

from syphilis and other infections. When it is necessary to use the human lymph it should be taken upon the eighth day from a typical unbroken vesicle in a perfectly healthy child at least three months old. The vesicle must be pricked at several points, care being taken not to draw blood. The bovine vaccine lymph is now in general use because it practically eliminates the possibility of syphilis and other infections. Also because it is more easily transported.

It is thought best by many authorities to vaccinate in infancy after the sixth month, at the seventh and eighth year, at puberty, and thereafter at intervals of about seven years, but depending considerably on the prevalence of small pox. The virus is prepared under sterile conditions from carefully selected and tested calves. It is put up under aseptic conditions in hermetically sealed capillary tubes or, in the old style, on ivory points.

There is a great variety of opinions as to the efficacy of vaccination in producing immunity against small pox, this variety of opinion being very prevalent among representatives of the medical schools. Dr. F. P. Millard of Toronto says the lymphatic system is the keynote, and that vaccine virus poisoning spreads through the lymphatics, causing diphtheria and allied throat affections. Dr. A. T. Still said, "We are opposed to vaccination." He repeatedly emphasized the fact that "Nature furnishes within the body all the remedies necessary to cure disease." In the recent Canadian epidemic (1919-1920) the medical authorities have met with a most strenuous opposition. The Homeopathic profession, almost to a man, went on record as opposed to compulsory vaccination. The Illinois Supreme Court has ruled that compulsory vaccination is unconstitutional.

Technic.—The area usually selected is the left arm at a point above the insertion of the deltoid muscle. Some prefer the leg over the junction of the two heads of the gastrocnemius muscle, because it is more easily cared for, and, because of the style of wearing short sleeves among women, it does not expose the scar which results from the vaccination.

The surface must be washed, dried, with a soft towel, and then sterilized with alcohol. With a sterilized needle or lance scratch an area about a quarter of an inch in diameter, being careful not to produce bleeding but merely an oozing of pinkish lymph. A drop of the virus should be deposited upon the abraded surface, rubbed in with the side of the needle and let dry. A thin layer of sterilized gauze should be lightly applied and held by means of adhesive plaster, not encircling the limb. This should be occasionally removed and redressed. The

pock should be kept dry and clean, and may be lightly dusted with starch or toilet powder. "Persons exposed to the contagion of small pox should be immediately revaccinated. The immunity conferred diminishes with time." It is the writer's personal opinion that, with the amount of complications that so frequently follow vaccination and with the fact that "it is necessary to revaccinate during an epidemic or after exposure," it were better to defer vaccination, if parties are favorably inclined to the practice, until such time as the presence of small pox in the community make it apparently necessary.

Typical Vaccination.—The period of incubation varies from three to five days. At the end of this time local reaction shows itself in the form of reddish papules at the point of inoculation. In about five days these develop into compound vesicles, which at first have clear and then later opaque contents. About the eighth day the vesicle is fully developed and is round or oval with prominent and well defined edges and a depressed center. An erythematous areola usually appears about the tenth day and the contents are purulent. The surrounding skin is swollen and tender, and a scab now begins to form in the center of the pock and rapidly extends toward its edges. About the end of the second week the areola fades, and the pock is changed into a thick brownish crust which becomes dry and hard, and comes off between the twentieth and twenty-fifth days after vaccination. A dusky red scar is left and this gradually becomes white and pitted. During the evolution of the pock the glands through which lymphatic drainage takes place become slightly enlarged and tender.

The constitutional reactions are usually moderate fever, restlessness at night, irritability and loss of appetite. These symptoms usually appear about the fourth day and continue about three to five days. At any time during the vaccinia erythema, roseola or urticaria may appear. The constitutional reaction in revaccination is sometimes very severe.

There are many atypical symptoms following vaccination as variation in the number of the pocks, in the size, in the severity of the constitutional symptoms, in the contents of the pock, in the healing and formation of the scar and in the transmission of specific diseases as syphilis, tuberculosis, leprosy, cancer and tetanus.

Complications.—All cases are not benign, as due to impurity of vaccine, carelessness in technic, improper care in dressing, handling of the wound by the patient himself, scratching it with the finger nails, and other accidents of like nature, infections may set in and very serious

complications arise. These result in abscesses, erysipelas, tetanus and various eruptions. Otitis media may leave deafness.

The writer knows personally of a young man in the Army during the World War who was vaccinated while in the Army and two abscesses developed which ate entirely through the arm, one abscess passing through the arm just anterior to the humerus and the other just posterior to it. It was many, many months in healing, and nearly caused loss of the arm.

There are many cases of record where vaccination was followed, directly or indirectly, by paralysis, deformities, and chronic constitutional diseases. It is usually claimed these conditions were due to accidents following the vaccination and not due to the vaccination itself. However, it can not be denied that the vaccination was at least the indirect cause of these deplorable conditions.

General Vaccinia.—(Vaccinal eruptive fever; Vaccinola). This consists of a vaccine rash, developing usually from the fourth to the tenth day following vaccination, and appearing in various parts of the body, particularly about the wrists and on the back. The secondary pocks usually develop about the eighth or tenth day after vaccination and are usually more abundant on the vaccinated limb than on any other part of the body. As the pocks appear in successive groups, all stages of the disease may be seen at one time, and the condition may last for many weeks. Fever may be absent or present, but is usually proportionate to the extent of the eruption and the associated complications.

Treatment.—After vaccination, the patient should be told to return in seven days, when the dressings should be removed, and if the vaccination has been successful, a pearl-like vesicle will be present. If the vesicle has been broken by accident or by rubbing of the gauze, the free portions of the dressing should be cut away and the adherent part left undisturbed. A new gauze should be applied in any case, and in five or six days more, the dressing should be again changed, and this changing continued at intervals until the crust falls, which is usually during the third or fourth week.

If no vesicle forms by the tenth or twelfth day, the vaccination has not been successful. It is suggested by the vaccination advocates that another attempt should be immediately made.

Prognosis.—Uneventful recovery is to be usually expected. Pitting from generalized vaccinia; various constitutional diseases; paralysis and other maiming disabilities sometimes occur. While it is not us-

usually considered dangerous to life, there are nevertheless many cases of record where death has resulted. It is not wholly unattended with danger.

The best of care should always be taken following vaccination to prevent the possibility of complications, though even then they do occur.

Scarlet Fever

(SCARLATINA)

Definition.—Scarlet fever is an acute, specific, contagious, infective disease of unknown origin, characterized by very sudden onset, fever, vomiting, sore throat and diffuse exanthem.

History.—It was first recognized in the sixteenth century, but first fully described and differentiated from measles by Sydenham in 1660. It was introduced into America about 1735.

Etiology.—The causative organism or agent is unknown. The virus of scarlet fever produces severe necrosis, but no suppuration. The streptococcus is the most important factor in the production of complications and in their mortality. It is claimed to be the cause of the malignancy of the disease but not of the disease itself. Susceptibility to the disease is by no means universal as only 38% of children and but 5% of adults exposed to the infection acquire the disease. Over 90% of the cases occur under ten years of age, and rarely during the first year of life.

“Scarlet fever is a toxic superficial expression of internal malnutritive conditions of the blood as a tissue. The cause of the toxicity is usually over-feeding, or the feeding beyond the demands of the proximate principles of the body, or the over-feeding under unhygienic conditions.”—J. MARTIN LITTLEJOHN.

“It was once held that the virus was disseminated during desquamation, but oral, nasal and otitic discharges probably perpetuate the infection, perhaps months after scaling is complete. In no other disease is the virus so tenacious. It may persist ten years on clothes, furniture, etc.”—A. R. EDWARDS.

The light forms are as contagious as the severe ones, and inoculations have occurred from the living subjects as well as from autopsy cuts. In degree of infectiousness smallpox ranks first, measles second and scarlet fever third. The infection may be spread by any third person or by articles coming in contact with the patient, and often the mode is obscure. Sporadic cases apparently frequently appear. The reason for the sporadic cases may easily be explained by the theory of J. Martin Littlejohn, given above. One attack usually confers immunity, but not

always. This disease occurs more often in the autumn and winter, and is more prevalent in cities than in the country. (Measles is more prevalent in the country.) Scarlatina sometimes occurs with other infections, such as diphtheria or measles, and more rarely with varicella, pertussis, etc.

Predisposing Factors.—Age, one to ten years; lowered resistance from over-feeding, unhygienic environments, exposure to sudden temperature changes; lesions, both muscular and interosseous which interfere with the distribution of the fluids and vital forces of the body; season of the year (autumn and winter); puerperal women, and wounds.

Pathology.—No specific lesions are found. No trace of the rash shows after death except in the hemorrhagic form. The anatomical changes in cases coming to autopsy are those of simple inflammation, follicular tonsillitis, or diphtheroid angina. Streptococci are abundantly found in the glands and foci of suppuration.

Symptomatology.—Scarlet fever is divided into four stages: (1) Incubation, (2) Invasion, (3) Exanthem, (4) Desquamation.

Incubation Stage.—Has no noticeable symptoms and lasts from two to four days. Some authors claim as high as ten to fourteen days.

Invasion.—The invasion lasts one day. The onset is very sudden beginning with a chill which is followed by a characteristic vomiting, occurring in 75% of the cases, which is more frequent than in any other disease of childhood except pneumonia.

The vomiting is followed by headache and the beginning evidence of sore throat, which usually soon develops into a tonsillitis. The severity of the sore throat is indicative of the severity of the scarlet fever that follows. The temperature suddenly rises to 103° or more, the pulse becomes unduly rapid for the temperature, 120 to 160 per minute, and the respiration is increased. The skin begins to burn, there is dysphagia and intumescence of the cervical glands. The muscles of the back become hypersensitive to touch and to extremes of heat and cold; and particularly sensitive spots are found over the transverse processes of the first to 4th cervical vertebræ, the 4th and 5th dorsal and the 11th and 12th dorsal vertebræ. At these points will be found intensely contracted tissues which must be kept relaxed.

Exanthem.—The eruption appears at the end of the first day or early the second day, showing first over the clavicles and on the neck, then over the upper trunk, next the lower trunk and limbs. The eruption on the extremities appears particularly over the flexor surfaces of the joints. By the end of the second day the eruption has covered practically the

entire body, leaving a white circle about the eyes and mouth. The eruption pales, or disappears on pressure, quickly returning to the scarlet color on the removal of the pressure. Frequently, the skin itches and is very uncomfortable.

A punctiform eruption in the arm-pits, over the groins, or on the roof of the mouth is considered positive proof of scarlet fever.

The eruption at first consists of small red spots which fuse as the skin swells and results in an intense lobster-colored erythema. This lasts four to six days. The tongue, at first, is red at the tip and margins with a greyish-yellow or whitish fur in the center through which is often seen the swollen red papillæ, the "strawberry tongue." The "fur" desquamates on the third or fourth day, leaving a surface intensely red with marked raised, swollen papillæ, the "raspberry or cat tongue," which lasts nearly a week. The breath has a heavy, sweet odor. The pharynx, uvula and tonsils become swollen, and often creamy-white patches cover the mouths of the tonsillar follicles.

Between the second and third day the eruption reaches its height, when it has a vivid scarlet hue unlike any other eruption, and becomes darker each day until it may be a bluish-red, when it gradually fades and desquamation begins. By the seventh or eighth day the rash has disappeared, together with the fever.

Desquamation.—Scaling begins on the face first, from the sixth to the ninth day and lasts several weeks. The skin looks somewhat stained, is a little rough like "goose-flesh" and gradually the upper layer begins to separate, and the scaling begins in large lamellæ or flakes. Casts of the fingers or toes may be shed. The swelling of the glands disappears, and the fever falls by lysis, and convalescence begins, unless complications intervene.

Diagnosis.—In typical cases diagnosis is easy, especially during epidemics or when the eruption is accompanied by other criteria.

1. Sudden onset, with nausea and vomiting, sore throat, quick appearance of fever and rapid development.

2. Punctate spots in the throat, swelling and dysphagia are usually present. The severe sore throat symptoms with the above are always very suspicious.

3. Strawberry tongue is constant.

4. Eruption, typical in character, appearing on second day, first showing on the neck above the clavicles, intense on the body and practically absent around the mouth. Eruption confluent, with no intervening free areas of the skin, followed by desquamation.

5. Lymphadenitis much more pronounced in the inguinal and other glands than in the cervical.

6. Desquamation, tender joints and albuminuria will force the conclusion of scarlet fever, if former symptoms have been indefinite.

In the atypical cases we may have very light attacks with all the symptoms present but very poorly developed; or some symptoms absent as in cases with no temperature, or others with no rash. Some cases are so atypical as to be impossible of diagnosis. The writer has very recently had the experience of one case when there were absolutely no typical symptoms present after being called on the case, but four days after the invasion of the disease in the patient a sister of the child developed typical scarlet fever, and not until the sixth day did any eruption or sore-throat appear, and then the eruption was more characteristically measles than scarlet fever. Consultants with the writer agreed with him that the case was one of an atypical, non-eruptive scarlet fever.

Differentiation.—Scarlet fever is not always easily differentiated from other diseases, such as a septic rash, drug rashes, diphtheria, measles and German measles.

A. R. Edwards gives this differentiation between scarlet fever and septic rash.

Scarlet Fever

Bright red erythema, with small red papules.

The eruption is much the same in both diseases, the same places being exempt.

Miliaria are rare.

Rather typical desquamation.

CRITERIA: angina, tongue, onset, glands, etc.

Sepsis.

A very deep purple-red rash, sometimes spreading over the entire body.

Miliaria are frequent.

Desquamation observed less frequently.

Etiology, chills, sweats, fever irregularity, polymorphous exanthems, etc.

Diphtheria.—Often difficult to differentiate. The simple erythema is sometimes observed in diphtheria, but is darker, more on the trunk, and more transitory than in scarlet fever.

Drug Rashes.—These rashes are caused by belladonna, iodoform, quinine, iodide, chloral, copaiba or aspirin. They may be easily differentiated if the cardinal symptoms of scarlet fever are considered in-

stead of the rash alone. At the present time, perhaps the most frequent drug rash that we meet is that produced by aspirin. It is sometimes hard to diagnose because the aspirin has been taken for a sore throat or tonsillitis, which so resemble the early symptoms of scarlet fever.

Measles and German Measles.—The symptoms of the invasion stage of these diseases is sometimes quite similar, and even the rash may be quite similar; the differentiation will be discussed under measles (q. v.).

Types and Forms.—(a) Mild and abortive form (*scarlatina sine eruptione*). In this the rash may be scarcely perceptible, while the fever, sore throat and strawberry tongue are present. Desquamation may be present and it may be followed with a severe nephritis.

(b) Malignant forms, (1) Atactic variety, violent intoxication, onset of great severity, fever very high (107° to 108°), extreme headache, delirium, and often convulsions. Initial delirium gives place to coma; dyspnea may be urgent; pulse very rapid and feeble; and death occurs before eruption appears. (2) Hemorrhagic variety: there are hemorrhages into the skin, beginning with scattered petechiæ, becoming more extensive and ultimately involving the whole skin. It is characterized by severe fever and brain symptoms at the onset; incomplete exanthem, necrosing angina, marked glandular and splenic swelling; subcutaneous, serous and mucous membrane hemorrhages with ulceration. Death may take place on the second or third day. This is more common in enfeebled children, although it may attack adults in apparently full health.

(c) Anginose form (*Scarlatina anginosa*.) This form resembles septic diphtheria, with marked toxemia, necrosis and adenitis. The throat symptoms appear early and progress rapidly. Temperature high, cyanosis, diarrhea, rapid weak irregular pulse, and stupor occur. The fauces and tonsils are covered with a thick membranous exudate which may extend to the posterior wall of the pharynx, forward into the mouth, upward into the nasal chambers, and may occasionally reach the trachea and bronchi. The Eustachian tubes and middle ear are usually involved. The glands of the neck rapidly enlarge and become the seat of brawny induration, and the inflammation extends beyond their limits. Necrosis occurs in the tissues of the throat, fetor is extreme, the constitutional symptoms are great and the child dies of toxemia. If he does not die, extensive abscess formation in the tissues of the neck takes place with sloughing and danger of hemorrhage from the opening of a large artery.

Blood Pressure.—Rises at first, thereafter it follows the pulse and temperature. After the seventh or eighth day it may be below normal. Cases of albuminuria show hyperextension and slowing of heart action. With the subsidence of the kidney irritation the pulse rate is increased and the blood pressure returns to normal.

Urine.—Shows ordinary febrile character, being scanty and high colored. Slight albuminuria is rather common after the stage of eruption, even a few tube casts may be present without any serious irritation of the kidneys. Urinalysis should be made daily.

Blood.—The red cells are moderately reduced to 3,000,000 or 4,000,000 per c. mm. during convalescence. There may be some poikilocytosis, and normoblasts are occasionally seen. Leucocytosis is early, 15,000 to 30,000 per c. mm., falling with the decline of the fever usually by the fourteeneth day, but may persist for weeks after the temperature is normal. The count runs roughly parallel to the temperature. Over 40,000 leucocytes per c. mm. are of bad prognostic omen. Polymorphonuclear cells are increased to 80% or 90%; early returning to normal in favorable cases.

Eosinophilia is present in all but malignant cases. It reaches its maximum two or three days after the rash appears and returns to normal after the leucocytosis has disappeared. The early presence of eosinophilia excludes septic conditions. When these cells are absent in scarlet fever, myelocytes are to be found.

Treatment.—Clinically scarlet fever represents, from the osteopathic viewpoint, (a) a toxic condition due to internal malnutrition and a decrease of the detoxinating function of the thyroid gland; (b) secondarily associated with the sore throat is a type of toxic tonsillitis, but it is due to the toxic elements in the blood; (c) in the lesion field it is associated with extreme stiffness and muscular tension in the upper cervical area and also in the entire dorsal area, overlapping the upper lumbar. The eruption is a superficial expression of the attempt of the body to eliminate the toxins, and this elimination should be aided by enhancing the activity of all the other eliminative functions. Cases are on record where patients have been exposed to scarlet fever, have gone the usual incubation period and developed the invasion symptoms, and by thorough, oft-repeated osteopathic treatments, with the aid of enemata and copious hot water drinking, have not gone beyond the invasion period and the disease apparently aborted within two or three days. It is therefore well to give thorough, oft-repeated attention to these cases during the very early stages.

(1) In all cases where the first symptoms indicate the possibility of a contagious disease, the patient should be immediately isolated and kept isolated until all danger of contagion is past. In scarlet fever cases get a competent nurse. Keep room light, quiet and thoroughly ventilated with a constant temperature of as nearly 70° as is possible. (It were better to have two rooms if possible, one for day and one for night: have room or rooms on upper floor if in a house). Arrange suitable means for thorough disinfection of all articles used in the sickroom. These are very essential.

(2) Patient should be clothed in usual night wearing apparel. The bed clothing should be warm, but not heavy. The physician should wear an operating gown or a sheet which thoroughly covers his clothing, also a cap. He should carefully wash his face and hands immediately after leaving the sickroom. The quarantine should be maintained for the legally required period, and even after if there continue discharges from the nose, nasopharynx or the ear. Bichloride wrappings should be placed about the body of the dead, and funeral must be private.

(3) Have enema given immediately to cleanse the lower bowel. Follow this with frequent draughts of hot water, or better hot lemonade for the first day. Place hot water bottles at feet. If eruption is slow in coming out, it may be aided by a hot bath, followed by wrapping the patient in warm blankets to prevent chilling.

(4) Thorough osteopathic treatment should be given along the entire spinal area from the atlas to the sacrum, inclusive, to keep the muscles well relaxed, giving special attention to the relationship of the vertebræ and the tension of the muscles from the occiput to the fourth cervical; the third to the sixth dorsal; and the tenth to the twelfth dorsal areas. Also give special attention to the deep cervical muscles, particularly those at the angle of the inferior maxilla, and at the articulation of the inferior and superior maxillæ. Remember the tendency of the kidneys to complication in scarlet fever, therefore do not neglect the renal splanchnics, for here you not only control the renal functions but also regulate the adrenal functions and their internal secretions. Keep the clavicles properly adjusted and articulate them by bringing them well forward to relieve any irritation that may have started in that area. Careful direct treatment to the abdomen should usually be given at each visit besides the work in the splanchnic area to keep the bowels, kidneys and liver active.

Diet.—Water must be given freely. If fever is very high, pellets of ice held in the mouth will give comfort. During the height of the

fever it is preferable to withhold all nourishment, but if in a particular case it seems to be indicated, confine the nourishment to fruit juices, especially oranges. Never force feeding during the fever. For infants cut down their feeding to at least half, making the milk very thin with water or gruel. After defervescence, carefully increase to a light diet using sparingly of nitrogenous foods except milk. After four weeks in the usual case, gradually return to the ordinary diet. This is a good time to make corrections in the ordinary diet if any are needed.

The **bowels** must be kept regulated. An enema is usually indicated after the onset of the disease. During the time that food is permitted it should be of a laxative character. During the fever stage the enema should be given daily to help keep the bowel cleansed and to help reduce the temperature. If bowels are persistently sluggish and the fever is constantly high the abdominal heating compress (so-called "cold compress") will give much relief.

The **nose and throat** should be constantly looked after. The nose may be cleansed by instillation by means of a medicine dropper, using normal salt solution. If the throat symptoms are mild, a gargle of warm normal salt solution is enough for cleanliness of the membrane. If the throat symptoms are too severe to permit the use of the gargle, or if the patient is too small to be taught the use of the gargle or to wash the throat, irrigation may be employed. The use of raw lemon juice, or of raw pineapple juice, on a cotton swab is of great value in cleansing the tonsils and throat. The swabbing should be repeated several times per day.

The **teeth** should be carefully and thoroughly cleansed twice per day.

The **skin** must be constantly cared for. During the fever it is well to cover the skin with linen or soft cotton. Daily sponge baths of carbolyzed water (1:40) of tepid temperature followed by applications of cocoa-butter will give much comfort. Use only good toilet soap and do not use the so-called antiseptic soaps because, authorities claim, there is a chance of renal injury. During the period of desquamation the use of the cocoa-butter will assist in limiting the source of infection by preventing the diffusion of the dry scales which are considered infectious by many physicians. A. R. Edwards says: "During desquamation, oil-rubs were once employed to decrease the dissemination of dry scales, but they decrease the function of the skin, which is of great importance when the kidneys are involved; also, infection is carried by means of throat secretions. Soap and water serve equally well." Some authori-

ties suggest that during the desquamation, after bathing the patient, the skin should be thoroughly rubbed and then the oily application used, using cocoa-butter, unmedicated cold cream, liquid albolene or the like. Olive oil and vaseline are usually irritating. The writer inclines to the opinion that the soap and water bathing is sufficient, except perhaps the use of cocoa-butter over the areas that are desquamating severely.

The **temperature** can usually be controlled by the usual osteopathic methods; steady deep pressure applied in the sub-occipital region for a few minutes, followed by relaxing the muscles of the back from the first to the eighth dorsal, by raising and spreading the ribs in the mid-dorsal area, and by light inhibition over the solar plexus. The tepid enema will assist in lowering the temperature. If temperature is high and patient is delirious and has other nervous symptoms the cold pack is useful. The ice cap may be used almost constantly in high fever. If glands are swollen treat by crowding the tissues toward the gland **but never work upon the gland itself.**

If pain is felt in the **ear** immediate attention must be given it. Correct any deviations of the atlas or other upper cervical vertebræ, relax the deep muscles at the angle of the jaw, and relieve any impingements in the lower cervical and upper dorsal regions. The ear should also be treated with copious boric solution irrigations, as hot as can be borne and at low pressure. The condition of the ear drum membrane must be watched daily and if there is bulging and congestion it is safer to puncture the drum under cocaine than to await spontaneous rupture. Use small amount of boric powder after rupturing.

