissue.

3. Any persistent discharge of pus from the tonsil in which the microscope shows the presence of virulent bacteria and which will not be relieved by treatment.

4. Markedly hypertrophied tonsils which directly interfere with the voice, deglutition or respiration and which do not respond to treatment.

5. Persistent focal infections of the middle ears, or sinuses or root abscesses which do not respond to treatment and in which case there is a virulent infection of the deep parts of the tonsil, shown by microscopic examination.

The above are only general conditions and there are probably many other indications or groups of symptoms that would indicate tonsillectomy. In most cases, unless the findings show positively that tonsillectomy should not be delayed, we advise treatment. If treatment does not restore to normal, it will probably reduce the time of the surgical sore throat following the operation.

Non-surgical treatment.—The local direct treatment, as we practice it, consists of: 1. Direct aspiration by means of the tonsil cup, applying from fifteen to twenty inches of vacuum. 2. Application of phenol-glycerine by means of cotton applicator to the full depth of each crypt. 3. Irrigation of the crypts by means of a catheter and hot salt mixture solution. 4. Syringing of the crypts by means of the catheter and phenol 10%, alcohol 20% and glycerine 70%.

The digital treatment of the tonsil consists of: 1. Applying pressure against the anterior pillar thus forcing the contents out of the tonsil,

the Ruddy method. 2. By the bidigital technic, the front finger of one hand inside, posterior and inferior to the tonsil and the fingers of the other hand outside exerting deep pressure and opposing the finger inside. In this way the tonsil can be lifted forward and upward and its contents expressed. The digital treatment is not as effective as that described above.

The osteopathic corrective treatment consists of adjustment of the atlas and axis and the mandibular articulation and the obtaining of free movement of the hyoid and the relaxation of the submaxillary musculature and other deep structures.

This treatment, if followed persistently, will relieve the local symptoms of a very high percentage of cases of chronic tonsillitis, and in many cases even the systemic complications will be relieved. Whether in cases of systemic absorption this is the preferable treatment I am not sure, because, once the local condition is improved the patient will usually refuse operation and even if the physician finds definite evidence of toxic absorption he cannot convince the patient that his tonsils require surgery.

MENTAL DISEASES

BY

L. VAN H. Gerdine and A. G. Hildreth.

INTRODUCTION

The subjects herewith presented, while including certain of the most important sections of mental disease, make no claim to completeness either in the subject matter presented or in the attempt to cover the entire field of the psychoses. They cover those portions, however, with which we have come in closest touch at the Still-Hildreth Sanatorium, and in which we have the most complete records. I have been aided in the compilation of the essential facts and statistics by the able staff of the institution and wish to acknowledge especially the valuable cooperation of Dr. C. M. VanDuzer in the Dementia Praecox group, Dr. H. P. Hoyle in the Manic Depressive group, Dr. B. L. Jemmette in the group entitled Delirium, Confusion and Stupor, Dr. J. C. Snyder in the Senile Dementia group and Dr. G. S. Elkins in the Involutional group. The opinions concerning each type held by Dr. A. G. Hildreth are appended under its appropriate heading. I wish to state emphatically that the sole treatment carried out in the Macon Institution is specific corrective work upon spinal lesions, and it is upon this treatment that the statistics are based which are to be found throughout the text. These records cover more than 700 cases, including complete histories of the patients with the physical and mental findings on examination; these represent, therefore, by far the largest body of statistics ever accumulated in the study of osteopathic results in mental disorders. While the results naturally vary in different types of mental disease the grand total shows that more than one-half of all patients admitted recovered. Details for each group will be mentioned under its appropriate heading. While adjuncts such as diet and hydrotherapy have been utilized; we certainly cannot attribute any curative value to their influence.

It should be further emphasized that in no case whatsoever has medicine been used as a curative agent. And the same may be said of surgery. It has indeed been conclusively proved even in the medical world that medicines and surgical procedures are absolutely ineffective; from the osteopathic viewpoint this of course is perfectly reasonable since the theory calls for definite lesions as causative factors and these lesions can hardly be reached other than by the osteopathic method of

correction. The results obtained, therefore, could only be attributed to the genuine osteopathic principle enunciated by Dr. A. T. Still who kept in close touch with the work and gave it his approval up to the time of his death. He had always maintained that the osteopathic principle could accomplish remarkable results in this field and considering the previous inefficiency of any other method his confidence has been fully justified.

Dementia Praecox

This condition refers to mental disorders arising usually during the period of puberty or adolescence, therefore, between the ages of fourteen and twenty-five for the most part, although apparently similar cases may arise in later years. The term dementia refers to mental deterioration and enfeeblement, while "praecox" signifies adolescence, though some writers infer that the term praecox may be used to indicate the early or precocious development of the mental enfeeblement. Certain it is that in most cases deterioration, with its resulting symptoms of mental enfeeblement giving rise to the term dementia, usually occurs in time, though by no means always early. It is a chronic progressive disease which may terminate in a complete loss of mentality; in other cases it may become arrested in any stage and remain so permanently; in still others it may recover, though this is rare. By reason of the variability of the symptoms, three groups are generally recognized, first suggested by Kraepelin. Each is differentiated by more or less characteristic symptoms and referred to under the head of the Hebephrenic, Catatonic and Paranoid types, although all have certain symptoms in common and there are mixed types.