The **heart** must be examined daily. Vigorous treatment through the thoracic region is indicated, if cardiac symptoms appear, and the patient must be kept quiet and in bed. If heart seems feeble it may be well supported by the cold packs directly over the heart.

Nephritis is most common in the second and third weeks of the illness, but may develop later. In all cases where any symptoms of nephritis appear, light or severe, the patient must be **confined to bed** for at least four weeks, and kept on a milk diet. All irritants must be absolutely avoided. Hot baths should be given twice daily to increase the sweat and the urinary functions, the bath lasting half an hour and the patient kept afterward between blankets. Treat thoroughly, daily, the splanchnic and renal areas, paying particular attention to the tissue conditions in the lower dorsal region.

In the milder cases, the urine contains albumin and a few tube casts, very rarely blood, and edema is slight or transient. Though the patient

improves, he remains pale and there is a slight trace of albumin in the urine for months. If recovery does not take place, then chronic nephritis becomes established.

In the more severe cases there may be a puffy appearance of the eye-lids, slight edema of the feet, urine diminished in quantity, smoky, containing albumin and tube casts. The kidney symptoms dominate, dropsy persists and there may be effusion into the serous sacs. The condition may become chronic, the patient may succumb to uremia, but in the majority of cases recovery takes place.

The nephritis may be hemorrhagic, in which the urine is suppressed or there may be a very small amount of bloody fluid laden with albumin and casts; constant vomiting and convulsions follow and the patient dies with symptoms of acute uremia.

Other **complications** are arthritis, malignant endocarditis, severe toxic myocarditis and acute phlegmonous inflammation, the last three of which are usually fatal. Chorea is a fairly frequent nervous complication. The mental symptoms are mania and melancholia. Progressive paralysis of the limbs with wasting, may simulate infantile paralysis. The fever may persist after the eruption disappears and the child remain in a septic state (scarlatinal typhoid).

Relapses are rare. Scarletina may coexist with almost any other acute infection. It lowers the resistance of the body to disease and is often followed by other acute infections or by tuberculosis. Therefore the necessity of care during the entire convalescent stage.

Measles

(RUBEOLA; MORBILLI)

Definition.—Measles is an acute infectious, contagious, erythematous disease, occurring in epidemics, characterized by an initial coryza, bronchial catarrh and an eruption of a general maculo-papular type; also by the presence of Koplik's buccal spots.

Etiology.—Predisposing Influences: The chief predisposing factor in measles, as in all other contagious diseases, is a lowered resistance in which some structural or functional change has taken place that reduces the functional activity of the body's inherent protective agencies. These predisposing factors may be classed under three heads, namely; (a) structural, (b) environmental, (c) dietetic. Under the first we find structural disturbances in the upper cervical area affecting the functional control of the nose, throat and head, as well affecting the thyroid and its internal secretions; structural disturbances in the upper and mid-dorsal

areas affecting the vasomotor control to the head, neck, and chest, thereby perverting nutrition to all these structures and rendering them more susceptible to the infective organisms; also the dorsal lesions disturb the functional integrity of the lungs and heart, with the result of disturbed respiration and circulation, both of which are vital factors in body resistance: we also find structural lesions in the lower dorsal region, affecting the function of the kidneys and their elimination and the function of the adrenals and their internal secretions. Under the second or environmental, we have unsanitary and unhygienic conditions, exposure to sudden changes of temperature, wet clothing, fatigue, etc., all of which produce secondary structural lesions and the effects above mentioned. Under the third or dietetic classification, we have the errors of diet so common in children and adults as well; such as too much candies and other sugars, also too much starches, as well as over eating and unbalanced diet.

Measles prevails in all climates and attacks all races, the Negroes appearing to suffer more severely than the whites and to be more subject to complications. Outbreaks are more common in winter and spring, but occur at all seasons. The disease is particularly a children's disease but adults may contract it if not protected by an attack in early life, and with adults the disease frequently manifests the more aggravated forms. It is more common after puberty than scarlet fever.

Exciting Cause.—While the disease is probably produced by a micro-organism, it has not yet been demonstrated. Inoculation experiments upon human beings have shown the presence of the infecting principle in the blood, in the tears, in the secretions of the nasal, pharyngeal and bronchial mucous membranes, and in the contents of vesicles occasionally present. Inoculation with the epithelial scales thrown off at the end of the disease has been unsuccessful. Ordinarily the transmission of the disease takes place through the breath or the nasal and bronchial secretions. The disease may be carried by a third person or by fomites. The infecting principle is intensely active, but not so tenacious nor persistent as scarlet fever. Measles is communicable throughout its entire course from the earliest appearance of the coryza. The individual predisposition toward measles is apparently so general that few, upon exposure, escape it, though we have observed cases where children have been directly exposed and who were immediately thereafter put under osteopathic care and did not develop the disease. Second, or even third, attacks may occur at intervals of some years, but these are unusual. Spor-

adic cases do occur and are often the starting points for epidemics. Extensive outbreaks occur at intervals of five or six years.

The incubation period is from seven to eighteen days, usually about ten days.

Symptoms.—Prodromes are common, usually consisting of loss of appetite, restless sleep, fretfulness, and often feverishness. There are three stages, (a) Invasion, (b) Eruption, (c) Desquamation.

(a) Stage of Invasion. The prodromal symptoms are intensified. There is often chilliness but seldom distinct chills. The temperature rises, often reaching 102 to 104 degrees, upon the first and second day. It then falls one degree or more to rise again upon the appearance of the eruption. Nausea, vomiting and headache are often present. The tongue is furred. With these symptoms coryza has developed and is sometimes intense, often simulating severe influenza. Irritation and smarting of the eyelids, lachrymation, photophobia, persistent sneezing, running of the nose, sore throat, discomfort in swallowing, hoarseness, and cough, at first of a croupy character, appear in rapid succession and with varying intensity. These initial catarrhal symptoms are characteristic and occur in the mildest cases in which chilliness, fever and the associated signs of the reaction of the organism to general infection are not observed. The vessels of the conjunctivae are injected, the eyelids swollen, the nasal mucosa tumid and reddened. The mucous membrane of the mouth and throat is erythematous, while upon the soft palate and the roof of the mouth, and particularly upon the buccal mucous membrane, are to be seen pin head or split-pea sized, circumscribed, round or irregularly shaped reddish blotches slightly or scarcely at all raised above the surrounding tissues, usually discrete, but sometimes confluent. This eruption also shows itself in the larynx and is undoubtedly the cause of the croupy cough and other throat symptoms. In a strong light there may be seen upon some of the spots on the mucous membrane of the cheeks and lips minute bright whitish, or bluish-white flecks which are called Koplik's Spots. These spots appear early and soon disappear, and as they are not found in any other disease they are of value in the early diagnosis of measles. The duration of this stage is usually three or four days; rarely it is shorter or it may be as long as a week.

(b) Stage of Eruption. On about the fourth day the temperature again rises, increasing as the rash develops, often to 104 or 105 degrees and reaching its maximum about the sixth day when it usually falls by crisis; followed on the seventh or eighth day by normal temperature. The pulse rate increases with the fever, often reaching 140 or higher.

The eruption usually appears on the fourth day, and shows first about the hair line on the forehead, spreading to the face, chest, trunk and the arms and legs. The eruption is attended by itching and burning, and completely develops in from twelve to thirty-six hours, the catarrhal symptoms persisting during this time. During this time, in the more severe cases, delirium or stupor may be present, and the patient complains of sore throat and general discomfort, and is restless and wakeful. Usually upon the second or third day of the eruption, great and rapid amelioration of all these symptoms takes place and the fever falls to normal or sub-normal. When the eruption is fully developed the individual spots are irregularly circular or oval, and differ greatly in size, averaging about the size of a split pea. The eruption is unevenly set, but usually close together and sometimes confluent, especially on the face, buttocks, hands and feet. Frequently they take on a crescentic arrangement and the spots are circumscribed, the intervening skin being normal or slightly hyperemic.

About the ninth day the rash begins to disappear, on the face first, then the neck and the rest of the body in about the same order as the eruption appeared. The skin takes on a yellowish discoloration and the rash disappears in a bran-like desquamation which lasts several days to a week. In the beginning of the stage of eruption, and in many cases throughout its course, the skin is moist and often bathed in free perspiration. At the height of the eruption the superficial lymphnodes of the neck, and elsewhere, are often slightly swollen and tender.

(c) Stage of Desquamation. The fine branny scales of desquamation are often so fine as to be easily overlooked. This process occupies about a week. The catarrhal symptoms in uncomplicated cases gradually disappear, so that, by the end of the second week from the initial coryza, convalescence is fully established. The cough frequently persists and is of a bronchial nature. Epitaxis is common at the height of the attack. Relapses of measles are extremely rare. Diarrhea is apt to occur at some time during the attack, without any particular significance.

Varieties.—Atypical cases may occur but are not common. They are as follows: (1) *Morbilli Papulosi*, development of distinct papules, hard to the touch but not extending deeply into the skin. (2) *M. Vesicular*; a vesicular form. (3) *M. Sine Exanthema*, cases in which the eruption does not appear, but general symptoms and coryza are present. (4) *M. Sine Exanthema*, in which the mucous membranes are not involved.

Variations in constitutional symptoms.—(1) *M. Afebriles*, rare cases in which there is no rise of temperature. (2) *M. Hemorrhagica*. This is the malignant form and in it the organism is unable to withstand the intensity of the infection and death takes place in the course of two or three days after sustained hyperpyrexia, profound adynamia, or hemorrhages into the skin and mucous membranes. These malignant forms are very rare in private practice, but they occasionally occur in asylums and in the fierce epidemics of camps, and were common in the first outbreaks among the natives of the Fiji Islands, where measles prevailed as a scourge. Death may occur before the rash appears or a few papules may show themselves upon the forehead and wrists. This is also known as **black measles**, and it is characterized by convulsions, delirium and coma, petechiae, bleeding from the mucous surfaces and profound constitutional depression. The patient is rapidly exhausted, the pulse frequent and thready, the skin pale and cold, and death occurs. (3) *Adynamic measles* is a serious type in which the symptoms are grave from the onset but without hemorrhages and a typhoid status is early present.

Complications.—In the absence of complications, measles is comparatively a benign disease, but these complications are frequently enough present to place measles among the more serious diseases of childhood. The ordinary complications are due to the extension or intensification of the catarrhal processes peculiar to the disease.

(1) Otitis media is quite common, and may result in perforation of the tympanic membrane and permanent impairment of the hearing; or lead to sinus thrombosis, meningitis, or abscess of the brain. (2) Bronchopneumonia is the most common complication. (3) Purulent conjunctivitis may occur and in neglected cases infiltration and ulceration of the cornea. (4) Catarrhal laryngitis is a frequent complication. (5) Pseudo-membranous type is very uncommon but very dangerous. (6) Edema of the glottis is not common but does occur. (7) Diphtheria is much less common in measles than in scarlet fever. The high death rate of measles is due to the bronchopneumonia complication in which the lesions become extensive, the symptoms become urgent and a large proportion of these cases die. (8) Acute enterocolitis is a frequent and serious complication. (9) Gangrenous stomatitis occurs in young and debilitated children, and in girls gangrene of the pudenda occur during convalescence with greater frequency than in other infectious diseases.

Sequelae.—The more common sequelae are chronic local inflam-

mations, conjunctivitis, otitis, nasal catarrh, laryngitis, and bronchitis. Tuberculosis is a common sequel.

Diagnosis.—During an epidemic, coryza, persistent sneezing and fever are suspicious. The appearance of the eruption on the third or fourth day upon the mucous membrane of the mouth and throat, and Koplik's spots are positive.

Measles is often confused with 1. Rubella or German measles, 2. Variola, 3. Typhus Fever and 4. Scarlet Fever, which see. Occasionally **drug exanthems** are confused with measles. These may be caused by salicylates, antipyrin, quinine, turpentine or copaiba. These rashes are not accompanied by fever or throat symptoms unless they have been given to allay these very conditions.

Treatment.—Measles is so often a serious disease that it should not be attended with carelessness as it so often is, but the best of care and attention given. Parents should be informed of the danger of complications and of the absolute necessity of proper care and attention.

As soon as a susceptible individual is exposed to the measles, he should be immediately isolated, watched and corrections made of any dietetic errors, unsanitary conditions or structural lesions that may exist. He should be protected from sudden atmospheric changes and carefully watched for the first symptoms of the prodromal coryza.

On the appearance of the prodromal, or invasion symptoms the patient should be put to bed in an isolated, well-ventilated room of as nearly constant temperature as is possible, from which all hangings, rugs and unnecessary furniture have been removed. The windows must be shaded to protect the eyes from direct or strong light, and any artificial lights in the room must also be well shaded.

The cases can usually be easily handled by careful, well-directed osteopathic treatments. In the manipulative treatment we must pay especial attention to the muscular and other soft tissue conditions in the suboccipital region, over the transverse processes of the upper four or five cervical vertebrae, under the angle of the lower maxilla and the lateral cervical tissues to remove any obstructions to the circulation and nerve control of the head and throat; see that the muscles in the lower cervical and upper dorsal areas are kept well relaxed, and articulation of these vertebrae, the upper three ribs and the clavicles are kept free; remove all lesions in the mid dorsal area, whether muscular or otherwise, to prevent involvement of the lungs or heart, and to keep up function of the respiratory and circulatory systems; treat and keep normal the tissues and the articulations at the kidney and adrenal center, 11th and 12th

dorsal; raise the ribs and keep them freely movable, this especially for the bronchial cough. Painful manipulations should be avoided and are not necessary. Dr. Still said, "The arms must be raised and the axillary region freed and kept so." During the acute stage two or three treatments per day are advisable. Do not treat severely or to cause discomfort to the patient. Best results are obtained in the gentle, but thorough, treatments.

In the beginning of the case have the bowels cleansed with an enema, and then careful attention must be constantly given to the bowels and kidneys. The bowels can be kept open by manipulations and diet. The diet should be light and easily digested; during the fever it is best to withhold all food but give plenty of water. Follow fast with fruit juices and then the light diet.

The temperature is usually controlled by treatment, but if it remains high for some time and if the physician cannot reach the patient, the nurse should be directed to give a tepid sponge bath of ten to twenty minutes duration, and repeated at intervals of two or three hours. Also the tepid enema will often reduce the temperature.

For the itching of the skin, a tepid bath with water at 100 degrees given twice daily should be used, the patient dried carefully, and an application of olive oil, cold cream, liquid albolene, or a two per cent menthol salve, rubbed over the entire body will give relief.

The cough is best relieved by thorough treatment of the anterior thoracic regions and the correction of any upper rib or clavicular lesions. Keeping the air of the room moist with vapor is agreeable to the mucous membranes. The dropping of a few drops of eucalyptus oil in the boiling water produces a very soothing vapor.

If the eyes are much involved, they should be bathed every hour or two with a three per cent solution of boric acid, using cotton which is immediately destroyed after use. Dark glasses in a well ventilated room is better than an unaired darkened room.

The nose and mouth should be carefully cleansed at regular intervals and the cloths burned. The throat should be carefully examined daily at first, and at least every other day later, until the case is discharged. The conditions of the lungs must be observed by daily examinations, and the lung and bronchial areas should be daily treated to prevent the possibility of respiratory involvement.

If rash is slow in appearing and the temperature is high, a hot bath (105 to 110 degrees) for three to five minutes will often bring out the rash and relieve the more serious symptoms. During convalescence the

patient must be protected against cold. Recovery is hastened by the continuation of treatment during convalescence and treatment given should be indicated by the symptoms present.

Prognosis.—Practically all uncomplicated cases recover. In the hemorrhagic and adynamic types, the majority succumb. One attack usually confers immunity. Sequelae are frequent under the "old school" treatment, but are infrequent under careful, conscientious osteopathic treatment and careful nursing.

"In and of itself measles is usually not particularly serious, but the after-effects are so far-reaching and so serious that students of the history of medicine rank measles third among infectious diseases for causing death. During recovery from measles the patient stands in special danger from pneumonia, and pneumonia following measles is more dangerous than uncomplicated pneumonia. There is a considerable length of time during which he is particularly susceptible to tubercular infection. This is so often insidious, and its evidences are so obscure, that by the time the disease has fully developed, one may have forgotten the mild attack of measles which really paved the way for the serious malady."—C. A. WHITING.

Rubella

(GERMAN MEASLES; RUBEOLA NOTHA; ROTHELN; EPIDEMIC ROSEOLA)

Definition.—A specific acute, contagious, infectious, eruptive disease, characterized by a diffuse maculopapular eruption and swelling of the superficial lymphatic glands. It is attended by a mild fever, suffused eyes, mild cough, slight sore throat but no catarrh, a macular rose-red eruption of the throat accompanied by the swelling of the cervical lymph glands and by a rose-red eruption of irregular size and shape appearing on the first day of the disease.

Rubella, in some ways, resembles scarlet fever and also measles and was at one time considered a hybrid of the two. It is now known to be an independent disease.

Etiology.—The exciting cause, or the infective principle, has not yet been discovered. The disease is probably carried by fomites, is readily transmissible, attacks children especially, and usually occurs in epidemics, though sporadic cases are frequently found. The epidemics usually occur at intervals with several years intervening, during which time there are comparatively few cases. Persons of all ages are susceptible unless having acquired an immunity through an attack of the disease at some former time. Rubella does not confer immunity against any

other disease, as scarlet fever or measles, nor do these diseases confer immunity against rubella. One attack of rubella confers immunity against any succeeding attacks.

The incubation period is from five to twenty-one days and is without symptoms.

The predisposing factors are the same as in measles or other infectious or contagious diseases.

Symptoms.—Invasion Period. This stage is usually of very short duration, lasting from a few hours to perhaps two days. The initial symptoms are usually mild, being a sudden chilliness, but not chills; mild fever of about 100 degrees; a slight headache; mild sore throat; swollen cervical and post auricular lymphatic glands; little or no coryza; sometimes slight pains in the back and legs; and the macular rose-red eruption in the throat which is constantly present. Often the initial symptoms are so mild that the presence of a disease is not recognized until the eruption appears, which usually occurs on the first day and rarely not until the fourth day.

Eruption Period.—The rash, which consists of round or oval reddish spots about the size of a split pea, mostly discrete, but sometimes confluent, and surrounded by areas of hyperemic skin, usually shows first upon the face and follows a wavelike progression over the body and limbs. The rash usually begins to fade upon the face before it has appeared upon the last affected areas, and usually remains in one region from a few hours to a half day. It extends over the entire body in from twenty-four to thirty hours. Occasionally the skin is so hyperemic in extensive tracts that the rash more resembles scarlet fever rather than measles. The crescentic arrangement of the papules usually seen in measles can not be made out in rubella. In the course of two or three days the rash disappears with very fine desquamation, leaving a faint pigmentation, which remains for a short time. Slight etching usually accompanies the rash.

Relapses are rare and complications infrequent. There are no special sequelæ, but albuminuria, bronchitis and pneumonia have been noted. Although one attack usually confers immunity, second attacks have been reported, which may have been real second attacks or the first attack may have been an error in diagnosis.

Diagnosis.—Early or sporadic cases may present great difficulty in diagnosis, but when an epidemic is present diagnosis becomes much easier. The **direct** diagnosis of the disease rests upon the very mild nature of the disease, its short initial onset, the character of the eruptions

and the early enlargement of the glands with the absence of severe throat symptoms and coryza.

Rubella is frequently mistaken for mild cases of measles or scarlet fever. Unlike measles, it does not have the prominent catarrhal symptoms, the higher fever, the crescentic grouping of the eruption and Koplik's sign. In measles the adenitis is not so severe as in rubella, and especially are the sub-occipital and post-auricular glands involved in rubella. Scarlet fever has a very sudden onset with severe symptoms, a very sore throat, the characteristic tongue and the peculiar rash, all of which are decidedly different from rubella. In the latter stages the character of the desquamation is also a distinguishing feature.

Treatment.—Patient should be kept in a properly heated and well ventilated room, being careful that no draughts chill the patient, and should remain in bed for at least two days. Patient should be isolated. Treatment should be directed to the upper cervical, mid-dorsal and lower dorsal areas to keep normal the function of the internal secreting mechanism, and to normalize and keep normal the respiratory and circulatory systems. Treat carefully to upper lymphatics, working around the enlarged glands and not directly over them. Watch the excretory functions and keep them active by judicious measures. If annoying itching occurs, the hot bath followed by being wrapped in a soft warm blanket will usually relieve. Daily tepid sponging should be given and if hot bath does not relieve itching an application of olive oil or cold cream will often relieve. Diet should be reduced and regulated according to age of patient and severity of the case. Usually the above is all that is indicated, but if more severe symptoms present themselves vary your treatment according to the symptoms present.

Prognosis.—Recovery is the general rule. Relapses sometimes occur, and are usually much more severe than the initial attack. The symptoms are often more severe in adults than in children. Like measles, this disease seems to lower resistance to other infections, and therefore especial care should be taken to protect the patient from exposure to other diseases for some time after recovery from rubella. See that the patient is built up constitutionally after recovery by plenty of fresh air, suitable exercises and good food.

Varicella

(CHICKEN POX)

Definition.—Chicken pox is an acute, specific, contagious, slightly febrile, eruptive disease, usually of childhood, affecting the whole or-

ganism through the blood. It is an epidemic disease that spreads rapidly, is highly contagious but not inoculable, and confers immunity.

History.—Varicella was first recognized about 1553 and was distinguished from smallpox by Trousseau.

Etiology.—The agent that causes the disease is not known; the disease usually affects children under ten years of age, but does occasionally attack adults. It bears no relation to variola, except the very slightly similar eruption. It is transferred by direct personal contact, by the air or by a third person. It is infective from the first symptoms until all the crusts have disappeared. Although the disease usually occurs in epidemics, frequently we see sporadic cases.

As in all other contagious or infectious diseases the predisposing causative factors are those conditions which lower the resistive powers of the body, such as fatigue, improper diet, exposure to sudden temperature changes and imperfect elimination of the body wastes. The structural lesions found as predisposing factors are contracted muscles of the neck and behind the jaw, and muscular and interosseous lesions of the upper cervical, mid-dorsal and dorso-lumbar areas, also of the clavicle and upper ribs.

Symptoms and Diagnosis.—There are three stages to the disease:

(1) Incubation, (2) Prodromal, (3) Eruptive.

1. Incubation Period.—This period lasts about fourteen days though it may vary from seven to seventeen days. During this period there is practically no symptomatology except perhaps the last two or three days, when the child shows evidence of a little excitability and irritability. Often on the day before the first noticeable symptoms the child appears even more active than usual.

2. Prodromal Stage.—Prodromal symptoms are not common and usually last but about twenty-four hours. The first noticeable symptom is the irritability of the patient, which is followed by a temperature, usually 99° to 101°, which temperature persists during the course of the disease. There are sometimes thirst, anorexia, constipation, seldom vomiting, and a furred tongue. Some cases have been observed to have the following as prodromal symptoms, but these we believe are usually due to concurrent conditions that exist at the time of the infection: delirium, convulsions, angina, conjunctivitis, dysphagia, bloody vomiting and stools, and an initial erythema, usually scarlatiniform.

3. Eruptive Stage.—The eruption comes within twenty-four hours and is often the first symptom that is noticed. It appears first as hyperemic macules and then rose-colored papular spots, somewhat compar-

able to the typhoid roseolæ and not hard. These papules rapidly become raised, flattened, ovoid, pin-head to pea-sized vesicles containing a fluid at first watery and then pearly. They disappear on pressure. The vesicles mature within twenty-four hours, are very superficial, and leave a slight areola about them, which is NOT inflammatory as in small-pox. The eruption appears first on the chest and then on the neck, face, scalp, and then trunk and limbs in the order named. The eruption is most abundant upon the back, and over the entire body they may number anywhere from eight to many hundred and are usually scattered.

The vesicles are not umbilicated, but some may have slightly depressed centers, are discrete, and appear in successive crops which require from three to six days to complete. Pustulation and hemorrhage into the vesicle rarely occur. On the third or fourth day yellowish-brown crusts form and gradually disappear. Scars may result from scratching or infection. By the fifth day we may find all stages of the eruption because of the appearance of the successive crops. There may be an efflorescence upon the mucous membrane of the oral cavity and of the pharynx causing slight difficulty in deglutition.

The itching may be more or less intense. As scratching may cause pitting it should be guarded against. The fever which is usually slight may persist during the entire eruptive stage, but if it is high and persists as high temperature it suggests complications. Muscular tension of the cervical muscles, especially those in front, and around the angle of the inferior maxilla are usually found, and often the clavicles are bound down, and relation of ribs is disturbed. Ulceration sometimes follows scratching, and even gangrene may appear around the vesicles in debilitated children, especially those who are tubercular or congenitally syphilitic. It is apt to be fatal in these cases. Complications of tubular nephritis, which occurs within two weeks; cardiac hypertrophy; uremia; otitis media; and bronchial affections, are sometimes met with.

Treatment.—Isolate patient so as not to come in contact with other children. The younger children should be put to bed until the crusts have formed; older children may be allowed to be up around the room if their cases are light. Pay particular attention to the muscular lesions of the neck, lower maxilla, mid-dorsal and dorso-lumbar regions, keeping them relaxed by gentle relaxing treatments. A general systemic treatment is soothing and helps to prevent complications.

“Be very careful and very thorough in your neck adjustments. Loosen the atlas and axis and draw forward the inferior maxilla from its pressure upon the vessels and nerves back of its angle. Draw the hyoid

bone forward and secure good circulation of blood throughout the entire cervical area."—A. T. STILL.

Give treatment at the 4th and 5th dorsals to stimulate the superficial circulation and thus increase elimination through the eruption as well as the sweat glands. Remember the eruption is the expression of the body's attempt to eliminate the toxins within.

Keep the bowels active by splanchnic and abdominal manipulations and by laxative diet. If bowels are persistently inactive use enemata. Diet should be bland and easily digested. During fever, diet should be liquid or better restricted, giving only water in abundance.

During the eruptive stage do not use tub baths. Daily tepid sponges with either plain water or boric acid solution answers both as an antiseptic wash and bathing. After the daily sponging, and as often as necessary to control itching, anoint with a 10% boric acid ointment or with carbolized vaseline. If scratching can not be controlled, the hands should be tied in muslin bags. As in smallpox the ultra-violet rays seem to irritate the eruptions and to increase the tendency to scarring, therefore the windows and lights should be screened with a dull red material.

Prognosis.—Invariably favorable unless complications set in, which is seldom. Recurrences are very rare.

Prophylaxis.—The child should be kept in quarantine for three weeks or until the skin is entirely clean.

Epidemic Parotitis

(MUMPS; EPIDEMIC PAROTIDITIS)

Definition.—Mumps is an acute, infectious, contagious disease, occurring in limited epidemics, and characterized by inflammation of the salivary glands, particularly the parotid, swelling slight fever and pain over the involved glands. There is special liability to orchitis or to mastitis.

Etiology.—Predisposing Factors: Mumps is peculiarly a disease of childhood and adolescence, not being common in infancy or after the twentieth year. It affects boys nearly twice as often as girls. Mandibular and upper cervical lesions, both of the interosseous and soft tissue types, are undoubtedly potent predisposing factors, as they obstruct and interfere with nerve and circulatory function to the glands affected. Also any condition which lowers the child's resistance to infections makes them more susceptible to this disease than to any other, these conditions being fatigue, exposure to dampness and sudden weather changes, dietetic errors, etc. The cases are more numerous in the spring and autumn

seasons. Extensive epidemics are infrequent, but do occur in reformatory institutions and children's homes. It is much more wide-spread in large cities than in the country or villages.

Exciting Cause; The specific cause has not been demonstrated. The disease is usually transmitted by direct contact, but there are instances where it has been transmitted by a third party or by fomites. There are two views as to the mode of infection; the first being that the active principle travels along the course of the salivary ducts from the mouth to the glands, probably most often through the duct of Stenson to the parotid gland. This is the most generally accepted theory. The second is that the infection is a general one to which certain structures are more susceptible, principally the salivary glands, and the parotid in particular.

Symptoms.—The period of incubation is from fourteen to twenty-one days. Prodromes are usually absent, though in the more severe cases constitutional disturbances, with chilliness, vomiting and mild fever may precede the local inflammation. In the milder cases the local swelling may be the first manifestation of the disease. The temperature is usually moderate but may rise to 103 or 104 degrees in the more severe cases. The left side is more often affected than the right. The disease is characterized by a feeling of tension with soreness just below the ear. Soon a slight swelling may be observed directly under the ear and in the course of forty-eight hours it reaches its maximum size. The parotid gland becomes greatly enlarged and the adjacent tissues of the neck and face become tense and edematous. The skin becomes hard and glossy and usually white in color because of the obstruction to the circulation from pressure. The swelling is between the angle of the jaw and the mastoid process, pushing the ear upward and its lobule is pushed sharply outward. In the majority of cases the other side becomes affected in two or three days, but sometimes the spread of the disease to the other side is delayed for several days, and occasionally the other side escapes the infection. Frequently the swelling of the other side is so slight that it is only recognized by the closest scrutiny. Infrequently the sub-maxillary glands become affected without involving the parotid glands, but these cases are rather rare.

The patient is usually unable to open the mouth without considerable pain; acids, and rarely sweets, produce spasms of the jaw muscles; speech and even deglutition are difficult; the salivary secretions are usually increased but quite frequently they are decreased. The breath is foul and the tongue is furred. The mucous membrane of the cheek and pharynx are reddened and there may be a slight angina.

The spine shows subluxations of the upper cervical area, particularly of the atlas and axis, also upper rib lesions and upper dorsal lesions are frequently found. The lesions of the second and third dorsal, and their ribs, are most frequently found when the submaxillary gland is involved.

The symptoms persist from six to fourteen days, when the swelling disappears and the patient regains normal health. Orchitis occurs in about one-third of the cases after puberty. In infancy and childhood it is extremely rare. Usually one testicle is involved, and is characterized by weight, swelling and pain in the scrotum. The testicle may become greatly enlarged when the pain becomes intense. Atrophy may result and if both testicles are affected the loss of reproductive ability may result. In females, usually after puberty, the breasts may become enlarged and tender, pain and tenderness of one or both ovaries, hematoma of the labia, or a vulvovaginal discharge may occur. However these complications are very rare. As a rule the patient is not very sick and relapses are very uncommon. The attack confers immunity which is practically permanent.

Diagnosis.—Under ordinary conditions, especially during an epidemic, the diagnosis of mumps is very easy. The swelling in front of and below the ear, with the displacement of the lobule outward is quite indicative of mumps. The relative rapidity with which the swelling appears, develops and subsides is characteristic of mumps. In acute cervical adenitis the swelling is below the angle of the jaw and does not at any time correspond with the outline of the parotid gland. In Hodgkin's disease, which is a chronic affection of the lymphatic glands, the salivary glands are not involved.

Treatment.—The patient should be kept away from other children, and should remain in a well lighted, well ventilated room of even temperature, and if the temperature is high or moderately high he should be kept in bed.

The correction of all interosseous lesions is indicated, especially of the upper cervical area, though the second and third dorsal should be given attention because of the influence of these dorsal nerves upon the submaxillary glands. Also correct upper rib lesions that may exist. As mumps is an infective disease the channels of elimination should be watched and stimulated. Build up the body resistance by treatment at the mid dorsal area to affect circulation and respiration; and lower dorsal area to affect kidney and adrenal function. Watch the bowels and keep this avenue of elimination functioning freely, using enemata if necessary.

The diet should be liquid, of fruit juices, thin gruels, milk and plenty

of water. Tepid sponging allays the fever and restlessness. Relaxation of the deep muscles of the neck and shoulders will do much to make the patient comfortable, also the muscles under the angle of the jaw. A very gentle relaxing of the tissues around the gland itself, by crowding them toward the gland, assists in relieving the tension by securing a better venous and lymphatic drainage.

Hot applications to the swollen glands will give a considerable relief; these may consist of hot fomentations, hot salt bag, electric heating pad, hot water bottle, etc. The mouth is kept in good condition by the use of a mild antiseptic mouth wash.

Orchitis should not occur if the boy is kept warm and in bed. If it does occur the best treatment is relaxation of the lower dorsal and upper lumbar spinal muscles, rest in bed, support and protection of the scrotum with cotton wool, cold applications, correction of any bony lesions affecting the pelvic viscera.

If mastitis occurs, rib lesions will be found and should be corrected, as they are probably the predisposing factor to this complication. Treatment would consist of correction of these lesions, if it can be done without irritating the inflamed glands. The manipulation of the surrounding tissues, with gentle crowding of the normal tissues toward the inflamed glands, without exerting any pressure on the gland itself, is helpful and comforting. Free tissues back to the axillary lymphatics.

Prognosis.—The outcome is usually favorable. In the rare fatal cases, meningitis is the usual cause of death. Under osteopathic care the duration of the swelling, fever and pain is usually greatly lessened.

Quarantine of twenty-four days is necessary.

Whooping Cough

(PERTUSSIS; TUSSIS CONVULSIVA)

Definition.—It is a specific, epidemic, infectious, contagious disease affecting the respiratory organs, characterized by a cyclic course, a severe convulsive cough, paroxysmal, with the characteristic "whoop."

Etiology.—It usually occurs in children, most frequently during the fourth year, and extremely seldom after the twentieth year. It appears to be slightly more frequent among girls, and most cases occur in March and April. Pertussis is highly contagious, being carried by direct contact and by fomites. The Bordet and Gengou bacillus is the specific cause. This is found in the sputum most abundantly during the first week, the most infectious period, and becomes gradually less. One attack usually confers immunity.

The incubation period is from seven to ten days. The patient may be considered non-infectious five weeks after the first whoop.

Lesions of the cervical and upper dorsal vertebræ and of the first, second and third ribs, affecting the vagi, the phrenic, the sympathetic, the recurrent laryngeal or the vasomotor nerves predispose to the disease.

The bacteria were found by Mallory and Horner to be characteristic between the cilia of the trachea and the bronchi. They interfere, mechanically, with the movements of the cilia, preventing the normal removal of secretions.

Symptoms.—The disease is divided into three stages: 1. The catarrhal stage, which lasts one to two weeks; 2, the spasmodic stage, three to six weeks; 3, the declining stage, three weeks.

The Catarrhal Stage: Characterized by headache, photophobia, conjunctivitis, coryza and a cough which becomes drier and harder toward the end of this stage. Often the invasion is insidious and sometimes well marked with a temperature of 100° to 102°. Frequently this stage cannot be differentiated from a "hard cold," except toward the end of the stage when the cough becomes worse instead of better, and the child will seek some support to steady itself during the coughing paroxysm. Also the eyes will water freely during the coughing spell and the child will not be able to "get his breath" between coughs, but will have a number of coughs without inhaling.

One to two weeks.

The Spasmodic Stage: This stage dates from the "first whoop." The fever now usually ceases, unless there are complications. The cough becomes paroxysmal, consisting of a succession of fifteen or more short, rapid expiratory puffs with no intervening inspirations, immediately followed by a deep, loud inspiration, which is the characteristic "whoop," and is due to the partial closure of the glottis. Each paroxysm is composed of three or more such spells, the last one often followed by the expectoration of a small plug of mucus or by vomiting. During the paroxysm the facies presents a swollen, dusky appearance, eyeballs protruding, eyes reddened, and puffy, pinkish lids. The child is well except for the paroxysm, which has an aura, tickling in the larynx, thoracic constriction, a creeping sensation, when the child attempts to brace himself, or runs in terror for support. The "whoop" is a deep, singing or whistling inspiration which is absolutely characteristic. During the cough the child's body is bent forward and he is perfectly helpless, often passing urine and feces involuntarily. Cyanosis often occurs from the strain.

After the attack patient regains control of himself, the respiration is fast, and there is fatigue, sweating and often pain in the abdomen from the strain of coughing. During the severe cough petechiæ of the forehead, ecchymosis of the conjunctivæ, epistaxis, bleeding of the external auditory meatus or from the frenum of the tongue may occur. Ulcer of the frenum of the tongue is quite common. The paroxysms vary from four to a great many per day, averaging about twenty.

Three to six weeks, usually four weeks.

The Terminal or Declining Stage: This stage is longer in proportion in the mild cases. The paroxysms occur at longer intervals, are of shorter duration and of less intensity, the catarrhal symptoms are more marked, the expectoration becomes thinner, fluid, mucopurulent, and looser. The "habit cough" may follow. It is during this stage that complications are most likely to occur, therefore it is the most dangerous.

Complications.—Catarrhal inflammations are common in the initial stage. **Bronchopneumonia** is the most frequent and severe complication. Lobar pneumonia, exudative pleurisy, endocarditis, pericarditis, meningitis and nephritis are infrequent complications. Spasms of the glottis in nervous or scrofulous children is largely nocturnal, and may cause death from asphyxia even in the lightest cases. Hemorrhages may occur in the skin, conjunctivæ, nose, throat, ears or cerebrum. The writer knows of one case where death was sudden from a cerebral hemorrhage in an apparently mild case. Other complications are cardiac dilatation, emphysema, bronchiectasis, pneumothorax, aneurysm hernias, muscular ruptures, and visceral prolapses.

Spasmodic cough from diseased bronchial glands very closely resembles whooping cough. Barthez and Sannee give the following differentiation:

Whooping Cough	vs	Enlarged Glands
1. Contagious, epidemic.		Isolated, not contagious.
2. Three periods, 2nd paroxysmal.		No distinct periods.
3. Paroxysmal cough with whoop, vomiting, viscid expectoration.		Paroxysms without whoop, expectoration or vomiting.
4. Respiratory sounds normal.		Signs of enlarged glands sometimes present.
5. Respiration normal in interval; apyrexia if simple.		Asthma in some cases, febrile movements, sweats, wasting, etc.
6. Voice natural.		Voice sometimes changed.
7. Acute.		Chronic.

Treatment.—Isolation of patient in well-ventilated, sunny room where there is plenty of fresh air day and night is essential. Children exposed to infection should be disinfected and isolated for three weeks, as the disease can not be diagnosed during the catarrhal stage. If case is at all severe, patient should be put to bed.

Cases receiving early treatment are sometimes aborted. Treatment of the whole respiratory tract with correction of vertebral and rib lesions, and relaxation of the contracted muscles should be given. Treatments for the first few days should be at least twice per day. Pay especial attention to the vagi and phrenic nerves. Lesions of the first and second ribs will affect the recurrent laryngeal nerves which will aggravate the cough. The muscles of the shoulder girdle are always very tense and should be kept well relaxed, as should the subscapular muscles. Frequently after treatment the child will have a coughing spasm and raise large quantities of mucus, after which there will be no more spasms for several hours.

Children who play and live out of doors get along best. To support the diaphragm and abdominal muscles from the strain of coughing a muslin bandage tightly pinned about the trunk is very valuable, a pad being placed over the stomach under the bandage. In a very young child instruct the nurse to strongly flex thighs on abdomen during the severe coughing. Inhalations of steam from water with a very few drops of eucalyptus oil in it often relieves the first tickling sensations.

If cyanotic symptoms appear they may be relieved by raising the ribs, especially those over the heart; by relaxing the subscapular muscles; and by supporting the heart by application of cold cloth over the heart. Elevating the abdominal viscera and diaphragm is, also, of distinct benefit.

The diet should be nutritious and easily digested, restricted to liquids during the fever. The child should be warmly clad and protected from drafts. The excretory systems should be kept active by plenty of water drinking and by diet. Treatment should be continued during the terminal stage to prevent the possible complications. Irritants, as beef-tea, stimulants, dry bread, cookies and overfeeding, provoke coughing and vomiting. Food should be given at frequent intervals in concentrated form—gruels, milk with lime water, zwieback in milk, eggs, meat-juice, etc. Older patients tolerate more solid food.

Prognosis.—With the complications, this is the most fatal of the acute infections under five years of age. Infants and little children should receive special care. Ordinary uncomplicated cases are favor-

able for recovery. The prognosis depends upon the age and strength of the patient, the severity and number of the paroxysms, and the presence or absence of complications. No recurrence is to be expected.

Death is due to spasm of the glottis or to extensive subdural hemorrhage, occurring chiefly in the children of the poor and in delicate infants.

Prophylaxis consists of isolation, disinfection of sputum and final fumigation of the premises. Children should be protected from exposure to infection from whooping cough. It must be realized that it is a very serious disease.

CONSTITUTIONAL DISEASES

Rheumatic Fever

(INFLAMMATORY RHEUMATISM)

Definition.—An acute, febrile, non-contagious disease; it is infectious, although there is some controversy as to its exact nature; characterized by a multiple arthritis and a tendency to involve the heart.

Osteopathic Etiology and Pathology.—The prevailing thought is that the disease is an infection due to a diplococcus. This micro-organism is called by others micrococcus rheumaticus and streptococcus rheumaticus.

“Rheumatic fever occurs most frequently in the temperate zone, among people who live under conditions which are unhealthful and which especially induce focal infection. It is most prevalent in the young and in the more exposed male of all ages. The excess of lymphoid tissue in the pharynx and nose of the young explains the frequency of the incidence of the focal infection and the subsequent rheumatism. The frequent association of the onset of rheumatic fever with lowering of the body temperature by exposure to cold and a wetting is explained by the increased specific virulence of the bacterial cause acquired by a low temperature and the coincident lessened resistance of the patient due to the exposure. The frequent absence of evidence of acute focal infection at the onset of the systemic disease is not an evidence that no focus exists. The latent chronic streptococcus infection of tonsillitis, pyorrhea alveolaris, sinuitis, etc., may suddenly acquire increased virulence and specific pathogenic affinity with varying degrees of focal tissue reaction. This transmutation of type and pathogenicity certainly occurs in the focus of infection. The removal of the tonsils and other sites of focal infection has been followed by complete recovery of prolonged, sub-acute and chronic types of arthritis and has unquestionably prevented recurrent attacks of rheumatic fever to which the susceptibility is increased by one or more attacks. The occurrence of rheumatic fever after the removal of an apparent focus may be due to secondary systemic latent foci in lymph nodes proximal to joints, in the neck or elsewhere. The streptococci of these secondary foci may take on new virulence and specific pathogenicity, from the same causes which induced like changes in the pathogenic bacteria of the primary focus.¹”

1. Billings, Focal Infection.

Osteopathic lesions play an important role, both in their relationship or bearing upon the tissues of a possible site for a focal infection and upon systemic conditions that derange general bodily tone. This has been definitely confirmed in those cases of rheumatism where correction of the osteopathic lesions, with attention to hygienic measures, have resulted in recovery. This is a feature of osteopathic etiology and therapy that can hardly be over-emphasized, for an intact innervation, circulation and chemism of the organism is basic to both preventive and curative therapy. Rheumatism, like most diseases, is of local origin and if tissues and structures can be kept up to the normal, infectious or the other pathologic processes can rarely become active.

Pathologically, the synovial membrane is hyperemic. The muscles and ligaments are inflamed. The fluid is serous with more or less fibrin and leucocytes. In severe cases slight erosion of the cartilages is found. Acute rheumatism is rarely fatal; when death does occur it is generally due to the complications which arise.

Symptoms.—The onset is usually sudden; although it may be preceded by slight fever, aching in joints, chilliness, and sore throat. It generally involves the larger joints and is almost always multiple; it has a tendency to move from one joint to another. The pain in the joints usually develops rapidly with slight chilliness and a rapid rise in the temperature from 102 to 104 degrees F. The pulse is frequent, often disproportionately to the fever. There are profuse acid sweats, often causing sudamina. There is loss of appetite and thirst is present. The urine is scanty, high colored, very acid, and deposits urates upon standing. The tongue is coated and the bowels are constipated. The joints are reddened, swollen, extremely painful and tender to the touch. Every movement, jarring of the bed, or the pressure of the bed clothes is agony to the patient. The blood is greatly deranged, anemia develops rapidly and there is well marked leucocytosis. The duration varies from a few days to several weeks.

Complications.—The temperature may rise to 106 or 109 degrees F.; this is often associated with delirium, great prostration and a feeble, frequent pulse. Endocarditis, pericarditis, myocarditis, pneumonia, pleurisy, iritis, chorea, convulsions and meningitis may occur. Coma may develop without preceding delirium or convulsions; this is very serious and may prove fatal. Subcutaneous fibrous nodules attached to tendons and fascia sometimes develop. They vary in size and are most common in children and in young adults, occurring most frequently in the fingers, hands and wrists. They are also sometimes seen about the

elbows, knees, scapulæ and spines of the vertebræ. They usually last a few days, sometimes for months, and generally develop during the decline of the fever. Cutaneous affections, such as urticaria, erythema, nodosis, purpura and sweat vesicles sometimes appear.

Diagnosis.—This is seldom very difficult; there are, however, several affections which resemble acute articular rheumatism. In **septic arthritis** its association with some other septic process and the tendency of the inflammation to end in suppuration with more or less destruction of the joints, will determine the diagnosis. Septic arthritis may develop during the course of pyemia, puerperal fever, or acute osteomyelitis. **Gout** is rarely mistaken for acute rheumatism. Gout occurs later in life and usually affects the greater toe; history and mode of onset will usually render the diagnosis easy. In **gonorrheal rheumatism** the history of recent infection, its obstinate character and being generally connected with a single joint from the start are diagnostic. It especially affects the knee. Heart complications are rare. **Rheumatoid arthritis** begins in the small joints; then attacks them all, leaving permanent deformity. There is no fever or sweats and the heart is not affected. Acute arthritis of infants usually attacks the hip or knee. The effusion becomes purulent.

Prognosis.—Recovery is the rule, but the prognosis nevertheless, must be guarded. Relapses and recurrences are common.

Subacute Rheumatism.—In this form both the local and general symptoms are of a milder type and are more prolonged than in the acute form. The temperature seldom rises above 101 degrees F. The inflammation of the joints is not so severe and fewer joints are involved. It may last for weeks or months, and then it may pass into the chronic form. Usually though, when the course is prolonged, the joints return to their normal state.

Treatment.—Place the patient in a room that is well ventilated and maintain a temperature of about 70 degrees F. Avoid draughts of air. The bed should be soft and smooth and blankets should be used. The diet should consist largely of milk, and let the patient drink freely of water. Oatmeal, barley water, egg albumen and meat juices may also be used.

Treatment should be given along the entire spine, especially if the rheumatism changes from one joint to another; otherwise treat the innervation directly to the affected joint. Correct any derangements that may be found along the spinal column and carefully relax the deep back muscles. Particular attention should be given to the bowels and

kidneys. Also, treat the liver most thoroughly during each treatment. The liver is many times considerably enlarged and tender in rheumatism and a thorough treatment of it seems to favor a more rapid cure.

Carefully treat the affected tissues. If you cannot treat over the joint, then manipulate the tissues above and below the joint; and usually after a few minutes' manipulation the swelling is somewhat relieved so that direct treatment of the joint can be given. It is best to wrap the inflamed joints in flannel if the pain is severe. Besides treatment of the innervation of the joint, hot applications will be helpful. Some claim that cold compresses are of aid to the inflamed joints.

Complications are to be treated separately. Besides the ordinary fever treatment for the fever, the cold bath is very effectual. After **convalescence** has been established, the patient should be carefully protected for several days from cold and damp. For any stiffness that may persist, manipulation and hot baths will be quite sufficient.