Etiology.—According to the authorities some form of hereditary factor can be found in some fifty per cent or more of all cases; this is supposed to create a predisposition, a natural weakness of the nervous system, which renders it unable to bear the ordinary storm and stress of life, so that the mechanism becomes according to the French expression, "wrecked upon the rock of puberty or adolescence;" in other words, a premature giving way of the nervous system, being inherently unable to stand the strain of life. Another suggestion is that it represents the outcome of abnormal types or reactions of the individual to the environment, with a failure of proper adjustment to surroundings and the formation consequently of mental problems which to the patient are incapable of solution. This may be called the psychological theory. The most commonly accepted idea, however, is the physical causation.

According to this the disease results from autointoxication, the intoxicant arising from the disturbances of the glands with internal secretions, more particularly the sexual glands. This endocrine theory is supposed to be supported by the fact of the appearance of this disease most commonly at the time of puberty and shortly thereafter.

The osteopathic conception fits in very well with this latter view, inasmuch as the spinal lesions are quite capable of explaining not only a disturbance of innervation to the glands with the resultant interference in their normal secretion, but also could produce disorder of the circulation and nutrition to the brain.

Symptomatology.—Although each variety of *Dementia Praecox* has special symptoms characteristic of the type there are certain symptoms common to all forms, and these will be first considered. All the functions of the mind in the course of time tend to become disturbed and to be weakened, but in the earlier stages we find marked differences as regards the disturbance of different functions, thus memory and orientation in most cases seem good; on the contrary, attention and association of ideas somewhat poor. Emotional life is almost always markedly affected, even in the beginning. Very commonly at first there is depression to be followed later by expansive feelings and then by apathy in general. The will power is altered early and the conduct is apt to be peculiar. The judgment becomes impaired. All of these symptoms mentioned are deviations from the normal in the patient and therefore presuppose that the patient was formerly normal. This should sharply differentiate the *praecox* group from cases of defective development (imbecility or idiocy). In this latter group there is an arrest of development of the mind, whereas in *praecox* there is a loss in a developed intellect. We see a young patient, for example, who has lost interest in things about him, neglects his work at school or at home, remains alone for long periods of time and seems unwilling to mingle with other people. He gives the impression of one depressed and worried about something he is trying to solve, perhaps he mutters to himself or gives way to unprovoked laughter, he may refuse to eat, or to talk unless questioned and may even then not answer. When he does talk it will be discovered that he knows perfectly well where he is, and knows people around him and understands everything that is going on; his memory will be found good, he can usually recall past incidents and tell what he has been doing recently. As the condition progresses, however, while the patient may still for a long time retain fair orientation and memory for past events, his accumulation of recent ideas will be found poor, so that he

will recall them with difficulty. We notice that it is difficult to get the patient's attention and concentration seems to be impossible, he may answer a direct question, but immediately seems to be occupied with other thoughts and it takes some little effort to gain his attention again. If he continues to talk it is plain that the association of ideas is poor, giving rise to disconnected phrases which usually come forth sluggishly and without show of emotion. Dissociation of ideas occurs; that is, different ideas expressed may practically contradict themselves. For example, the patient may say he is a king and yet when asked to sweep the floor will do it perhaps without hesitation, not considering that is hardly the kind of work a king would do. The dissociation is also marked in the contradiction found between the content of the thought and its associated emotional idea, for example, the patient may speak of a near relative as dying recently, yet with no show of emotion, even with a meaningless laugh. This dissociation may ultimately result in complete incoherence, in which no sense can be found whatsoever in his speech. Emotional indifference is noticeable early and sluggishness of reactions to stimuli, even failure of such reactions; the patient will neglect himself, stay away from meals, express no desires and make no complaints. In the earlier stages, however, the patient who may have been for some little time apathetic, suddenly without apparent cause becomes angry, noisy, and possibly violent and destructive, again gradually relapsing into his quiet, apathetic state. The thought content is commonly associated with delusions, that is obviously false ideas, but which the patient is unable to perceive are false. Delusions of persecution are most common, the patient feeling in a dim way that everything is not right; and in attempting to explain to himself the reason, often attributes causes to people or forces outside of himself, and on account of the feeling of bodily discomfort, also by reason of the depression, he explains the external forces as unfriendly to himself. Hallucinations may be present and furnish the material around which the delusions form; on the other hand hallucinations may result from the delusions. By hallucination is meant a false sense perception, as the patient may state he sees someone before him who is not there, or that he hears voices from individuals who are not around him; he may also complain of receiving electrical shocks, or wireless messages, which he usually states come from his persecutors. Symptoms of this nature form a good example of the so-called split personality, or "schizophrenia," wherein certain idea complexes are split off from the main personality and address themselves to the main portion, the patient attributing these noises (voices), sensations (visceral and tactile),