H. M. Still¹ writes "If the fever is not over 103 degrees I do not try to reduce it. . . After treatment in a majority of cases, the fever is reduced within twenty-four hours unless complications have set in. These are usually of the heart, so no matter how mild the attack, keep this in mind. If the action is irregular and weak, stimulate it two or three times a day. If it is rapid and high fever, go to the vasomotor centers and reduce fever, then inhibit the heart action and keep the excretions active. If the joints are affected I always move them gently no matter how great the inflammation. As yet I have never had a case of rheumatism in which cardiac lesions or ankylosed joints were a sequela."

If the tonsils are evidently badly diseased and osteopathic treatment does not clear them up do not hesitate to have them removed.

Chronic Articular Rheumatism

Osteopathic Etiology and Pathology.—This disorder should be studied in connection with arthritis deformans owing to similar sources of infection and various common factors. It usually develops slowly and follows an acute or subacute attack and is common among the poor, especially those exposed to damp and cold. Heredity, advanced years, although the disease may appear at any age, and constant exposure to cold and wet are predisposing causes. Chronic lesions to the spinal column corresponding to the affected area are found. Too much stress from an osteopathic point of view cannot be placed upon the importance of lesions to both the digestive organs and to the joints especially in-

1. Massachusetts Journal of Osteopathy, Jan. 1906.

volved. Then, in addition, particular attention should be given osteopathically or surgically, or both, to sites of focal infection.

Pathologically, the capsules and ligaments of the joints are thickened also, the sheaths of the tendons around the joint, so that in long standing cases the movements are impaired. In severe cases the cartilages may be eroded. Atrophy of the muscles covering the joints sometimes occurs, especially when there is neuritis; thus producing marked deformity. This muscular atrophy is particularly marked when the shoulders or hips are involved. The atrophy is caused partly from disease; in cases where the joint is distended with effusion, the wasting may be due to pressure upon the muscles or blood-vessels.

Symptoms.—Several joints are usually affected; but it may be limited to one joint, particularly the knee, hip or shoulder. Pain and stiffness are the most common symptoms. The pain is increased upon motion, while the stiffness is often lessened by using the limbs. The joints are slightly swollen, but seldom reddened and are usually tender upon pressure. All the symptoms are aggravated on the approach of stormy weather. There is fever but the general health is not greatly impaired. There may be distortion of the joints and ankylosis may occur. Arterial degeneration and chronic endocarditis may develop as complications.

Prognosis.—This should be guarded so far as a complete cure is concerned; although most cases are greatly benefited.

Treatment.—The treatment of chronic articular rheumatism is largely correcting lesions of the spinal column, which affect the diseased tissues as well as the digestive organs, local treatment of the joints, and removal of focal infections. A certain percentage will respond to osteopathic measures alone, though surgery has a definite place in others. The joints and limbs should be thoroughly treated so as to restore a better circulation and relieve the inflamed tissues. Wrapping the affected joint with cold cloths and then covering the cloths with flannel and oiled silk is often helpful. Due attention should be given the general health, such as nourishing food, free elimination and outdoor exercise.

Probably in some cases where the primary infection has been eliminated secondary foci are present and a general treatment will arouse sufficient reaction to cope with the condition.

Arthritis Deformans

(RHEUMATOID ARTHRITIS)

Definition.—A chronic affection of the joints, characterized by progressive changes in the cartilages and synovial membranes, and by new osseous formations restricting the motion of the joint and causing deformity.

Osteopathic Etiology and Pathology.—It is due to lesions of the spinal column affecting the spinal and sympathetic nerves as well as disturbing the circulation to the cord. Lesions of the spinal column and ribs are found corresponding to the innervation of the diseased joints. The osteopath has been able in every case to demonstrate clinically important osteopathic lesions. In addition the symmetry of joint involvement, muscular atrophy, sweating, etc., point to nervous lesions. Falli found upon autopsy that the anterior horns had undergone atrophic changes. Nervous lesions are probably of a predisposing character while some infection is the exciting cause. A thorough search of the entire body should be made for foci of infection. Malnutrition, traumatism, exposure to cold, and pelvic diseases are important causative factors. In all cases lesions will be found disturbing the organs of digestion. Females are more frequently affected than males. The disease is frequently seen in women suffering from ovarian and uterine troubles, especially at the menopause. Hereditary influence may be a factor, also auto-intoxication. The disease is most common between the ages of twenty and thirty. Mental worry, anxiety, grief and injury are also predisposing factors.

Pathologically, in one class of cases, the cells of the cartilages and of the synovial membrane proliferate. The cartilages undergo atrophy, or may become soft, degenerate, and are absorbed, leaving the ends of the bone bare. The bones naturally atrophy and become smooth. In another class the edges of the cartilages where the pressure is slight, thicken and form outgrowths which ossify and enlarge the heads of the bones, forming osteophytes which greatly impair the motion; true ankylosis is rare. The synovial membrane becomes thickened, also the capsule and ligaments, thus greatly restricting the movements of the joints. The muscles around the joints atrophy. In the spinal cord atrophic and degenerative lesions are found. In Still's disease there is an enlarged spleen and marked changes in the joint.

Symptoms.—Pain and swelling of the joints and fever and enlargement of the lymphatics near the joint are characteristic. The spleen

is congested and later on there is gastro-intestinal disturbance. **Multiple arthritis deformans**, also known as Heberden's nodosities, is characterized by nodules developing at the sides of the distal phalanges. It occurs most frequently in women between the ages of thirty and forty, and gradually increases with age. At first the joints are swollen, tender and painful and then apparently become better. These attacks may appear at different intervals while the nodules at the sides of the joints gradually increase in size. The larger joints are rarely affected. The progressive form may be either acute or chronic. The acute form at the onset may resemble articular rheumatism. It is more common in women between the ages of twenty and thirty, but may occur in children. Pregnancy, recent delivery, lactation, the menopause, and rapid child bearing are common antecedents. There is swelling and tenderness of the joints and slight fever. Several joints are usually involved. The **chronic form** is most common. Symmetrical joints are usually involved. The affected joints slowly enlarge and are painful and red. Usually the hand is first affected; then the wrists, knees, toes, jaws and spine; in extreme cases every joint is affected. The vertebræ, **spondylitis deformans**, may be attacked. The cervical spine may be alone involved, in which case the head cannot be moved up or down, although rotation usually remains. In some instances the entire spinal column is affected and may become perfectly rigid. In some cases there is hardly if any pain, while in others the pain is agonizing and is almost constant. The joints gradually become deformed, stiff and creak when moved; later they become completely ankylosed. This deformity is due partly to the thickening of the capsule, to the presence of osteophytes, and to the contraction of the muscles. These contractures flex the leg upon the thigh and the thigh upon the abdomen. Muscular atrophy increases the deformity. Numbness, tingling, pigmentation and glossiness of the skin, and local sweating may be present and are of trophic origin.

The **monoarthritic form** affects old persons chiefly, and women more frequently than men. It affects particularly the hips, the knees, the shoulders, and the vertebral articulations. This is often caused by an injury. The muscles waste away and the knee-jerk is usually increased upon the affected side.

Diagnosis.—Care has to be taken in not confusing it with rheumatic fever or gout. Radiographs should be made.

Prognosis.—If treated early there is a fair chance for curing the disease. Advanced cases usually improve under treatment. The osteopathic treatment should be persistent for at least several months.

Treatment.—Osteopathic treatment, if long continued in rheuma-

toid arthritis, has given satisfactory results, although owing to the extent of the deformity, a cure in advanced cases cannot be expected. An important cause of the disease is probably a trophic or vasomotor disturbance to the tissues of the joint. Osteopathically, there is never any difficulty to locate disorders in the spinal column corresponding to the innervation of the involved joints. The fact that many of the joints are affected symmetrically indicates that the lesion is a spinal one involving the nerve center. During the incipency marked improvement is the rule.

A thorough attempt should be made in every case to discover the source of infection and remove it, though this does not preclude the essential osteopathic adjustment.

The treatment consists of attempts to correct the spinal derangement and careful manipulation of the diseased joints to restore vitality and motion in them. The preceding simple, but effective treatment, must be continued two or three times per week for months or even years in order to be of particular value. Coupled with the specific treatment should be a careful consideration of the general health. The emunctories should be kept active and the food of the patient be nutritious. The osteopath should require the patient to take considerable physical exercise at regular intervals, warm baths and plenty of fresh air. Massage and friction of the diseased joints will be of aid in absorbing effusions and in restoring the tone of atrophied muscles. Hot compresses are a help. The baths at various hot springs are sometimes of benefit, and change of climate is invigorating.

O. J. Snyder¹ has this to say: "I must be very emphatic, however, to here advise exceptional caution in your manipulative procedure. * * * You cannot attempt to move the joint, for, if you do you will cause excruciating pain and do irreparable harm in that you will cause breaking down of the cartilage and cancellous bone tissue. Your first endeavor should be to reduce inflammation and to mitigate pain. * * * Osteopathically much comfort and reduction of pain can be accomplished by inhibition in the proper spinal areas. A little friction and very gentle extension or traction of the joint can be attempted as soon as the condition of the joint, by the foregoing treatment, has been made possible. At no time should rotation or side-bending, or any other manipulation that produces irritation of tissue be attempted."

In stout adult women a villous arthritis of the knees may develop owing to faulty posture and poor elimination. These conditions are often amenable to treatment.

1. Journal of the American Osteopathic Association, November 1919.

Muscular Rheumatism

Definition.—A painful disease of the voluntary muscles and of their fascia and the periosteum. It is regarded by many as a neuralgia of these muscles. The pain is greatly increased by motion and pressure.

Osteopathic Etiology and Pathology.—Osteopathic experience with cases of muscular rheumatism shows that the nerves, as they pass to and from the spinal muscles, are affected. The lesion is caused, principally, by subdislocations of the vertebræ, ribs or pelvis, according to the region involved. A gouty or rheumatic diathesis, heredity, exposure to cold and wet and previous attacks are predisposing causes. Men are more often affected, owing to their more frequent exposure. The disease affects persons of all ages. It occurs in acute, sub-acute and chronic forms.

In cases of frequent recurrence focal infections and intestinal toxins are often important factors. Vertebral and muscular lesions, septic foci, intestinal stasis, exposure to cold and drafts are principal causes.

Pathologically, there is swelling of the muscles of the nature of myositis. In chronic cases there is often atrophy of the muscles, due to interference of the trophic nerves.

Symptoms.—These are generally local and are never accompanied by marked constitutional disturbances. There is seldom fever, and the pulse is only slightly increased in frequency. Pain is the chief symptom; it is increased by motion or pressure. Tenderness is generally present and there may be swelling of the tissues. Rheumatic nodules have been found. The duration is usually three or four days, though it may last longer with frequent recurrences.

Lumbago is a painful affection of the muscles of the lumbar area and their tendinous attachments. The onset is generally sudden. In severe cases it sometimes renders the patient helpless. In **torticollis**, or stiff neck, the muscles of the side and back of the neck are affected. It is usually confined to one side of the head. Any attempt to turn the head causes a sharp pain. In **pleurodynia** the intercostal muscles, and sometimes the pectorals and serratus magnus, are affected. It usually affects but one side, more frequently the left; it is the most painful form of the disease, since the pain is aggravated by breathing. The respiratory movements are consequently restricted on the affected side. The absence of fever and physical signs will distinguish it from pleurisy. In **intercostal neuralgia** the pain follows the distribution of the nerves and there are tender spots along their courses. **Cephalodynia** affects

the muscles of the scalp. **Scapulodynia, omodynia** and **dorsodynia** affect the muscles of the shoulder and upper dorsal. **Abdominal rheumatism** affects the muscles of the abdomen.

Prognosis.—The prognosis is good. Favorable results are the general rule under careful treatment.

Treatment.—Muscular rheumatism is usually an easy affection to cure. The cause of the disturbance is generally found in the region involved, and is due, in the majority of cases, to some dislocated tissue, usually osseous, that irritates the nerves to the muscles. In addition to correcting the lesions, removal of septic foci, free elimination, lessened diet, stretching of the muscles, application of heat, ironing and rest are beneficial.

In **lumbago** there is invariably found a slight lateral deviation of some vertebræ along the lower dorsal or lumbar region. Occasionally deformity of the vertebræ, asymmetry, or arthritis are factors. The radiograph may be a diagnostic aid. Occasionally, a floating rib or an innominate becomes displaced. Stretching the loins by placing the patient upon his side or back and flexing the thighs on the abdomen is very beneficial. Maintain the tension for three or four minutes. Hot fomentations and rest are helpful.

Torticollis, or stiff neck, is generally due to a lesion of the middle cervical vertebræ. The lesion is usually between the third, fourth and fifth vertebræ, occasionally as low as the second dorsal. A reduction of the subdislocation will often relieve the attack. Stretching of the muscle and application of heat will also be of aid. In some cases of torticollis (chronic) there is a curvature of the cervical spine, and occasionally the muscles are more or less fibrinous. Surgical measures may be instituted. In such instances a cure cannot always be accomplished. The tonsils, nose and teeth should be examined for sources of infection.

A few cases of acute torticollis are caused by some of the deep muscular fibres becoming caught around a process of a vertebra. Severe contraction of the muscles by cold or extensive rotary flexions of the neck, may result in torticollis. Occasionally a case is found due to injury at birth. The cervical vertebræ should be carefully examined. The spinal accessory is the nerve generally involved. Lesions to the spinal accessory occur commonly at the third, fourth and fifth cervicals, or the atlas and axis. The muscles involved in torticollis are the sternocleido-mastoid, trapezius, splenius and scaleni. Operations should not be performed until a thorough course of treatment has failed to relieve.

Pleurodynia is often a neuralgia of the pleural nerves. It is usually caused by subdislocations of the ribs exactly over the regions involved. Occasionally, a lesion may exist to the corresponding vertebra, but rarely. The rib is at times completely dislocated. Applications of heat and rest of the part are of aid. Strapping of the region will give considerable relief.

In **cephalodynia** the muscles of the scalp are generally involved by lesions in the upper five cervical vertebræ. In **scapulodynia**, **omodynia** and **dorsodynia** the muscles of the shoulder are usually affected by displacements of the second and third ribs, although the lesion may be found slightly lower in the ribs, or in the corresponding vertebræ. The lower cervical vertebræ may also be at fault. In recurring and chronic cases carefully examine for infectious sources. Dislocations of the shoulder occur frequently; and muscular fibres may slip out of the bicipital groove (rarely). In a few cases muscles may become contracted about the coracoid process, or the acromial end of the clavicle may become dislocated.

Abdominal rheumatism is generally caused by lesions in the lower six dorsal vertebræ, which involve the innervation to the muscles. In some cases lesions of the lower ribs are found, and in a few instances a lesion may be discerned in the upper lumbar vertebræ.

Myalgia of the **upper extremity** is caused by lesions of the cervical or upper dorsal vertebræ or upper ribs. Occasionally some trouble may be found in the shoulder or elbow joints. In the **lower extremity** lesions may be found in the lower dorsal or lumbar vertebræ, or there may be derangements of the pelvic bones. Occasionally disorder is found at the hip and knee joints.

Gout

Definition.—A nutritional disorder in which there is an abnormal accumulation of uric acid and other purin bodies in the blood and tissues; and arthritis, deformity of joints and visceral derangements being the characteristic features.

Osteopathic Etiology and Pathology.—Hereditary influences are the predisposing factors of about one-half of the cases of gout. Men are more frequently affected than women. It rarely develops before the age of thirty. Overeating, sedentary habits, drinking alcohol, especially fermented drinks, and lead poisoning are predisposing factors. Emotional disturbances may excite an attack. Gout is not confined to the rich by any means; but there is also a "poor-man's gout," due to

poor food, unhygienic surroundings, and to an excessive use of malt liquors. Uric acid seems to be a causative factor, but whether there is an increased formation or a diminished excretion of the uric acid has not yet been fully decided. The ultimate result is the same in either case; there is an accumulation of uric acid and other purin bodies in the blood, which is responsible for some of the effects of the disease.

Osteopathic experience with cases of gout shows that lesions affecting the nervous system are important factors that control uric acid accumulation or excretion. The nerve centers controlling the affected portions of the body are almost invariably involved, as well as the nerve control to the digestive and excretory organs. A neurosis of these nerve centers probably occurs and is thus a predisposing cause of gout. Considerable can be accomplished in the treatment of gout by careful examination of the spinal column, in the region corresponding to the innervation of the affected area, for vertebral lesions, and correcting them. Usually, slight dislocations of the bones of the foot are found, when that region of the body is involved. The most common subdislocations of the foot are involvements of the astragalus with its articulations and the metatarsals.

Pathological changes are those of the joints principally. There is deposit of uric acid in cartilages, synovial membranes and ligaments. The joint of the great toe is most frequently affected, then the fingers, ankles, knees, hands and wrists. The exudates become hard and are then called tophi. In severe cases the cartilages of the ears, nose, eyelids and larynx are involved. Finally the joints become stiff, deformed and ankylosed, and sometimes there is ulceration.

The kidneys are usually the seat of chronic interstitial inflammation with a deposit of urates. The heart and blood-vessels almost always present changes. Arterial sclerosis is quite a constant lesion; the left ventricle of the heart is hypertrophied. Urate of sodium has been found deposited upon the valves. There is an excess of uric acid in the blood. Chronic bronchitis, emphysema and asthma are among the changes in the respiratory system.

Symptoms.—In **acute gout**, before the attack, the patient may complain of dyspeptic disorder, restlessness and twinges of pain in the small joints. He is apt to have irritability of temper and depression of spirits. The first symptom of the attack is great pain in the metatarsophalangeal joint of the great toe, which usually comes on suddenly at night with swelling, heat and discoloration of the joint. The temperature rises to 102 and 103 degrees F. Towards morning the symptoms generally abate to recur again the next night. This lasts for several

days, the symptoms gradually abating. The urine is scanty, high colored, of high specific gravity and acid in reaction. It deposits urates and often contains a small quantity of albumin. There may be gastro-intestinal symptoms—pain, vomiting, diarrhea, faintness and a rapid, feeble pulse. Pharyngitis is an occasional symptom. The cardiac symptoms are pain, shortness of breath and irregular action of the heart. These attacks may appear with varying severity. In some cases there may be severe cerebral symptoms.

Chronic gout follows repeated attacks of the acute form. The articular symptoms continue for a longer time and the condition extends to other joints. The chalk deposits slowly increase until the joint becomes swollen and deformed. The morbid changes already described are characteristic. The urine is increased in quantity, is of low specific gravity and may contain albumin and hyalin and granular casts. Involvement of the heart and blood-vessels gradually occurs.

Irregular gout or lithemia is seen in persons who have been gouty or have a hereditary predisposition. It includes a set of symptoms that are not alone distinctive, but when taken with this gouty tendency, all forms of irregular gout can be recognized. There are various gastro-intestinal disturbances; cutaneous eruptions; heart and blood-vessel changes; pains in the various muscles and joints; nervous symptoms, as headache, neuralgia and neuritis; urinary symptoms, and pulmonary and ocular disorders.

Diagnosis.—Only the irregular form of gout should be difficult to diagnose. Differentiation is to be made from arthritis deformans and acute and chronic rheumatism.

Treatment.—The hygienic treatment of gout is very essential. The patient should live a quiet life, avoiding mental and physical strains. Plenty of fresh air, exercise and regular hours should be insisted upon. Alcoholic drinking should be avoided and the food taken in moderate quantities. Keeping the skin active by the use of cold baths, if the patient is strong, and warm baths should he be weak, is a helpful measure. The dress of the patient should be warm and suitable for the climate.

A regulated diet of nutritious food, taken at regular hours, is necessary. Each patient should receive separate instructions as to diet. The food given may be small amounts of beef, mutton and chicken, with fresh vegetables; with the exception of strawberries, tomatoes and bananas, fruits may be used; fats, milk and stale bread are also suitable. The patient should avoid tea, coffee, pastry, hot breads, highly seasoned dishes, and such articles. The free use of water is beneficial.

The **osteopathic treatment** consists of careful correction of the lesions of the spinal column in order to free the nerve force to the affected region. The spinal treatment in gout is the most essential treatment and is effective. A most thorough examination should be made of the tissues about the diseased area; in the foot the astragalus oftentimes is subdislocated from its articulations, causing obstructions to the local vessels and nerves. The metatarsal bones should receive due attention, as occasionally one of the bones corresponding to the affected tissues is dislocated, usually downward. All the joints between the diseased tissues and the spinal nerve centers should be carefully manipulated so as to favor a better circulation. During a severe attack of gout, besides careful treatment of the blood supply to the diseased region, wrapping the joint in cotton wool and applying warmth and moisture to the joint may be helpful.

The kidneys, liver and bowels are to be kept active. A light treatment to the kidneys and liver each time is very helpful in aiding the organs to eliminate the waste material, and especially in controlling any inflammation that may exist in the kidney. The essential treatment in gout is to relieve the disorder of the nerve centers, to increase the activities of the emunctories and to regulate the hygiene of the patient.

Diabetes Mellitus

Definition.—A nutritional disorder in which there is an abnormal amount of sugar in the blood, characterized by an excessive urinary discharge, in which grape sugar is constantly present, and by a progressive loss of flesh and strength.

Osteopathic Etiology and Pathology.—Almost invariably there will be found a posterior dorso-lumbar curvature wherein the spinal column tissues are much contracted. This condition probably involves the sympathetics (vasomotor and trophic) to the pancreas, liver and intestines. Important lesions may also be found as high as the occiput. Tenderness and congestion over the abdomen, especially the liver, are frequent. It affects men more frequently than women and is a disease of adult life, ranging between the ages of thirty and sixty, though cases have occurred in the very young. It is more serious in the young, the very young seldom recovering. Hereditary influences are believed to be a predisposing cause. It affects the better classes principally and especially those of a neurotic temperament. The Hebrew race is specially predisposed. The colored race is seldom affected.

Obesity, certain chronic diseases (malaria, gout, syphilis), occupations taxing the mind, and pregnancy are predisposing influences. Injury or disease of the spinal cord or brain frequently cause diabetes, especially any irritation of Bernard's diabetic center in the medulla. Derangements of the endocrine system are important. Injuries to the spine, chiefly in the dorso-lumbar and sacral regions, and to the abdomen, and diseases of the pancreas or liver are, as has been stated, oftentimes causes. Lesions to the spine may disturb the glycogenic function of the liver, the glycolytic ferment of the pancreas, or produce an alimentary glycosuria. Extirpation of the pancreas is immediately followed by diabetes, but if a fragment of the pancreas is left it is not always followed by diabetes. The normal amount of sugar in the blood is 1-1000 while in diabetes the amount of sugar is 3 to 4-1000 up to 7 or 8-1000. The healthy kidney will not excrete sugar when it is at the normal ratio. Concerning the presence of acetone-bodies von Noorden¹ says: "The excretion of acetone-bodies may serve, like glycosuria, as a measure of the intensity of the diabetic disease.....it will be at once understood that in no other disease do the acetone-bodies occupy so important a position as in diabetes." Irritation of the centers of the vasomotor nerves to the liver or direct stimulus to the liver cells is followed by glycosuria. Interference with the pneumogastric nerve also influences diabetes.

Pathologically, the liver is enlarged, firmer and darker in color than normal. Often there is fatty degeneration of the organ. The pancreas is diseased in about one-half of the cases of diabetes, especially the islands of Langerhans. The lesions found are granular atrophy, occlusion of the pancreatic duct, atrophy from pressure, fat necrosis, and sometimes it is small, soft and anemic. The kidney changes are those of catarrhal nephritis. In the fatty degeneration hyalin changes take place. The heart is hypertrophied in a few cases. Arterial sclerosis is frequently met with. In the lungs bronchitis, pneumonia and tuberculosis occasionally develop. In the stomach and intestines catarrh is common. The blood presents an increase of sugar. In the nervous system are found many lesions, especially congestion, extravasation and sclerosis of the brain; disturbances of the posterior part of the cord, and congestion and sclerosis of the sympathetic ganglia. The bony lesions, however, (almost invariably a posterior lower dorsal and lumbar) must involve the sympathetics, via the splanchnics, to the extent of profound metabolic disturbance, for in no other way can the results of osteopathy be explained.

1. Diabetes, p. 90.

The importance of specific treatment at this point cannot be over estimated.

Symptoms.—The **onset** is gradual; thirst and frequent micturition being the first symptoms noticed. After an injury or a sudden, severe nervous shock, diabetes may set in abruptly. As the disease progresses there will be marked thirst, polyuria, an abnormal appetite, wasting and debility. The tongue is dry, red and coated. There is constipation and the skin is dry and harsh. Temperature is often subnormal; pulse frequent with increased tension.

In some cases the **urine** is not increased in quantity; usually however, the amount varies from four to five pints to several quarts in twenty-four hours. It is pale in color, of high specific gravity and acid reaction. Sugar is present in variable quantities from one or two per cent to five or ten per cent. Sugar in the urine must be constant in order that the affection is a true diabetic one. Albumin is often present; urea is increased and uric acid may be slightly increased. Acetone-bodies are often found and usually indicate a more serious condition.

Diabetic Coma is the most important and gravest complication. There is either a sudden or gradual loss of consciousness. This may occur after some form of exhausting exercise. There may be previous headache or a feeling of intoxication. It may be preceded by nausea, vomiting, colicky pains or some local affections, such as pharyngitis or pulmonary complications. Peripheral neuritis, neuralgia, numbness, are possible symptoms. Impairment of hearing, cataracts, strabismus, diabetic retinitis and atrophy of the optic nerve may occur. The sexual function is lost early in the disease. Eczema, with burning and itching of the labia and vicinity, (and in men a balanitis), furuncles, boils and carbuncles are common. Gangrene and edema are not uncommon. Acute pneumonia, bronchitis and tuberculosis are possible complications. **Progressive loss of flesh** is a serious indication.

Diagnosis.—The diagnosis is easy, as there is no other disease with which it can be confounded. Careful urinalysis should always be made. Examination for acetone, diacetic acid and oxybutyric acid is valuable.

Prognosis.—Many cases have been cured by osteopathic measures while nearly all treated have been benefited. If the patient is put upon a diet free from carbohydrates, in mild cases the sugar will disappear, while in severe cases it will still be present. Mild cases usually yield readily to treatment. In cases over forty years of age the outlook is quite favorable,

but in cases under forty, and especially the young, the prognosis is not so favorable. In cases under puberty the results are apt to be fatal. Stout persons bear diabetes better than lean. All cases are liable to complications, which render the prognosis more serious. It is a disease of long **duration**, although death has occurred in a few weeks.

Treatment.—In nearly all cases of diabetes mellitus examined there have been found posterior conditions of the lower dorsal and lumbar regions. The posterior curve has always been fairly well marked and generally is a symmetrical curve. By that is meant a spinal curve that is not irregular and the relation of the various vertebrae, one to the other, is not seriously deranged. Correction of this condition of the spinal column has almost invariably given satisfactory results and in the majority of cases the condition of the patient has improved remarkably, and many entirely cured. To get the best results the patient should be laid on his side on the operating table and the knees drawn up so that the thighs are flexed upon the abdomen. The osteopath standing in front of the patient throws his weight against the flexed thighs and reaching over upon the spinal column springs the entire weakened portion of the spine toward its normal position, stretching the spinal column to separate each vertebra from its neighbor so that the deranged nerves, as they pass through the intervertebral foramina, may be released. Meeker¹ reports a case with a marked kyphosis which was treated two years before enough motion could be had between the vertebrae to produce any results, but after that they were favorable. Direct treatment to the abdominal organs to correct liver congestion and stimulate the pancreas and increase activity of the intestines is essential.

The nerves affected by the posterior pathological curve of the spine, mentioned above, and by separate lesions that may exist within the pathological curvature, are probably the vaso-motor nerves to the portal system, pancreas and the intestines. The vaso-motor nerves to the portal system branches are given off principally from the fifth to the ninth dorsal vertebrae, although fibres may escape from the cord as low as the first lumbar vertebra. The nerves to the intestines are given off principally from about the ninth dorsal to the lower lumbar vertebrae. Possibly there are nerve fibres direct to the hepatic cell protoplasm.

How lesions in the dorso-lumbar region cause diabetes mellitus is an important question and is hard to answer. An unnatural acceleration of the portal circulation may cause an increased quantity of sugar to pass to the liver, resulting in part of the sugar not being changed into

1. Journal of the American Osteopathic Association, Oct., 1904.

glycogen and thus passing into the circulation; or a paralysis of the vasomotor nerves to the liver causes congestion and slowness of the blood stream. Thus a disturbed circulation of the liver may cause accumulation of sugar in the liver, so that the blood ferment has time to act upon the glycogen and transform it into sugar; or there may be a saccharinity of chyle or blood in the portal vein, due to an impeded conversion of sugar in the intestines into lactic acid; or there may be an accelerated absorption of sugar due to an abnormal state of the intestines; or the nervous control to the pancreatic functions may be disturbed. Hence, one or many pathological changes may occur and influence a case of diabetes. due to a disordered dorso-lumbar region.

The center for the hepatic vasomotor nerves, "diabetic center," is in the floor of the fourth ventricle at the level of the origin of the vagi nerves. A lesion of the "diabetic center" or an obstruction to the pneumogastric anywhere along its course may cause diabetic symptoms; hence, there may be lesions of the cervical region that would affect reflexly the diabetic center, or lesions of the pneumogastric may occur, particularly at the atlas or axis, and cause diabetic symptoms, or, at least, these may influence the course of a case of diabetes mellitus. - Or the upper cervical lesions may disturb the pituitary gland which is of importance in carbohydrate metabolism.

There are nerves from the superior and inferior cervical ganglia of the sympathetic that have considerable influence upon the liver. These nerves do not pass down the cord to the splanchnics, but pass in the sympathetic to the celiac and hepatic plexuses and then to the liver. Stimulation of these nerves causes the hepatic vessels at the periphery of the liver lobules to become contracted. Possibly in a very few cases, a stagnation of blood in other vascular regions of the body may cause the blood ferment to accumulate in the blood to such an extent that diabetic symptoms occur.

Dietetic treatment is essential, but is not so necessary as some medical authors would have us believe. A regulated diet should be insisted upon in all cases, but one should not go to extremes in dieting. A complete elimination of the carbohydrates is no longer considered the best treatment, as it withdraws too important an element from the diet, producing weakness without any corresponding return for good. A patient's appetite is often inordinate and it will be necessary to regulate the quantity and character of foods. Proctor¹ mentions a case which recovered when carbohydrates were restored, as the patient was too starved

1. Journal of the American Osteopathic Association, Oct., 1904.

to build up. Under osteopathic treatment much more liberty can be allowed in selection of foods. Von Noorden¹ reported a number of cases in which excretions of sugar continued upon the strict anti-diabetic diet, but which were sugar free when they received a large amount of oatmeal along with some vegetable proteid or white of egg and butter, other carbohydrates being excluded. It is suggested by the editor of the Series that the oatmeal may be used alternately with diabetic diet, and relieve the monotony greatly. It can also be used as a test of the patient's digestive and sugar destroying powers. The following food may be included in the dietary:

Animal Foods.—Meats of every variety, except livers; game, poultry, fish and eggs.

Vegetables.—Cabbage, cauliflower, celery, lettuce, green string beans, the green ends of asparagus, tomatoes, spinach, mushrooms, cucumbers, watercress, young onions, or any other green vegetable.

Bread and Cakes.—Made of gluten flour, bran flour or almond flour; griddle cakes, biscuits, porridges, etc., may be made of these flours.

Beverages.—Skimmed milk, buttermilk, coffee and tea without sugar, and carbonated water.

Relishes.—Pickles, cream cheese and nuts of all kinds except chestnuts.

Fruits.—Oranges, lemons, cranberries, cherries, strawberries, all in moderate quantities.

Other foods may be used, but each case requires a thorough study in order to determine what is best to do.

Various foods should be tested out and controlled by urinalysis. The point is to increase metabolism so that the body can store up considerable carbohydrates without the appearance of sugar in the urine.

In severe cases Allen's fasting treatment to be followed by a low diet should be instituted. However, it should be remembered that the correction of dorsal and upper cervical lesions is invaluable.

Mental excitement and worry should be avoided as much as possible. Frequent bathing and regulated exercise will be of considerable value. The diabetic patient should have a well ventilated room and plenty of rest and sleep; flannels are to be worn next to the skin the year around.

Various symptoms and **complications** are liable to arise, which the competent osteopath is prepared to meet by following general rules.

Keep the bowels open. And frequently examine for acetone and diacetic acid. If there are any symptoms of **coma** fast the patient, and neutralize the acid intoxication with bicarbonate of soda until the urine is alkaline.

1. Practical Medical Series, 1905.

Diabetes Insipidus

(POLYURIA).

Definition.—A constitutional disorder in which there is a continued excessive secretion of urine, free from albumin and sugar. There is constant thirst.

Osteopathic Etiology and Pathology.—This disease is more frequent in males than in females. It occurs most commonly between the ages of twenty and thirty. It is due to chronic disturbances of the nerves. The lesions usually found upon osteopathic examination are lateral derangements of the vertebrae in the renal splanchnic region. (ninth to twelfth dorsal inclusive) or a slight kyphosis in the same locality. Such lesions probably affect the central nervous system in the region of the sympathetic nerves to the kidneys, by a paralysis of the muscular coat of the renal vessels. The disease may be associated with other conditions, as injuries and diseases of the nervous system elsewhere; exposure to cold; prolonged debility and fatigue; cerebral diseases, as meningitis, paralysis of the sixth nerve, tumor of the brain, and blows on the head; injuries of the cervical region; sunstroke; cerebrospinal fever; malaria; syphilis; pregnancy; hysteria; hereditary influences, and drinking too freely of cold water. There are many diseases and conditions which may be associated with diabetes insipidus; and which act as irritants, directly or reflexly, upon the center in the medulla oblongata (which is just above the diabetic center), or upon the sympathetic ganglia in the abdominal region. Thus, there is a vasomotor neurosis, due either to central or reflex lesions.

Second in importance to lesions of the renal splanchnics are lesions of the upper cervical region. Irritations in the cervical region may act upon the center in the medulla or the lesions may affect some of the sympathetic fibres as they pass from the brain to the renal sympathetics. The pituitary gland may be disturbed. Probably axis and atlas lesions are factors.

Lesions of the nerve centers and of the sympathetic ganglia have been found upon post-mortem examination, but they are not constant. Nervous lesions have been found in the region of the base of the brain. The kidneys are sometimes congested and enlarged. The tubules may be dilated.

Symptoms.—Great thirst and an enormous secretion of urine of a pale, watery and slightly acid nature are the characteristic symptoms. The skin is usually dry and harsh, the bowels are constipated, and the

appetite may be voracious. The health on the whole is quite perfect, although if the affection is not arrested, considerable loss of flesh and strength may result. There is a tendency for the disease to become chronic.

The nervous lesion causing polyuria may be the outcome of a debilitated condition of long standing or the symptoms may occur suddenly. Preceding the large flow of urine such symptoms as nervousness, irritability, headache, sleeplessness, failure of memory, and inability to concentrate the mind commonly occur. Other symptoms may be present in addition, as debility, diarrhea, epigastric and lumbar pains, and impaired sexual function.

Diagnosis.—The diagnosis is not difficult. Thirst, polyuria and the absence of albumin and sugar characterize the disease. In **diabetes mellitus**, finding of grape sugar in the urine would at once exclude polyuria. In **paroxysmal diuresis**, the increased amount of urine is not permanent. In **interstitial nephritis**, there is albumin, casts, etc.

Prognosis.—Depends upon the cause. The disease yields to treatment much quicker than diabetes mellitus and is without doubt much less serious. The disease, in a large majority of cases, can be cured. Under osteopathic treatment most cases will yield good results or be cured in from a few weeks to six months.

Treatment.—The treatment of the disease causing diabetes insipidus is of first consequence, but frequently such a disease is undiscoverable. There is often a tendency toward neurasthenia; consequently, habits, environment, etc., should be carefully attended to. Examine for sexual, rectal and other reflex irritations.

Correcting lesions of the renal splanchnics is important; in fact, in a fair number of cases treatment of this locality will entirely cure the disease. A very effective treatment, in addition to the ordinary methods of treatment, is to have the patient lie flat upon the back while the osteopath reaches around the patient on either side, placing the fingers firmly upon the transverse processes of the lower dorsal vertebrae and springing the spine forward by lifting upward on the patient, enough even to raise the patient from the surface he is lying on. This treatment is especially effective in lessening the increased amount of urine. Attention should be given to the false ribs on either side and to the condition of the spine below and above the renal splanchnics. The cervical vertebrae should be examined carefully for disorders, and if any are found they should be removed at once, if possible.

Hygienic treatment is of as much importance as in diabetes mellitus. The clothing should be warm, warm baths taken, and general friction and care of the skin utilized so that the circulation may be somewhat diverted from the kidneys. Restriction of water is not always necessary, except in cases where excessive drinking has become a habit, as the thirst is caused by the diuresis and not the diuresis by the large ingestion of water. Regulate the diet and see that the bowels are acting normally.

Rickets

RACHITIS

Definition.—A constitutional disease of children, characterized by impaired nutrition and changes in the growing bones, causing deformities. The physical growth is disturbed and the bone deformity is due to an over growth of cartilages and delayed calcification.

Etiology and Pathology.—Rickets may occur in the new-born, but it rarely begins before the child is six months old. It is a disease of the first and second years of life. Heredity is probably not a factor but certain races, especially the Negro and Italian, have a tendency to be rickety. The disease is much more common in the large cities than in rural districts; also it is more common in Europe than America. The disease is most frequently met with among the ill-fed and badly housed poor of the large cities, though it is not rare to find it among the well-to-do. Lesions to the digestive organs predispose. Breast-fed children seldom have the disorder. Improper or insufficient food (a diet too low in fats and proteins) bad air, want of sunlight, prolonged lactation, exposure to cold and dampness are predisposing factors.

Pathologically, the most marked changes are seen in the long bones and the ribs. The cartilage between the epiphysis and shaft is thickened and is soft and irregular in outline. Underneath the periosteum the tissue is spongy. Microscopic examination shows an increase of proliferation of the cartilage cells with scanty calcification. The bones are soft and there is a diminution in the calcareous salts. In a word ossification is delayed and the bones are not perfectly developed. In the cranium the frontal and parietal eminences are prominent, while the top of the head and the occiput are flattened, giving the head a square appearance. The fontanelles remain open until the second or third year of life. The ribs become affected very early. At the point where the ribs join the costal cartilages, bulging occurs, forming the so-called "rachitic rosary." The normal shape of the chest walls is markedly changed. Just outside the junction of the ribs with the cartilages, the

ribs fall in, producing a shallow depression, while the sternum and cartilages are pushed forward. The bones of the leg may be distorted. The normal curves of the spine are occasionally disturbed. The liver and spleen are often increased in size.

Symptoms.—The **onset** is slow. In many cases digestive disturbances, with their usual effect upon the nutrition, precede the appearance of the characteristic lesions. The child is irritable and restless, and there is usually slight fever and profuse sweats. The child is often languid, pale and feeble. The lymph gland are enlarged. The tissues are soft and flabby and skeletal changes begin to make their appearance. Among the first are changes in the ribs and head, already described under pathology. Changes sometimes occur in the bones of the face, particularly the maxillæ. Dentition is delayed. The spinal column is frequently curved antero-posteriorly or laterally. The long bones are curved and their extremities become thickened. The pelvis is distorted and twisted and in women this may seriously complicate labor. "Chicken breast" and "bow legs" are common, as well as muscular weakness, and the child walks late. The abdomen is large and prominent, due to flatulency and to the enlargement of the liver and spleen.

Diagnosis and Prognosis.—By observing the symptoms, diagnosis is not difficult. Prognosis should be guarded, owing to danger from other diseases; still, on the whole, prognosis is fairly favorable.

Treatment.—Rickets being a disease of malnutrition due to weakness of the digestive organs, improper food, or to influences of disease, the treatment must be principally following hygienic rules and good dieting. The child under six months, if not nursed satisfactorily by the mother, should be given diluted cow's milk. Salts may be obtained from barley gruel and whole wheat. Diluting the milk with barley water is highly recommended. Fresh meat juice and cream are invaluable. If curds are found in the stools, the digestion is not perfect and is usually due to overfeeding the child. The child should be out doors as much as possible. Fresh air is a necessity. The worst air outside is better than the best air of the house as far as purity is concerned. Protect the child carefully with warm clothes, and when sitting or walking the child should be supported. Baths will be found beneficial.

In the older child, beef juice, light meats, yolks of eggs, green vegetables and fruits may be given. Lessen the amount of carbohydrates. Careful osteopathic treatment of the various affected tissues of the child will aid a great deal in correcting deformities. Attention to the lesions found will also aid in increasing the nutrition to the involved tissues.

as well as correcting digestive disturbances. This, also, is of distinct benefit in improving the assimilation of lime salts. Possibly treatment of the "nutritional" centers, (fourth dorsal and fourth lumbar) would be effectual. Carefully guard against complications of the nervous and respiratory systems. After ossification the deformities may be corrected by the orthopedic surgeon, though in the young child considerable can be accomplished by repeated attempts at straightening by bending and molding the long bones. All those conditions which predispose to rickets should receive attention; chief among these is the care of the nutrition of the mother during pregnancy. Nursing should be regulated, and possibly future pregnancies discouraged.

Obesity

Definition.—Obesity is essentially a nutritional disease and is an inconvenient accumulation of adipose tissue in the body, sometimes impairing the bodily function. With some individuals obesity is a normal condition. In others it means impaired health, especially poor elimination.

Etiology and Pathology.—Heredity, overeating, sedentary habits, hot, moist climates are predisposing causes. Exciting causes are especially the eating of fat-making food, excessive use of alcohol and insufficient exercise. Obesity may follow the menopause or an infectious disease. Osteopathic lesions are frequently found in the upper and middle dorsal region. These probably are causes of a disturbed metabolism. An excessive diet of starches and sugars will indirectly act as a fat producer. In young people the possibility of hypopituitarism should be considered. Lesions of the upper cervical, in these cases, are frequent.

Pathologically, adipose tissue is deposited throughout most of the tissues. Usually the abdomen is encumbered with a large amount. Passive congestion probably favors the deposition of fat, for in cases of pendulous abdomen, simply drawing the abdomen in and up and the patient, through voluntary effort, keeping it up, will frequently cause absorption of the fat in a few days or weeks. The fat is distributed underneath the skin, throughout the viscera and about the heart. The tissues may suffer from fatty infiltration, especially the heart, arteries and veins; also the liver, kidneys and stomach. There is an increase of specific gravity of the blood. Edema occurs from passive congestion, due to weak heart.

Symptoms.—The round, fat face, double chin, hanging cheeks, large waist, the thick, prominent, sometimes pendulous abdomen, and the

bulky extremities form characteristic features. At first obesity presents no harmful symptoms. Usually the first troublesome symptom is increased frequency in the breathing, due to a weak and overworked heart, and to the fact that the motion of the lungs is hampered by the heavy chest walls, and also by the interference with the descent of the diaphragm on account of the enlarged liver. Dyspnea, passive congestion, anemia, poor digestion, uterine disorders, and mental inactivity are common. There is cardiac hypertrophy; later the heart is overlaid with fat. The pulse is usually frequent, but may be irregular and slow.

Treatment.—Obesity being a nutritional disease it seems but reasonable that alterations of the anatomical structures will produce a change in the proper balance of nutrition. Along osteopathic lines, derangement of tissues affecting the nerves to the digestive and lymphatic systems will produce obesity. In the majority of cases examined have been found disturbances at the sixth and seventh cervical, fourth and fifth dorsal and from the tenth dorsal to the second lumbar. Lesions at these points could readily interfere with the thoracic duct and the receptaculum chyli, as well as with the processes of digestion, assimilation and elimination. It is claimed that stimulation of the splanchnic nerves causes dilatation of the receptaculum chyli. Direct treatment to the abdomen and to areas of fatty deposit will aid very materially in absorption.

The **dietetic treatment** is essential, the principle being to furnish less food to oxidize. Restrict fats, sugar and starches and limit the amount of water. Alcohol should be prohibited. Another important point in the treatment is exercise, which must be carried out in a systematic way. Rules can be laid down only in individual cases and should be governed by the osteopath in charge. The principal effect of general mechanical treatment is to promote oxidation. Massage and baths are beneficial. The patient can do much for the abdomen by keeping it in and up, and walking erect.

Scurvy

Definition.—A constitutional disease, characterized by extreme general weakness, anemia, spongy condition of the gums, disintegration of tissue and a tendency to hemorrhages.

Etiology and Pathology.—In comparison with former times scurvy is now a rare disease. Lack of fresh vegetables or their substitutes, overcrowding, dampness, bad hygienic surroundings, and prolonged fatigue under depressing influences are the predisposing causes. Arctic explorers have shown that fresh bear's meat and bear's blood are a preventative.

There are extravasations of blood into the skin, muscles and mucous membranes. Hemorrhages may occur in the internal organs, especially the kidneys and liver, and in the serous membranes. The gums are swollen and spongy. The teeth decay. The spleen is soft and enlarged. Parenchymatous degeneration of the heart, liver and kidney is frequent. Ulcers occasionally occur in the skin and bowels. The blood is thin but there is no leucocytosis.

Symptoms.—The disease is usually slow in development. The general manifestations of anemia with debility are among the first symptoms. The gums are swollen, soft and spongy, they bleed easily and in severe cases there is ulceration. Petechial spots appear upon the body. Subcutaneous ecchymosis occurs, first on the legs, then on the arms and trunk. The eyes and face are swollen; the patient appears as if he had been bruised. Hemorrhages from the mucous membrane frequently occur. The temperature is usually normal. The pulse is small, feeble and frequent; sometimes irregular and slow. The appetite is impaired and constipation is present at first, as a rule, although this may be followed by scorbutic dysentery.

Diagnosis.—The disease is readily recognized when several cases occur together. It is somewhat hard to recognize in isolated cases, and to be able to distinguish it from certain forms of **purpura**. The etiology, the gingival changes and the hemorrhages usually decide the diagnosis.

Prognosis.—Scurvy being a disease due to malnutrition, it is necessary to remedy such condition by attention and correction of the faults producing it. Hygienic surroundings and a wholesome diet will do more in curing the disease than anything else. An out-door life and good ventilation with anti-scorbutics, as fruit juices, especially lemons and oranges, fresh vegetables, (onions, potatoes, etc.) and fresh milk, are necessary.

It is held by Garrod that scurvy is caused by an absence of potash, for a deficiency of potassium salts is found in the blood. The anti-scorbutics named above contain potash. A careful treatment along the splanchnics would help to improve the appetite and digestion. Treat the gums and ulcers according to surgical indications.

Infantile Scurvy

SCORBUTUS

This form usually follows the prolonged use of condensed milk, sterilized milk or proprietary foods for children. The disease occurs during the first two years of life, but it is most common from the seventh to the fourteenth month.

It develops rapidly. Joint pains, anemia and irritability are early symptoms. The child is pale, has a muddy complexion and may show signs of rickets. The gums may be soft and spongy. There is tenderness and pain on motion. There may be hemorrhages under the skin. The lower limbs are drawn up and motionless. The bones become thickened from sub-periosteal hemorrhage, and there is apt to be softening between the shaft and epiphysis. The back and legs become very weak. The lesions are usually symmetrical. The temperature is variable.

Treatment.—The treatment of scurvy in children consists in, first, omitting all proprietary foods and substituting fresh cow's milk, meat juice, strained gruel and a moderate quantity of fresh orange or lemon juice. Under this treatment, cases that have not progressed too far will promptly recover.

Northrop says: "It is a significant fact that the country which furnishes most of the literature on scorbutus in children is the same which is posted from end to end with advertisements of proprietary foods."

Purpura

Purpura is a symptom rather than a disease. It is characterized by extravasation of blood into the skin and bleeding from the mucous membranes, irrespective of direct injury. These extravasations do not disappear upon pressure and vary greatly in size. They may be small, (petechiae) or large (ecchymoses). They are bright red and gradually become darker. Clotting of normal blood requires three to five minutes, purpuric blood, ten to fifteen minutes.

It is a symptom of **infectious diseases**, as in pyemia, septicemia, mycotic endocarditis, typhus fever, smallpox, etc. **Toxic**, as produced by venomous snake bites and by **certain medicines**, as copaiba, mercury, quinine, iodides and others in overdoses. **Cachectic purpura** may be observed in cancer, tuberculosis, Bright's disease, scurvy, etc. In **senile purpura** the spots are generally confined to the extremities. In certain **nervous diseases**, bleeding spots appear on the skin, as in tabes, myelitis and severe neuralgia. **Mechanical purpura** is seen in venous stasis; this is rare.

Purpura simplex affects only the skin. It occasionally follows attacks of infectious diseases. The spots are found upon the legs, more rarely upon the trunk and arms. Articular pains may or may not occur. Fever is seldom present. Loss of appetite, diarrhea and slight anemia may be manifested. The duration is one to four weeks.

Purpura rheumatica is a much more serious affection, characterized by multiple arthritis of rheumatism. Seldom seen under five years,

and lasts about two weeks. The joints are swollen and painful and the temperature rises to 101 and 103 degrees F. The amount of edema varies greatly and occasionally it is quite excessive. In addition to the purpura there is usually urticaria. **Henoch's purpura** is seen most frequently in children and is characterized by severe gastro-intestinal disturbances as pain, vomiting and diarrhea, hemorrhages from the mucous membranes and acute enlargement of the spleen, in addition to the symptoms already named under the foregoing form. There is some danger of hemorrhage into the kidneys.

The disorder of **purpura hemorrhagica** is usually associated with rheumatism, malaria and other infectious diseases. This is the most serious form of purpura. It is most commonly met with in delicate girls during early life; but it may occur at any age and in the most robust of either sex. Fever, weakness, vomiting and diarrhea are the early symptoms. After a couple of days of languor and weakness, purpuric spots appear upon the skin; and bleeding occurs from the mucous membranes and may cause profound anemia. Hemorrhages into the internal organs occur. Favorable cases recover in ten days or two weeks. Others may end fatally. Care should be taken not to confuse the disease with scurvy.

Treatment.—In the treatment of purpura the disease from which it develops should receive due attention. Occasionally there is danger of overlooking the primary disease and treating some symptoms of the disease, although it is true that sometimes an important symptom is nearly all that is manifested. Outside of treating the conditions under which purpura arises, general measures should be considered, as a nutritious diet, rest, fresh air, and general treatment of the patient so that normal circulation and strength may be restored. The treatment of the purpura locally should be such as to restore normal circulation of the part by removing any obstruction or irritation of the blood supply that may be found, by careful manipulation of the tissues. As stated the management of the disease under which it arises should be embraced in the treatment. In cases of hemorrhage from various organs see article under hemorrhage. Some cutaneous hemorrhages are best relieved by local manipulation.

Hemophilia

(BLEEDER'S DISEASE).

Hemophilia is a hereditary condition manifested by a tendency to uncontrollable hemorrhage with or without injury. The usual mode

of transmission is through the female line, rather than by the male. The mother does not necessarily have to be a bleeder, but the daughter of one, in order to transmit the disease to her offspring. Atavism through the female alone is almost the rule. Not all the children of a bleeding family are afflicted; the male children are more subject to the condition than the female children. The tendency usually appears within the first two years of life. The families of bleeders are often large and are commonly healthy looking and have fine soft skins. It is claimed blondes are most likely to be afflicted.

Pathologically, an unusual thinness of the blood-vessels with a fatty degeneration of the intima has been noted. In many cases there is deficient coagulability of the blood and a lessened number of leucocytes. Hemorrhages have been found in and about the capsules of the joints, and in a few instances inflammation of the synovial surfaces. The arteries are situated superficially, but that does not explain anything. The real nature of the disease has not been determined. Emotional excitement is a factor, consequently vasomotor disturbances may be important. The frailty of the blood-vessels and the peculiar constitution of the blood preventing thrombotic formation are the two facts of importance that have been recognized.

Symptoms.—Hemorrhages occur from the most trifling injuries. Blowing the nose may cause severe epistaxis; the extraction of a tooth is a frequent cause of hemorrhage; the prick of a pin, a slight cut, a scratch, or a blow may result in profuse bleeding. The bleeding may occur spontaneously from the mucous membrane of the mouth, nose, lungs, intestines, etc.; or it may occur directly from the fingers, toes, back of the hands, and lobes of the ears. The hemorrhages may last several hours. As soon as checked the patients rapidly resume natural appearance providing the bleeding is not often repeated, thereby causing a permanent anemia. There may be attacks of arthritis with fever, as with acquired hemorrhagic tendency, closely resembling rheumatism.

Diagnosis.—Hereditary tendency and persistent hemorrhage from slight injury.

Prognosis.—In a few cases the tendency to bleed gradually diminishes until at last it entirely ceases. The younger the subject the more is it liable to prove fatal. In the majority of cases death occurs between the first and eighth years. After maturity the chances of an attack are much lessened.

Treatment.—Members of the bleeder's family, particularly the boys, should be guarded against traumatic influences, and operations

of all kinds should be avoided. Out-door exercise, fresh air, bathing and plain nourishing food, in fact, the hygienic surroundings, and all food should be carefully watched so that the threatened subject may become strengthened and hardened. Marriage should be discouraged, especially with the daughters, as it is through them the tendency is propagated. Possibly, coupled with the foregoing prophylactic treatment, a stimulation of the glands of elaboration of the blood will be of service to build up the physical constitution of the patient. During attacks absolute rest and the required symptomatic treatment should be given. For resultant anemia the usual treatment is to be employed.

In severe cases direct transfusion should be considered.

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DISEASES OF THE DIGESTIVE SYSTEM

Diseases of the Mouth

Stomatitis

Definition.—Inflammation of the mouth.

Etiology.—Chemical, mechanical, thermal or parasitic irritations; secondary to disorders of the gastro-intestinal tract, scarlet fever, measles and variola; cachexia, due to such diseases as cancer and phthisis; dentition; artificial feeding; hot weather and poor hygienic surroundings are the most common causes. Lesions to the innervation and vascular supply of the mouth are found, principally, in the upper cervical vertebrae, occasionally in the upper dorsal vertebrae and corresponding ribs.

Varieties.—Catarrhal, aphthous, ulcerative, parasitic, gangrenous.

Catarrhal Stomatitis

Etiology.—Most common in infants and children. Hot and irritating substances; secondary to diseases of the stomach, to measles, scarlet fever and variola; difficult dentition; alcoholic or tobacco excesses.

Hazzard says in all cases of stomatitis "there is generally lesion to the bony or other tissues in the cervical region (sometimes also in the upper dorsal), which deranges vasomotor control of the tissues of the mouth and tongue, obstructs venous return, weakens the tissues and lays them liable to the effects of some particular irritant, local or in the system, but there is, generally, lesion affecting the gastro-intestinal tract which is the real underlying cause of the trouble."

Symptoms.—Diffuse, red swelling of the mucous membrane, heat and pain in the mouth, increased flow of saliva, feter of breath, restlessness and languor. In children there is a disinclination to nurse and a slight fever may be present. The sense of taste is blunted and there is commonly a bitter taste in the mouth. The neck glands are enlarged.

Treatment.—Removal of the exciting cause is the most important point in the treatment. Good hygienic conditions must be enforced. The mouth should be kept clean. Wipe it out at frequent intervals with a soft piece of absorbent cotton and cold water. A borax solution is frequently used. Attention should be paid to the diet and secretions. Light but thorough treatment of the upper cervical region is to be given,

with careful attention to the tissues about and below the angles of the jaw, so that the innervation, blood and lymphatic supply may be equalized.

Aphthous Stomatitis

(CANKER)

This disease is characterized by little, painful, grayish-white spots upon the superficial layer of the mucous membrane. They consist, primarily, of an exudate of fibrin and wandered-out leucocytes. It is principally a disease of childhood. Among the common causes are difficult dentition, disorders of digestion and uncleanness of the mouth, such as neglect to cleanse the child's mouth after nursing. It may be a symptom of measles or of local diseases.

Probably the innervation to the region of the little grayish-white spots or canker is obstructed at some points by a disordered tissue. The lesion may be mechanical or it may arise from a disordered digestion. If one is able to locate such a lesion and remove it, a cure will be hastened. The seat of the infection is the internal surface of the cheeks, gums, roof of the mouth, tongue and lips.

Symptoms.—There is redness of the mucous membrane of the mouth, followed by the appearance of the vesicles with a red areola. Pain in the mouth and an increased flow of saliva occur. Mastication, deglutition, and even speaking, may be painful. This condition is followed by sleeplessness, feverishness, diarrhea and fetor of the breath.

Treatment.—Removal of the cause, as in other varieties of stomatitis, is paramount. Give attention to the food. The milk should be sterilized. The disordered digestion should be corrected at once. All secretions must receive prompt attention. The child should be nursed at regular intervals. Locally, keep the parts clean and carefully treat the innervation.

Ulcerative Stomatitis

This is a disease of children, although it may not be limited to them, as it occasionally occurs in epidemics and affects all ages. It occurs chiefly in the families of the poor and in places where the hygienic surroundings are bad, the food poor and personal cleanliness lacking. It may begin as an aphthous stomatitis. Often sufferers from severe, acute diseases are subjects of attack.

Symptoms.—The gums of the lower jaw are chiefly affected. They are at first congested, swollen and bleed readily. Pain is increased by mastication and deglutition, the mouth is hot, the breath fetid, the saliva dribbles and the digestion and bowels are disordered. The ulcers may appear at various points upon the cheeks, lips and tongue; the deposit is yellowish-gray.

In the more severe cases the gums are spongy and the teeth are loosened. In proportion to the constitutional disturbances, fever and enlargement and tenderness of the submaxillary glands occur. Even necrosis of the bone may follow.

Parasitic Stomatitis

(THRUSH)

The exciting cause is a fungus known as *Laccharomyces albicans*. It is claimed that a catarrhal stomatitis is the soil upon which the fungus develops. Parasitic stomatitis is chiefly a disease of nursing children and is promoted by unhygienic conditions. It is seldom seen after ten years of age, occurring in adults only in the last stages of consumption, cancer, and severe chronic diseases.

Symptoms.—Upon inspection there are seen numerous milk-white elevations. These appear first about the angles of the mouth, soon extending to all parts of the mouth, and in a few cases, even to the pharynx and to the esophagus. When removed bleeding points are left. The general symptoms of stomatitis are present—pain upon mastication and swallowing; fetid, hot breath; increased saliva; increased temperature; restlessness; swollen lips and disordered digestion occur.

Diagnosis.—The microscope will remove all doubt as to the nature of the affection. In aphthous stomatitis the ulcers are preceded by the formation of vesicles.

Prognosis.—Is favorable in the majority of cases.

Treatment.—Hygienic measures, absolute cleanliness, correction of the disorders of the gastro-intestinal tract and local treatment as in other forms of stomatitis, is the required treatment. A boric acid solution will be found beneficial.

SPINAL LESIONS AND THEIR RELATION TO DISEASES OF THE GASTRO-INTESTINAL TRACT

Acute Gastritis, Chronic Gastritis, Gastric Neurosis, Gastric and Duodenal Ulcer.

By CHARLES J. MUTTART

The instant relief that Osteopathy can give in acute indigestion is one of its outstanding achievements. It impresses the patient and his friends with a deep conviction of the superiority of osteopathic therapy. The results in these cases are not, in any sense, a matter of chance. They follow logically from the osteopathic viewpoint, teaching, reasoning, and practice. In dealing with the manifestations of disease, such as heredity, onset, course, duration, subjective and objective symptoms, etc., and in the effort to differentiate cause from effect, and to reconstruct a mental picture of the sequence of cause, effect and sequelæ, the osteopath has the advantage of binocular vision in that he recognizes two distinct pathologies co-operating to produce the symptom complex, syndrome or disease which he is called upon to treat. One pathology is to be found in one or more of the vertebral and rib articulations and the immediately adjacent or corresponding segments of the spinal cord. The other is in some one or more of the organs or tissues connected with the pathological segment or segments of the cord.

The function of the joint is MOTION.—Unrestricted normal range of motion is essential for the normal function of all parts of the articulation as well as for the nutrition of the nerve mechanisms immediately adjacent. When a spinal articulation ceases to perform its function all of its parts are more or less impaired, muscles atrophy, ligaments lose their tone, and circulation to and from the spinal segment is interfered with because action is a large factor in promoting the flow of blood and lymph and maintaining normal stimulus.

As a result of this spinal pathology, internal organs and tissues, supplied by nerves arising in the segment that is in lesion, will be variously disturbed in their function.

Dr. Carl P. McConnell says: "My observation of lesioned animals so far as the digestive organs are concerned is that the lesion affects the reflexes of and through spinal and sympathetic ganglia so that the vasomotors are involved with a consequent hyperemia of the submucous coat. This means involvement of the endothelial layer of the blood-vessels, diapedesis, derangement of the secretory function and dis-

turbance of the motor mechanism, all of which lead to functional upset and disturbance."

The dominant part played by the osteopathic lesion as a causative factor in acute and chronic diseases of the alimentary canal becomes increasingly evident as clinical observation and laboratory research permit a more thorough appreciation of the anatomy and physiology of the parts involved. The abnormal stands out more clearly from the normal. Finally, the task of restoring normality is becoming a clear-cut problem to which the correction of the osteopathic lesions furnishes an almost complete solution.

The normal alimentary canal transports food, macerating it, mixing it, and treating it with various chemicals and enzymes on the way, breaking it down physically and chemically, and absorbing from it such end-products as are needed to maintain metabolism. The abnormal alimentary tract may be at fault in any of these functions. This delinquency is generally traceable to a mechanical origin. Correction of the mechanical deviation is followed by restoration of normal function except in cases where extensive tissue changes have occurred.

Thorough mastication is essential to good digestion. Any dental defects or deficiencies should be corrected. **The temporo-mandibular articulation** should be examined, and full free motion restored if lacking. The muscles on the affected side are softer than on the sound side. Tonic spasm rigidly closes the mouth. It may be due to tetanus, caries of the lower teeth, cutting of the lower wisdom tooth, or other irritations to the sensory branches of the inferior maxillary nerve. There is enough space back of the wisdom teeth to pass a catheter to administer food.

The tongue assists in mastication and deglutition and is the seat of most of the nerves of taste. The hypoglossal nerve, which supplies it, leaves the skull through the anterior condyloid foramen and may be impinged there or lower in its course. **Lesions of the occiput and upper cervical vertebrae** and obstructions to the lymphatic drainage at the angle of the jaw may cause pressure on this nerve and cause disturbances in the movements of the tongue, atrophy, swelling, etc. Swelling may be due also to endocrine disturbance, constitutional diseases, anemia, glossitis, local irritants, injuries, etc. Pressure may be made on the hypoglossal nerve behind the angle of the jaw.

The special sense of taste plays an important role in normal digestion. The lingual nerve supplies the anterior two-thirds of the tongue with taste. The sense of taste may be lost, impaired, perverted or otherwise abnormal.

The sense of smell plays an important part in our appreciation of flavors, and when it is impaired by colds, adenoids, or other affections of the nose or pharynx, the sense of taste is measurably impaired. **Normalization of nose and pharynx** restores the sense of taste in such cases. Impairment or loss may also be due to lesions of the chorda tympani, or glosso-pharyngeal nerves. Lesions of the mandible, hyoid, occiput or upper cervical nerves, parotid disease or obstructed lymphatic drainage behind the angle of the jaw may cause pressure directly or indirectly on the glosso-pharyngeal and chorda tympani nerves. Perversion of taste occur in pregnancy, hysteria, epilepsy and insanity.

Foul taste, fetororis in the mouth is frequent in pneumonia, typhoid fever, peritonitis, septicemia and other severe fevers; also after ingestion of pungent foods or strong drugs; in constitutional diseases; as a result of inattention to oral hygiene, excessive smoking, mouth breathing at night, furred tongue, etc. It clears up on removing the cause.

Furred tongue occurs in gastritis, fevers, and a variety of other conditions. The fur is composed of broken down epithelium which would normally be removed by friction with solid food. When none is taken, the fur accumulates. When blood or hematin becomes mixed with the broken down epithelium, the fur is brown. Ordinarily it is white. **A clean red tongue** is frequently found in hyperacidity. It is probably due to vasodilatation due to hyperactivity of the autonomies or inhibition of sympathetics. The sympathetic supply is from the **superior cervical ganglion**. It may be affected by lesions of the occiput, atlas, axis and third cervical vertebra, of the hyoid, by anterior cervical muscular contractures, by obstruction to venous and lymphatic drainage and blood supply. Correction of the lesions named and normalization of the other structures involved will usually restore the tongue to normal condition.

The salivary glands have a two-fold innervation. The thin, full, watery, salty secretion is produced by activity of the cranial autonomic fibers; the sparse, viscous secretion containing the organic elements, ptyalin, etc., is produced by the sympathetics. **The sympathetic nerve supply** is from the middle and superior cervical ganglia and can be disturbed by lesions affecting them as mentioned above. The secretion of ptyalin may be disturbed by any lesion from the fifth dorsal up.

It must not be forgotten that a **posterior occiput** draws the superior cervical ganglion back against the axis and third cervical with just as much pressure as is exerted by an anterior atlas or third cervical. This pressure or stretching tends to inhibit it, preventing vasoconstrict-

tion and permitting vasodilatation of the internal carotid artery and its branches and congestion of the parts supplied, mid-brain, cerebrum, etc.

If, for any reason, the venous drainage from the lateral sinus into the internal jugular vein, or the ebb and flow of the cerebrospinal fluid between brain and cord, is reduced or hampered, an extra burden is thrown on the cerebral veins and sinuses, and the intra-cranial pressure is raised at each heart-beat, ultimately producing pressure on the meninges and causing violent headache over the fifth and tenth cranial nerves which supply the meninges with sensation. These nerves are intimately connected with the digestive system. Any increase of intra-cranial pressure causes increased irritability and hyperactivity of the cranial nerves, many of which are concerned with various functions of the digestive system. Moreover, the nuclei of these nerves lie on the floor of the fourth ventricle which is supplied mainly by the vertebral arteries and the basilar artery. Lesions of the cervical vertebræ affecting the plexus on the vertebral artery or filaments to it from the upper parts of the cervical gangliated sympathetic cord, may impair the blood-flow through the vertebral arteries and cause similar increased irritability of the nerve-cells in the medulla, mid-brain and cerebellum. Such disturbance is reflected in awkward movement, hyperesthesia, and symptoms due to increased irritability of the autonomic nerves such as slow pulse and respiration, watering of the mouth, hypersecretion and hypermotility of the gastro-intestinal tract, rapid digestion and poor assimilation, vasodilatation, impoverished blood, and so through a vicious cycle back to still greater impairment of nutrition to the nerve-cells within the cranium. Until the lesions are corrected, the condition becomes progressively worse till exhaustion occurs.

Ordinary medical hygiene can do little or nothing. The palliative remedies employed simply mask the symptoms, or actually accelerate the destructive process. Lesions that irritate the cervical sympathetics would cause vasoconstriction and give rise to opposite symptoms, namely, cerebral ischemia, decreased flow of saliva, atony of stomach, lack of digestive juices, sluggish intestinal peristalsis, rapid pulse and respiration, etc. Correction of the lesions and restoration of normal blood-supply and drainage to the brain and removal of any lesions tending to inhibit the sympathetics from the fifth dorsal up, will usually in a short time restore the activity of the salivary glands to normal. The otic and sphenopalatine ganglia can be disturbed by abnormal conditions within the pharynx. These must be corrected when found.

Deglutition, or swallowing, is a very rapid, highly complex movement. It takes not more than a second for the food to cross the pharynx. The soft palate and larynx are raised to close off the air-way, making the food-way practically continuous for the second needed to complete the transfer of the food across the air-way. The tongue is pressed against the roof of the mouth and the mylohyoid contracts vigorously and shoots the bolus of food across the pharynx. Bolting the food leads to serious digestive disturbances, not the least of which is the loss of the normal reflex which prevents swallowing unprepared food. When lost, this reflex can be restored by thorough mastication for three or four months.

The voluntary part of swallowing is performed by the motor portion of the fifth cranial and the hypoglossus. The involuntary part involves afferent impulses over the superior laryngeal and efferent impulses over the inferior laryngeal. The levator palati which raises the soft palate is probably supplied by the spinal accessory nerve through the pharyngeal plexus. This nerve can be affected by lesions of the occiput, atlas, mandible and hyoid, and by any obstruction to lymphatic drainage which increases pressure behind the angle of the jaw. In paralysis of the levator palati, as **afterdiphtheria** or other peripheral neuritis, fluids regurgitate through the nose during the act of swallowing. The raising and closing of the larynx is accomplished by the superior and recurrent laryngeal nerves by way of the pharyngeal plexus. Pain in swallowing is generally due to some inflammation or infection of the tonsil or pharynx. This does not occur when everything is normal from the fifth dorsal up.

The second and third stages of swallowing occur in the **esophagus**. The esophagus receives esophageal branches from the vagus, carrying autonomic fibers which contract its longitudinal muscles and dilate its arteries. It also receives sympathetic impulses from the plexus on the arteries which supply it. These sympathetic impulses convey vasoconstriction and constriction of the circular muscles of the esophagus. Any lesion from seventh cervical to ninth dorsal might affect the esophagus; probably fifth dorsal is the most nearly specific, as the heartburn which results from regurgitation into the esophagus is usually localized there.

Lesions of the upper six dorsal vertebræ interfere with digestion and nutrition in another vital way by reducing the activity of the lungs and consequent **intake of oxygen** into the system. If there is not sufficient oxygen to oxidize the proteins to amino-acids there will be harmful pro-

ducts left for the tissues to neutralize. Lesions of the third, fourth and fifth cervical affecting the **phrenic** may have a like effect. Sub-oxidation must be noted when present and treated by removing lesions affecting respiration, by deep-breathing exercises, and by diet rich in the needed mineral salts, and properly balanced. An improperly balanced diet changes the structure of the tissues and amounts in effect to an osteopathic lesion which causes disturbed function. It must be searched for, found if present, accounted for, corrected and kept corrected to obtain maximum therapeutic results.

The stomach, intestines and rectum are intimately related with the other abdominal viscera.

It will therefore be readily seen that any disturbance of the liver, gall-bladder, pancreas, spleen, duodenum, pleura or peritoneum will disturb the function of the stomach, and that any disturbance of any organ will disturb the function of the intestine. In fact, clinically, it would seem that the majority of cases can be accounted for by the lesions found, the stomach or intestinal disturbances which are regarded as reflex from some other organ, being in reality caused by the same lesion as disturbed the organ which first manifested disturbance.

Going more deeply into the nature of the mechanism whereby symptoms of gastro-intestinal disturbance are produced, we find that the alimentary tract has an ingenious conveyer mechanism with a number of sphincters. These are operated by intrinsic sympathetic or myenteric nerves, called plexuses of Meissner and Auerbach. In conveying food, impulses are passed from one portion of the tract to the next over these myenteric arcs. Normally the peristaltic movement is always forward because the point of highest irritability is at the proximal end. There is an exception to this rule in the ascending colon, where antiperistalsis occurs normally. When the irritability of a distal point of the alimentary tract becomes greater than the more proximal points, an antiperistaltic wave is set up causing vomiting. The myenteric activities are regulated by the autonomic impulses over the vagus, and by the sympathetic impulses over the splanchnic nerves. The autonomies contract the longitudinal muscles, dilating and shortening the tube. They also stimulate secretion of digestive juices and fluids and mucus and dilate the blood-vessels. The sympathetics contract the circular fibers and sphincters, narrowing and lengthening the tube, retarding the food, inhibiting the secretions and constricting the blood-vessels. The myenteric reflexes can continue after the vagi and splanchnics are cut. The vagi simply stimulate them and the splanchnics inhibit them.

The pathways are from the coeliac plexus where the vagi and splanchnics meet with various other plexuses on the arteries and following the courses of the arterial supply to the minutest parts of each organ. Each cell is surrounded by nerve fibers. Visceral-afferent fibers over both vagi and splanchnics convey impulses to the cord segments and medulla which modify the systemic blood-supply, drawing blood from the head and surface by constricting their arteries during digestion and filling the abdominal arteries. If opposite impulses should be received drawing blood away from the abdominal arteries, digestion would be interfered with. Any lesion or other condition causing hyperirritability or overstimulation of the vagus will result in overstimulation of the myenteric nerves, with vasodilatation, hypersecretion, contraction of the longitudinal coat, widening and shortening of the digestive tube, sluggish peristalsis but rapid movement of food through the sphincters, incomplete digestion and undernourishment. Inhibition of the splanchnic nerves will produce a like result. The opposite condition would come about as a result of inhibition of the impulses over the vagus to the myenteric nerves, or of overstimulation of the splanchnic nerves.

Inhibition of the splanchnic nerves may be secured by extreme flexion of the spinal column. This raises the cord in the spinal canal, lengthens it, stretches or draws on the nerve roots and vessels, squeezes the fluid out of the cord, and inhibits the splanchnics in two ways, first by a partial anemia or ischemia of the cord, and secondly by direct traction of the visceral afferent fibers in the posterior and anterior roots.

Conversely, stimulation of the splanchnic nerves may be secured by complete extension of the spinal column. This lowers the cord in the spinal canal, shortens it, releases the strain on the nerve roots and vessels, flushes the cord with blood, and tones up the sympathetic impulses in two ways, first by increasing their relative and absolute nutrition, through richer supply of richer blood, and secondly by releasing the nerve roots from strain, permitting free entry of afferent impulses over the posterior roots, and free exit of visceral-efferent impulses over the anterior roots.

Any lesion, inasmuch as it limits or alters the normal motion in a joint, produces an exaggeration or diminution of the normal spinal curves, and more or less lateral curvature. The altered equilibrium thus produced affects the viscera in three ways: 1. Mechanically, by pressure, gravity, altered position of ribs, vertebrae, diaphragm, etc.; 2. Reflexly, influence on nerves to and from affected segment; 3. Directly, by interference with nutrition of nerve-cells by hyperemia or ischemia.

There is always a functional kyphosis in visceroptosis or splanchnoptosis. The nerves in the cord are inhibited. The skeletal muscles are hypotonic, allowing the functional kyphosis to occur, and the visceromotor nerves are inhibited, allowing the abdominal viscera to become hypotonic and sag out of place within the abdominal cavity. The ribs are held up by the cervical fascia, and the abdominal muscles are held up by the ribs. The hypotonic condition extends to intercostals and abdominal muscles, with the result that the abdominal muscles are unable to play their part in maintaining the viscera in their proper places. The contraction or tonus of the abdominal muscles, the external and internal oblique, transversalis, rectus abdominis, diaphragm and levator ani, maintain the viscera firmly in position. It is only when the muscles of the abdominal wall have lost their tone that any strain or weight is thrown on the peritoneal and vascular supports. The inhibition of the restraining sympathetic impulses via the splanchnic nerves, allows hypersecretion and hypermotility of the alimentary tubes and further complicates the clinical picture by a colicky diarrhea or spastic constipation.

There are eight sphincters of circular unstriped muscle in the alimentary tract. Inhibition of sympathetic supply or increased autonomic supply causes sphincter insufficiency, overstimulation by sympathetic impulses or an insufficient supply of balancing autonomic impulses causes sphincter spasm, stasis, vomiting, fermentation, putrefaction, auto-intoxication. At each of these sphincters food is held back and controlled till the proper time has elapsed and the proper chemical environment is prepared for it in the next portion of the tract. Normal function of these sphincters is absolutely essential to normal metabolism and nutrition. The upper esophageal sphincter controls the entrance to the esophagus; the cardia controls the entrance to the stomach, the pylorus controls the entrance to the duodenum, the X-Ray shows a duodenal sphincter that controls the entrance of food into the jejunum. Here the food enters the long tract of the jejunum and ileum which measures twenty-five feet when the longitudinal muscles are relaxed and the circular muscles tonic, and which a short time later may measure only fifteen feet when the longitudinal muscles are contracted and the circular are relaxed. This section ends at the ileo-cecal valve, which controls the entrance of food into the cecum. There is the mid-colic sphincter about the junction of the proximal third with the distal two-thirds of the transverse colon, and the recto-colic sphincter which controls the passage from the sigmoid to the rectum. The rectum ends in the internal sphincter ani. There is some evidence of a ninth sphincter, the

mid-gastric at the point where the peristaltic waves of the stomach begin. Absorption takes place mostly from the ileum and jejunum and it is worthy of note that four of these sphincters hold the food up on its way into this part of the tract, and four of them hold it back on its way out. Any lesion may affect one or other of these sphincters. It is believed that antiperistalsis from the mid-colic sphincter to the cecum during digestion is normal permitting more complete absorption of nourishment. Yet here, after absorption is complete, and at all times elsewhere in the alimentary tract, peristalsis is normally forward because the point of highest irritability is at the upper esophageal sphincter and the irritability decreases as the tract is further from the esophagus.

When the splanchnics are inhibited and the vagus autonomic impulses are normal or increased, the intestinal sphincters from the pylorus down may all be incompetent, so that food passes along too rapidly to be properly digested and absorbed. This results in undernourishment.

Any lesion anywhere in the body will affect **peristalsis**. It begins at the lower third of the stomach where it joins the pyloric portion and goes forward to the internal sphincter and, being modified in its course by local conditions. Compensation may be established. Many cases of diarrhea and constipation are thus to be accounted for. **Diarrhea** is a symptom due to vasodilatation, hypersecretion and relaxation of the circular muscles especially at the sphincters. When these three factors are cleared up by correction of the lesions and hyper-extension of the spine, the diarrhea stops unless some other factor is at work to irritate the myenteric nerves or to excite the autonomies or inhibit the splanchnics. Lesions from the sixth dorsal down are usually accompanied at first by some diarrhea, which afterwards becomes constipation, through loss of tone in the longitudinal muscles especially in the distal part of the colon. In these cases, correction of lesions, and extreme flexion of the lower dorsal and lumbar spine will give relief while the body is returning to normal.

When gastric digestion begins, simultaneous action is set up in the ileum. When disease of the cecum, appendix or ascending colon is present, there is contraction of the ileo-cecal valve causing stasis of the lower ileum and disturbed or retarded action of stomach and duodenum. These reactions are brought about by impulses to and from the myenteric plexus. The sympathetic and autonomic nerves affect the motor system of the alimentary tract not directly but through the myenteric or Auerbach's plexus.

The **external sphincter ani** muscle is supplied by the pudendal nerve from the third and fourth sacral segments. It is in a state of tonic contraction, and having no opposing muscles keeps the anal orifice closed. The autonomic supply to the longitudinal muscles in the descending colon and rectum is from the second and fourth sacral. Inhibition here will, therefore relax the longitudinal muscles and external sphincter and permit free peristalsis in the descending colon and rectum. Pelvic disturbances may affect these nerves, or pressure due to visceroptosis, etc. The circular muscles of this section are supplied from the lumbar cord. They may be affected in any lumbar lesion, with the end result of spastic constipation by reason of a shortened markedly distended descending colon, sigmoid and rectum, and little peristalsis because of inhibition of the circular fibers, and contraction of the external sphincter ani.

The fundus of the stomach, lying in the left dome of the diaphragm, always contains a cushion of air which supports the left dome of the diaphragm, as the convexity of the liver supports the right. Normally the air is regulated and causes no symptoms. A lesion, usually of the mid-dorsal or lower dorsal segments may inhibit the circular fibers and permit distension, which becomes enormous when the pylorus is obstructed. The shortness of breath, palpitation of the heart, etc., accompanying this distension are probably due to pressure on the heart and lungs from which the stomach is separated only by the diaphragm.

Eighth, ninth and tenth dorsal lesions play a large part in peptic ulcers by permitting hyperemia, hypersecretion, and lowered vitality of the mucosa, and pyloric incompetence or spasm, because the pylorus, pyloric end of the stomach and first part of the duodenum get their chief sympathetic supply from the ninth and tenth dorsal segments of the cord. The tenth vertebra is more freely movable than the higher dorsal joints and is therefore more frequently in lesion, which helps to account for the greater frequency of duodenal ulcer.

The main sympathetic supply to the appendix seems to be derived from the eleventh dorsal segment. The appendix has the same motor and secretory mechanism as the rest of the alimentary tract but is richly supplied with lymphoid follicles. One of the twigs from the eleventh dorsal nerve pierces the rectus muscle to supply the skin at McBurney's point, thus explaining the great frequency of pain and cutaneous hyperalgesia at this situation in appendicitis. Lower dorsal and upper lumbar lesions are unquestionably causes of many cases of appendicitis and other obscure diseases traceable to appendicitis. Correction of

these lesions has restored the appendix and related structures to normality in hundreds of cases.

Sensory reflexes are shown in hyperalgesia and pain or tenderness in the abdominal skin and muscles and the parietal layer of the peritoneum from the ensiform cartilage to the pubes in an area extending about two inches on each side of the mid-line, corresponding to the distribution of the twigs of the lower six thoracic nerves which supply sensation to this region. **Esophageal** disturbance at the cardia causes pain in the region supplied with sensation by the fifth and sixth dorsal, near the ensiform. **Gastric derangement** causes pain midway between the ensiform and umbilicus, which radiates to the left, in the area supplied by the eighth dorsal. **Hepatic disturbance** causes pain on the right of the median line, radiating to the right in the sensory distribution of the ninth dorsal. **Intestinal pain** is located in the sensory distribution of the tenth dorsal nerve in an oval area around the umbilicus. Pain due to **duodenal ulcer** is sharply localized at a point about an inch or two above and to the right of the umbilicus where twigs of the tenth dorsal nerve come to the surface. This point corresponds closely to the normal position of the underlying duodenum, though the duodenum may be displaced, and the sensitive spot remain at the same point. The pain from **fundal gastric ulcer** or **carcinoma** is usually localized sharply about an inch or two to the right of the median line mid-way between the ensiform and umbilicus, at the spot where the twigs from the eighth dorsal nerve pierce the rectus and come to the surface. In the disease of the **pylorus**, reflex pain is lower; of the **cardiac end**, higher. The reflex pain at McBurney's point in **appendicitis** has been referred to, but it must be borne in mind that pain from disturbance in the **colon** also shows in the sensory distribution of the eleventh dorsal nerves midway between the umbilicus and pubes. Pain may also be referred to areas supplied in the back by the corresponding segments. These reflex pains can usually be stopped by inhibiting along the spine corresponding to the sensory area affected. This reduces the impulses entering the posterior roots and lowers the irritability of the segment.

The **motor reflexes** from gastro-intestinal disturbances result in muscular contractures of spinal, abdominal and other muscles supplied by motor nerves arising in the anterior horn of the segment which innervates the part of the viscus that is affected. Stomach, liver, gall-bladder, pyloric and duodenal disturbances cause increased tone, contraction, contracture and rigidity of the rectus muscles above the umbilicus, for instance, and the other viscera contract it in lower portions. More

important are the extreme contractures of the musculature of the back which is supplied by the segments which supply the affected part of the viscus. These contractures produce some distortion and loss of motion in spinal joints and thereby produce the same effects as primary lesions, causing widespread disturbance which persists until the spinal musculature is normalized. In **colic**, the lumbar segments being involved, there is marked contraction of the ilio-psoas which causes the characteristic drawing up of the thighs on the abdomen, while the extreme contraction of the rectus abdominis draws the thorax down.

Most persistent vomiting may arise reflexly from other organs as in so-called biliousness, jaundice, pregnancy, brain affections, appendicitis, onset of acute infectious diseases, alcoholism, sea-sickness, colic, hernia, intestinal obstruction, migraine, shock, and anesthesia. Irritation of any sensory branch of the vagus or of nerves which connect with it in the medulla, or reflexly from consciousness via the cerebral cortex, as in the case of nauseating sights, smells, tastes, as well as irritation from any viscera innervated from the sixth dorsal down, may overstimulate the corresponding efferent nerves going to parts of the alimentary tract supplied by that segment, increase its irritability and start antiperistalsis. Similarly disturbances in almost any viscus may reflexly disturb the normal balance between sympathetic and vagal autonomic stimuli resulting in hypersalivation, hyperchlorhydria, pylorospasm, distension, gastric atony, gastrosulcorrhea, enterocolitis, spastic constipation, achylia, or colicky diarrhea. In these cases, the derangement of the viscus reflexly disturbs the alimentary tract through central nerve connections. Correction of the primary trouble is followed by removal of the reflex symptoms. In this connection it is important to note that the visceral reflex symptoms may arise from irritation of the alimentary tract by improper diet, poor cooking, or wrong combinations. Carbohydrates digest quicker than proteins, and these more rapidly than fats. Food is handled by the fundus in the order in which it was swallowed. If the fats are swallowed first, the starches may be held up for five or six hours, subjected to the acid stomach secretions and allowed to ferment causing distension, which reflexly produces a variety of symptoms.

Mental exertion, strong emotions, heavy physical exertion, interfere with the function of the alimentary tract and set up disturbances in the balance of sympathetic and vagal autonomic impulses, through the nervous reflexes via the cortex, and through the demand for blood,

which impoverishes the abdominal circulation at a time when it needs all the blood it can get. The ischemia produced in this way has about the same effect as ischemia produced by a spinal lesion. Conversely, disturbances of the alimentary tract produce profound changes in character and personality, by reflexes to the cerebral cortex causing dullness of perception, in all the senses, poor memory, sluggish thought, erratic judgment, irritable disposition, fear, worry, lack of ambition, indecision, lack of energy, vacillation, and finally a psychosis in which manic-depressive symptoms are balanced by paranoiac symptoms.

The alimentary tract is so intimately bound up with the whole stream of vital activity, whether vegetative, sensorimotor, or psychic, that any disturbance of body or mind is likely to affect it in some part, and conversely any disturbance of the alimentary tract is bound to affect all the rest of the body and the mind. A satisfactory classification of its diseases is therefore difficult to make, but the one here adopted is probably the best for the purpose. The early stages of gastro-intestinal diseases are often so similar that it is nearly impossible to differentiate them with certainty; the classification is therefore based on the clinical picture and pathology of advanced stages. Fortunately, with the exception of cancer, diseases treated in the early stages usually clear up when the lesions are corrected, and the necessary attention given to the other causative factors present.

Acute Gastritis

Acute dyspepsia is one of the frequent disorders of the stomach. It may occur as an early symptom of an infectious disease, but very often it is due to some non-specific irritation. The usual exciting causes are errors of diet, over-indulgence in improperly cooked and highly seasoned food, or food that has been spoiled, such as meat, fish and milk, or over or under ripe fruit. Food that is either too hot or too cold may develop an attack. Alcohol is a common cause in those not accustomed to its use. Overuse of tobacco may bring on an attack. Many acute "bilious" attacks are brought about by some mental shock or excitement at the time of taking food, for it has been shown by the researches of Pawlow that both gastric motion and secretion are altered by mental irritation during digestion.

Unquestionably osteopathic lesions of the splanchnics and vagi are important predisposing factors. These lesions produce a lowered resistance of the tissues, which will frequently explain why certain excit-

ing factors that will initiate an attack in one individual will not do so in another. A healthy mucosa will not be so readily irritated by either indigestible or partly decomposed food.

Osteopathic experimental work reveals that the vertebral and rib lesions readily affect both the spinal nerves and the sympathetic ganglia, which is followed by vasomotor and trophic disorder to the mucous and submucous coats of the stomach, as shown by ecchymosis and hemorrhage of the submucosa and beginning parenchymatous degeneration of the free ends of the glands of the mucosa. Upon the other hand irritation of the muscles from dietetic errors always causes more or less contraction of the muscles in the upper and middle dorsal, which, in turn, may produce through imbalance of tension and fibrositic changes, constant interosseous lesions and thus be the cause of the catarrh becoming chronic. This vicious cycle phenomenon should not be overlooked. Visceromotor, viscerosensory and viscerotrophic reflexes may be factors in the pathogenesis of the osteopathic lesion.

Pathologically, the mucous membrane is more or less covered with mucus. Upon removal of the mucus the membrane is found red and swollen, and the epithelial cells of the glands are granular. This is especially noted in the pyloric area. There are minute extravasations of blood and hemorrhages of the mucous coat, and infiltration of the submucous layer.

Symptoms.—Acute gastritis occurs at all ages, so particularly in children care has to be taken that the attack is not the beginning of some infectious disease. A careful inquiry into the history, and examination of the vomitus will usually make the diagnosis clear. The sudden onset of nausea, vomiting, pain in the epigastric region referred to the back and head, vertigo in some cases, if the infections can be ruled out should leave no doubt as to the nature of the disorder.

Other symptoms are weakness, and chilliness which later if the attack is severe, is followed by fever. The tongue is coated, the lips dry, and there may be herpes. Belching of gas, constipation in some and diarrhea in others, and dark colored urine are noticeable. There is tenderness on palpation over both the stomach and splanchnic areas. Examination of the stomach contents show deficient hydrochloric acid, the presence of organic acids, bile and undigested food, and considerable mucus.

Diagnosis.—In young children acute gastric indigestion is common, though a casual gastritis is rare. In the former prostration, vomiting,

and undigested, greenish stools are noted. In some cases there is no fever, while in others it may range from 102 to 105 degrees. In all cases care should be taken, as has been stated, that the attack is not the beginning of some infectious disease. Appendicitis, acute bowel constriction, pregnancy, uremia, meningitis, gall-stone colic, and gastric crises of tabes dorsalis should be differentiated. Most attacks of acute dyspepsia are over in twenty-four hours. The prognosis depends upon eliminating the cause. The X-ray may be of value in protracted cases.

Treatment.—If the case is seen early, emptying the stomach by induced vomiting or the stomach tube is the first indication. If several hours have elapsed and much of the stomach contents have passed into the intestine, emptying the colon with an enema will commonly give quick relief. Withhold all food for from twelve to twenty-four hours, or longer if necessary. In some cases the sipping of hot water will be beneficial, while in others pellets of ice in the mouth will give some relief.

Whether or not there existed previous spinal lesions there will always be found muscular tension and spinal rigidity during an attack of acute gastritis. These should be corrected for immediate relief, but what is of greater importance, if these acute lesions are not corrected the patient's recuperative forces are interfered with and recovery is delayed. Then, also, these lesions tend to chronicity and predispose to future attacks. Treatment should be given daily, or oftener if special indications arise. Though the most common area that demands attention is from the fourth to tenth dorsals, still the vagi nerves, especially the right, should not be neglected. Lesions of the upper three cervicals are the most frequent disturbances of the vagi.

Vomiting is a common and distressing symptom. Pathologically, it is due to an antiperistaltic contraction of the stomach and a spasmodic contraction of the diaphragm and the abdominal muscles. It is caused, usually, by irritation of the vagus in the stomach, or in the pharynx by irritation along the spine (particularly in the cervical and upper dorsal regions), or to the sympathetic nerves or to various parts of the body, or by direct influence of the brain. Relief can usually be given by inhibition of the vagus in the occipital region or by inhibition at the fourth or fifth dorsal vertebra on the right side. In a few instances, placing the patient in the knee-chest position and gently raising the abdominal organs gives relief. If this does not suffice the stomach and colon should be emptied, providing the vomiting is protracted. A frequently effective measure for nausea and vomiting that can be carried out by the attendant, is the application of hot fomentations to the dorsal spine.

Flatulency may be very distressing. The spinal treatment may be sufficient to control this condition, or careful direct pressure for a few minutes over the pit of the stomach. Adjustment of the lower ribs, especially of the left side, may be effective. Occasionally the gas can be passed into the intestines by careful inhibitory treatment in the region of the eighth and ninth dorsals. The inhibitory treatment causes relaxation of the pyloric orifice; also, inhibition of the left vagus relaxes the pylorus. Inhibition at the sixth and seventh dorsals relaxes the cardiac orifice, thus favoring the passing of the gas from the stomach out through the esophagus.

In all cases subject to gastritis the dorsal spine should receive considerable attention in order that recovery may be complete. The habits of the patient should be thoroughly regulated and over-fatigue guarded against. And, also of special importance in recurring attacks, is the fact that a number of cases present some derangement of the biliary tract, or duodenum, or the appendix region.

Diet.—After twenty-four or forty-eight hours, if the attack has been severe, albumin water may be given in small quantities; also whey, milk, bouillon, and chicken or lamb broth. If there is no return of gastric distress, add junket, custard, cornstarch pudding, gelatine, dropped eggs, scraped beef, and white meat of chicken; vegetables purees made with cream or meat stock are usually well borne at this time. Foods containing much cellulose, fats and sweets should be withheld until all symptoms have subsided.

Chronic Gastritis

It is unnecessary here to repeat the causes of acute gastritis, any one of which continued over a long period of time will cause chronic catarrh of the stomach, as it is sometimes called.

Spinal and rib lesions anywhere from the occiput to the coccyx, but more particularly from the fourth to the tenth dorsal, will predispose to chronic gastritis, the particular type and degree of local pathology depending upon the exciting factor.

A commonly found *en bloc* lesion is a flattening of the normal convexity in this region, with more or less immobilization, shown by attempting to reestablish the normal convexity through flexion.

In addition there may be single spinal or rib lesion in the same area, or cervical lesions affecting the pneumogastric, which is the secretory nerve to the stomach. (See chapter on the "Lesion and Its Applied Anatomy.")

Pathology.—Chronic gastritis probably never develops as such without going through several preliminary stages beginning with alimentary hypersecretion, or hypersecretion occurring only during the active period of digestion. These are the cases usually classified as hyperchlorhydria. At this time no actual pathology can be demonstrated in the glandularis.

If the condition is not treated intelligently at this time the next step will be periodic attacks of what is known as "hypersecretion periodica chronica" followed by "hypersecretion continua chronica." The stomach contains abnormal amounts of gastric juice even after a night's rest. At this stage there is a transition from the functional to the organic condition. All stages are characterized by an abundant secretion of mucus.

If allowed to go on there will finally result a destruction of the secreting cells known as Atrophic Gastritis or Achylia Gastrica in which the stomach presents a smooth functionless appearance.

Secondary Chronic Gastritis.—Portal obstruction from any cause predisposes to chronic gastritis. The most common of these is failing compensation in heart lesions, which through back pressure causes portal stasis; the same thing may follow obstruction in the liver itself. Chronic gastritis is also a late accompaniment of the nephritic trinity, kidneys, heart and arteries. It may also be associated with diabetes, gout, anemia and other constitutional disorders.

Tuberculosis is commonly ushered in by symptoms of chronic gastritis. We should be constantly on the alert to avoid the mistake so commonly made of treating the stomach as an entity and overlooking the real trouble in some other part of the anatomy.

It is probably safe to say that there are only two primary diseases of the stomach, ulcer and cancer. All others are suspiciously associated with diseased processes elsewhere, and when the spinal lesion is given its full significance even these will be found to be directly traceable to anatomical perversions somewhere within the mechanism of local nutrition.

Symptoms.—These are governed by the stage of progress in which the patient is seen. During the stage of hypersecretion of acid gastric juice there will be vague feelings of distress, fullness and burning in the stomach, and "heartburn" during digestion. When the stomach is empty all symptoms will subside. Later there will be periods of a few days or weeks when there will be more or less continuous distress with some vomiting of highly acid gastric juice containing mucus.

When the condition has progressed to the stage of continuous hypersecretion there will be continuous symptoms as above, but with nausea, vomiting becoming more frequent especially late at night or in the morning, always accompanied by sticky mucus.

Appetite is variable, there is often a disagreeable taste in the mouth (the "dark brown" taste of the chronic alcoholic). Heart palpitation and vertigo and other vagus symptoms are common.

Diagnosis.—On physical examination the stomach is found distended, and in some cases displaced (gastroptosis). There will be diffused tenderness on pressure over the whole organ which should help to distinguish it from gastric ulcer or cancer in which the tenderness is quite localized.

Chronic gastritis cannot be **positively** diagnosed without making a gastric analysis. Many cases are wrongly diagnosed through neglect of this very important procedure.

The cases in which gastric analysis should be made are so well stated by Lockwood that we will take the liberty of quoting them in their entirety.

"(1) Gastric analysis should always be made in every case of dyspepsia, no matter whether these symptoms be apparently gastric or intestinal, unless passage of the tube is contraindicated.

"(2) Gastric analysis should be made in every case of chronic diarrhea that is not due to evident disease of the colon or rectum.

"(3) Gastric analysis should always be made in all cases of intestinal toxemia, or recurring headache of toxic origin, and in patients who complain of the symptom-complex which is spoken of by the laity as 'biliousness'.

"(4) Gastric analysis should be made in all cases of anemia and general physical wretchedness without known cause and which are rebellious to treatment."

The finding of excessive gastric mucus intimately mixed with food remnants is the chief differential point in the diagnosis of chronic gastritis.

Differential Diagnosis.—A complete statement of differential diagnosis by Kemp cannot be well improved upon.

"**CHRONIC GASTRITIS.**—No severe pain, no circumscribed spot, painful to pressure; no hematemesis; no cachexia; no marked emaciation, except in severe cases of long duration; free hydrochloric diminished or absent; gastric mucus present; slow course.

"**ULCER OF THE STOMACH.**—Hyperchlorhydria present, but not invariably so; severe pain in the epigastrium with intervals free from pain when stomach is empty; local tenderness which is circumscribed; dorsal pain; hematemesis, or occult blood in the stool or gastric contents; microscopic pus; no mucus; patient has appearance of suffering; no true cachexia.

"**CANCER OF THE STOMACH.**—Age usually over forty-five; rapid course; free hydrochloric acid usually markedly diminished or absent; lactic acid present; pain generally continuous, but not so acute as in ulcer; Boas-Oppler bacillus; cachexia; tumor on physical examination; small amount of visible or occult blood; hematemesis much less than ulcer; foul odor to vomitus at times present.

"**ACHYLIA GASTRICA.**—Slow course; scarcely any gastric juice; acidity very low or entirely absent; absence of pepsin and rennin; usually no mucus or lactic acid.

"These differential considerations apply to typic cases, and the observer must be on the qui vive for various gradations and modifications of these clinical pictures."

Prognosis.—The outcome of chronic gastritis depends upon our ability to locate and remove every factor in the etiology, the willingness of the patient to cooperate and the patience and resourcefulness of the physician. At best the progress is slow and one must expect temporary setbacks usually due to failure of the patient to carry out instructions.

Treatment.—The most successful treatment is prophylactic, but until the public has been educated up to this form of economy we must begin with conditions as we find them.

First get the patient's confidence by making an intelligent examination, a scientific diagnosis, and a reliable prognosis based upon your findings. All lesions, bony, ligamentous, muscular and psychic must be intelligently and carefully removed.

Specific lesions which would directly or reflexly interfere with the nerve and blood to the stomach must be corrected.

The rigidity commonly found in the vertebræ and ribs of the splanchnic area must be overcome first by specific adjustment, and the normal flexibility maintained by teaching the patient proper exercises for the purpose. This should include deep breathing with the spine flexed to the limit, and the ribs fixed, by the patient reaching around as far as possible and grasping the ribs as described by Dr. Harry Forbes. This will tend to overcome the flat dorsal so characteristic in all gastrointestinal conditions.

Direct manipulation over the stomach has no particular value and may be even harmful.

Inasmuch as nausea and vomiting and excessive gas formation are only the result of hypersecretion we cannot expect to give more than temporary relief except by methods which remove causes. Much comfort may be given by inhibition in the splanchnic area. In severe cases it may be necessary at times to wash out the fermenting, irritating mass by gastric lavage. Outdoor life, frequent vacations and change of occupation are often of decided benefit.

Diet.—Indiscretions of diet must be avoided and this cannot be too positively impressed upon the patient. It is always best to make a list of foods to be taken for breakfast, lunch and dinner and insist that no other foods be taken without further instruction.

Just what these foods shall be depends upon the gastric secretions as shown by gastric analysis. They should always be nutritious and given in quantities sufficient to maintain nutrition.

The stomach should have rest and yet is expected to do its part in the process of digestion. All foods must be given in a finely divided form and well masticated to spare the stomach the mechanical effort of grinding.

In hyperacid gastritis all foods of an irritating nature must be positively prohibited. The classical breakfast of grapefruit, oatmeal, ham and eggs and coffee will not do. Starchy foods must be reduced owing to their tendency to ferment in the presence of highly acid juice and the delay in the stomach due to the high acidity.

In subacid gastritis advantage must be taken of the fact that carbohydrates digest well and proteins do not.

Diet for Hyperacid Gastritis.—Before breakfast: Wash the stomach with warm water and an ounce of Phillips Milk of Magnesia, allowing the water to remain in the stomach 20 minutes or a half hour, lying down and turning from side to side on the face in order that the water and magnesia may be brought in contact with all parts of the stomach.

For breakfast: Prunes, allowed to simmer for four hours, without boiling, and put through a colander, to remove the skins. Soft cereals, such as farina, cream of wheat, or wheatlet, thoroughly cooked, and served with middle heavy cream, no sugar. Two eggs, soft boiled, or poached. Zweibach, thoroughly masticated, with a liberal quantity of butter. Cocoa (Phillips).

Luncheon: Puree of peas, beans or lentils, made with cream. Asparagus, green peas, boiled rice, spinach chopped very fine, creamed car-

rots, boiled onions, baked potato, well done. Chicken, boiled lamb or beef, ground; oysters in any form but fried; fresh fish. Desserts: Choice of junket, cornstarch, custard, rice pudding, floating island, gelatine or tapioca.

Evening meal: Same as luncheon except substituting eggs for meat.

Cup of hot water before luncheon and dinner.

If patient requires quick building up give milk between meals and at bedtime.

Gastric Neuroses

Gastric neuroses include **motor**, **sensory** and **secretory** derangements. Though the sensory disturbance is often the most marked, still motor and secretory symptoms are usually present. In other words there is commonly a complex of the different forms.

Where gastric neuroses can be positively diagnosed, by a process of elimination, there is no more plausible explanation than that of the spinal lesion. The success of osteopathic physicians in treating so-called "stomach trouble" proves conclusively the superiority of the osteopathic method. A note of warning should be sounded, however, for as diagnostic methods have become more exact it is found that many cases which were formerly diagnosed as neuroses prove to be referred from some organic change, such as infected gall bladder, appendix, tube or ovary, tonsil, tooth or sinus. It has been proven that many cases of sensory and secretory disturbances have entirely cleared up when these causes have been removed. Though infection may play an important role, still in some instances, especially gall bladder, duodenum and appendix, the gastric neurosis may be simply due to a nervous reflex.

Gastrop $\ddot{u}$ sis, atony, and in many cases splanchnoptosis, has been found to be the underlying cause of many hitherto unaccountable gastro-intestinal symptoms.

Gastric crisis of locomotor ataxia if not properly diagnosed by the finding of the other well known symptoms may give us much trouble and discouragement.

Ulcer and cancer have quite characteristic symptoms, yet it is well known that they are often treated as neuroses in the early stages, much to the detriment of the patient, especially if the case proves to be cancer.

In the **sensory** disturbances, which are probably the most common, hyperesthesia and **neuralgia** are the special features. In the former a feeling of weight, fullness and burning are complained of, which are fre-

quently manifestations of a neurotic temperament. In fact, hysteria and neurasthenia are very often basic conditions. The same is true in gastrodynia, where the pain starts in the pit of the stomach and extends around the lower chest and ribs. There may be other neurotic symptoms such as excessive hunger and a constant desire for food. Menstrual irregularities, the menopause, worry, constipation, and anemia are important factors. Special care should be taken that there is no organic disorder of the gastro-intestinal tract or of the nervous system.

The **motor** neuroses comprise a variety of derangements. Excitation of the motor functions of the stomach, as a direct result of irritated nerves or of reflex stimuli, are not uncommon. Owing to this the food may not remain in the stomach long enough or the stomach activity may be too pronounced. There may be also more or less rapid vomiting of the food, without any particular strain. Other motor neuroses may be spasms of either the cardiac or pyloric sphincters, and in a few instances there may be atony of the stomach walls. Although these conditions may be of a neurotic character, still great care should be taken that some organic disease is not basic.

The **secretory** derangements consist of hyperacidity, supersecretion, and lessened amount of acid secretion or achylia gastrica. Many of these cases are associated with hysteria and neurasthenia, though in achylia gastrica, cancer may be the cause. Hyperacidity may be associated with ulcer. Pelvic diseases, nervous reflexes from the gastro-intestinal tract, constipation, and anemia are to be considered as possible etiological factors.

Diagnosis.—These cases require the most painstaking inquiry into the history, the most complete physical examination, and all findings carefully checked up by laboratory tests.

Inquiry will often show that all symptoms subside when on a vacation with a change of scene and climate.

Lockwood gives the following rules for arriving at a diagnosis of "nervous indigestion."

"(1) A diagnosis of nervous indigestion should not be made in the presence of more than 30 c. c. of fluid in the fasting stomach, the fluid giving a strong reaction for hydrochloric acid. Hypersecretion is generally an expression of pyloric stenosis, organic or spasmodic, and this is due to an organic cause.

"(2) A diagnosis of nervous indigestion should not be made in the presence of persistent hyperacidity accompanied by epigastric pain. Nervous hyperchlorhydria may occur, but is not accompanied by either

pyrosis or pain. The association of either of these latter symptoms should suggest an organic origin for the complaint.

"(3) Achylia gastrica may be of nervous origin, but this is not probable when serious motor error is in evidence. Achylia with food-stagnation is strongly suggestive of cancer of the stomach.

"(4) Achylia gastrica, accompanied by pain or vomiting, indicates an underlying organic cause.

"(5) The diagnosis of nervous indigestion should not be made when recognizable food remains are repeatedly found in the fasting stomach. Under the influence of fear, nervous shock, or vicissitudes of temperament the motor functions may be temporarily interfered with, but this would not be the case permanently.

"(6) The diagnosis of nervous indigestion should not be made when epigastric distress or pain occurs regularly at a definite time after eating. The very fact of this disturbance coming on at a definite time argues against a neurosis.

"(7) The diagnosis of nervous indigestion should not be made when one symptom alone persists, without other evidences of nervous instability. The presence of one definite symptom in itself presupposes an organic cause.

"(8) The physician should be on the qui vive for drug addictions, for these habitues can sometimes present a syndrome of symptoms that will puzzle the most experienced.

"(9) The diagnosis of nervous indigestion should not be made in persons over forty or forty-five, in whom indigestion is a new symptom. Such patients are usually developing a serious systemic or malignant disorder.

"(10) Finally, digestive nervous neuroses and organic disease may be concomitant, and the presence of either need not exclude the other."

Treatment.—First get the patient's confidence by making a most complete examination. This desirable beginning is usually hastened by the osteopathic physician, when after a few treatments symptoms are greatly relieved. Correct all lesions wherever found, particularly those anatomically connected with the stomach. When the symptoms are sensory relief can always be given by inhibition over the splanchnic area. Occasionally the ensiform process and the lower costal cartilages are lesioned.

Diet.—When hyperchlorhydria is the chief symptom foods must be selected which bind acidity or those which lessen its secretion, such as milk, eggs, cream cheese, fats such as butter, cream, olive oil, boiled

or broiled fresh fish, **boiled** beef or lamb run through a grinder, oysters in any form but fried, white meat of chicken, vegetable puree made with cream or milk (no meat stock), gelatine, custard, junket or **sponge cake**.

Many neurotic patients are under-nourished through fear of food. They must be positively assured that if the food is well chosen and carefully masticated there need be no fear of discomfort. Care should be taken that the patient is not constipated.

Some cases can only be reached by a "rest cure" of four to six weeks, which together with the treatment outlined above will prove most satisfactory.

In all cases guard against worry and overfatigue. Build up the general health as rapidly as possible. Outdoor life, sufficient sleep, frequent vacations, and change of scene are specially beneficial.

Gastric and Duodenal Ulcer

Statistics show that peptic ulcer is far more prevalent than is supposed by the casual observer. "In the combined statistics of 59,450 autopsies of various series evidence of healed or unhealed ulcer were observed in 4.4 per cent." (Bassler.)

The reason for this is that peptic ulcer may present very definite symptoms which are readily interpreted or they may be so atypical as to make definite diagnosis impossible. Like all gastro-intestinal diseases, many of the symptoms are easily confused with so called indigestion or "stomach trouble."

Etiology.—One characteristic of gastric and duodenal ulcer is that it only occurs where the mucous membrane is subject to the influence of hydrochloric acid and pepsin; lower end of esophagus, stomach and first part of duodenum.

Similar ulcers are often found in the sigmoid and rectum where the feces often become acid due to bacterial action, or on account of slow movement, hydrochloric acid and pepsin which may have escaped neutralization in the duodenum may attack the mucosa.

For the part played by spinal and rib lesions on the glandular layer of the stomach, the reader is referred to a previous discussion of the lesion.

Probable secondary causes of gastric ulcer are: (1) Embolism of an artery (gastric arteries are terminal). These emboli are supposed to be caused by toxic and infectious agencies which enter the circulation, as sometimes occurs in pyemia and large burns of the skin.

(2) While hydrochloric acid associated with pepsin seems to be an important factor, it is doubtful whether it can attack the mucosa without there being a previous abrasion or other injury. It is said that a normal secretion of mucus is nature's protection against self digestion.

The swallowing of substances of a coarse or irritating nature or those chemically corrosive or at extremely high temperature may so injure the mucous membrane as to permit an attack by HCl and pepsin.

Certain occupations seem to predispose to gastric ulcer, such as cobblers, or others who in their work press various objects against the stomach.

Sharp blows over the stomach have been followed by acute ulcer. A frequently associated condition is gastropotosis, which seems to be explained on the basis of narrowing of the blood vessels and their more ready occlusion. Probably sagging of the duodenum is an important predisposing factor.

Anemia and chlorosis should not be overlooked as predisposing causes. And tuberculosis and syphilis are possible associated disorders.

Of all the theories advanced, the lowering of vitality, due to lesions of the splanchnics and vagus nerves remains the most logical.

Symptoms.—The most characteristic symptom is pain, which in a typical case comes on at a regular time after taking food. It may be a half hour, an hour or two hours, and in the case of duodenal ulcer may be as late as four hours. The distance beyond the cardia at which the ulcer is located seems to govern the time; also the time at which the secretion of hydrochloric acid reaches its height, which varies in different individuals.

The pain is due to free acidity (that which is not combined with the food) irritating the raw surface of the ulcer. Pain is often increased or lessened by posture. If turning on the left side gives relief the ulcer is probably at the pylorus; if worse when standing than reclining the ulcer is probably on the greater curvature.

The pain is usually localized by the patient, and pressure at the given spot increases the pain. In many cases there is referred pain in the region of the 9th, 10th and 11th ribs on the left side.

At the height of pain vomiting may occur, due probably to pylorospasm resulting from high acidity. Vomiting always gives relief. The taking of protein food or alkali will usually relieve the pain of ulcer, (hunger pain). Ulcer patients are usually well nourished owing to the habit of relieving themselves by eating, or they may be thin due to their fear of food.

In acute ulcer frank blood may show in the vomit, and may be the first indication of trouble, whereas in the chronic type it may be occult, or occult blood may be found in the feces. The hemorrhage of ulcer, unlike that of cancer, is not constant.

Diagnosis.—Diagnosis of duodenal ulcer, as distinguished from gastric, is made by finding the tender spot to the right and below the pylorus, the pain coming on three or four hours after taking food, and the finding of blood in the feces (tarry stool) and not in the stomach contents. Repeated examinations may be necessary owing to the fact that hemorrhage is not constant.

The large percentage of stomach ulcers are near the pylorus, and of the duodenal ulcers the ascending portion is the area almost invariably involved.

Ulcer is differentiated from functional disorders by a history of real pain as distinguished from the vague disturbances of sensation often called pain by neurotic patients. Also its regular appearance in relation to food. The pain of "gastralgia" has no regular habit and is not influenced by food.

Referred pain from cholecystitis, chronic appendicitis, etc. has no relation to food and is not relieved by food or alkalies.

Ulcer is to be distinguished from cancer by the age of the patient (in cancer usually over 40) with a previously good gastric history, except in cases where cancer has been grafted on to a chronic ulcer. In these cases a careful inquiry will bring out a characteristic ulcer history up to a certain time, when all symptoms change; pain becomes constant; is not relieved by food or alkali; vomit becomes dark in color and has a characteristic odor, appetite fails, and signs of cachexia set in.

Gastric ulcer should be suspected in all cases of persistent gastric symptoms which are not readily relieved by treatment and regulation of diet, and in which there is found high acidity and continuous hypersecretion not accompanied by mucus.

The X-ray and gastric analysis should never be neglected in suspected cases, keeping in mind the possible injury from the tube in case of recent hemorrhage.

Treatment.—Osteopathic treatment of gastric ulcer will be almost uniformly successful if we will analyze all of the factors entering into the problem.

It is obvious that in order to heal the ulcer we must remove all factors which interfere in any way with nutrition. Then give the stomach as near absolute rest as possible while at the same time building up the nutrition by a generous but well chosen diet.

When acute hemorrhage has recently occurred, complete rest in bed with a trained nurse in attendance is the first indication. Complete rest of the stomach, all nourishment being given by nutrient enema. An ice bag is to be placed over the stomach, and removed every three or four hours to allow surface circulation to react. Warm applications should not be used while there is any marked bleeding.

During this period no effort on the part of the patient should be permitted, and no manipulative treatment which would tend to increase blood pressure should be given.

After all evidence of hemorrhage has ceased for ten days, or at once in case of chronic ulcer, we may carefully correct all spinal or rib lesions in the splanchnic area especially the 6th dorsal, or cervical lesions affecting the pneumogastric. Pain and pylorospasm may be relieved by steady pressure at the 4th and 5th dorsal on the right side.

After spinal lesions have been corrected without unduly irritating the stomach, careful relaxing treatment should be given with the patient on the back, keeping in mind that all exertion will tend to irritate the ulcer.

If special care is observed, frequently definite relief may be given by placing patient in knee-chest position and gently raising the lower portion of duodenum where it lies alongside of ascending 3rd and colon, 4th lumbar.

During this period a hot water bag or a thermal pad should be kept over the stomach night and day.

In certain cases of perforation in a few obstinate conditions, and in a few where mechanical obstruction is marked, surgery may be indicated.

The following diet will be found best during the first week:

7 A. M. A half glass of cooked milk, with the leathery substance which rises on the top removed, and the yolk of one egg stirred into it and sweetened, if desired; taken luke warm or cool, but never ice cold. This amount to be increased on the second day to three-fourths of a glass, and on the third to a full glass, which is to be continued for a week. If the milk produces diarrhea, add two tablespoonfuls of lime water to each portion.

9 A. M. A saucerful of gelatine (Knox's or Crystal Rock) with 2 tablespoonfuls of cream and a teaspoonful of sugar.

12 M. A half to full glass of milk prepared as above.

3 P. M. A saucerful of gelatine, with cream (medium) and sugar as at 9 A. M.

6 P. M. A half to whole glass of milk, as before, with one egg stir-

red in and sweetened. The egg yolks at 7 A. M. and 6. P. M. are to be increased until six are taken daily at the end of the week.

8 P. M. A half to a full glass of milk.

The whites of the eggs are to be stirred up in the water in the proportion of a white to a glass of water, 4 teaspoonfuls of sugar to be added to every glass, this to be taken by the patient only when thirsty. If the bowels do not move, no laxative can be taken, but an injection of warm water or a little soap may be employed. If much discomfort is produced by the food, a hot compress must be laid over the stomach or above the navel.

During the second week the diet should remain much the same except for the addition of one or two pieces of Zwieback three times a day.

During the third week, if pain and blood in the feces are lessening, we may add soft, well cooked cereal like cream of wheat, cocoa, puree of split pea made with cream.

Fifth week add minced chicken, coddled egg, **boiled** beef or lamb put through a meat grinder, soft vegetables such as chopped spinach, squash and mashed or baked potatoes with liberal quantities of butter.

During and after the sixth week we may add all vegetables which can be served in puree form, fresh fish, oysters, apple sauce, inside of a baked apple, prune whip, custard junket, corn starch pudding.

At this time also if all goes well the patient may sit up in bed and gradually move about, being careful to avoid all sudden movements which would put a strain on the epigastric region.

If necessary we may also increase our manipulative treatment at this time.

The patient must be warned against the use of any article of diet which will be chemically or mechanically irritating to the stomach, for a period of months, and an examination of feces should be made from time to time to make sure of no return of hemorrhage.

Dilatation of the Stomach

A dilated stomach is a stretched stomach having increased capacity, due to nervo-muscular atony or to pyloric obstruction. Every stomach which is not retracted when empty is a dilated stomach. A dilated stomach may occur either as an acute or as a chronic condition, but it is to be distinguished from temporary distention and a normally large stomach.

Osteopathic Etiology and Pathology.—The nervo-muscular atony causing dilatation may be due to obstructive lesions in the stom-

ach splanchnics, or to a general debility of the spine in the dorsal region (usually a kyphosis), or to continued overeating and improper food causing a stasis and fermentation. It may also be due to overdrinking and various diseases, as phthisis, liver and lung diseases, anemia, chlorosis, acute fevers and kidney diseases, causing more or less of a general nervo-muscular atony. Dilatation may result from a mechanical obstruction, or narrowing of the pylorus or the duodenum, by a cicatricial contraction of an ulcer; by hypertrophic thickening due to various diseases, by adhesions and tumors. Occasionally the pyloric obstruction is congenital. A floating kidney may fall upon the horizontal portion of the duodenum and thus mechanically obstruct the passage of food from the stomach, which consequently dilates. Tight lacing might prevent the liver, when congested, from passing in front of the kidney, thus luxating the kidney. Dilatation of the stomach occurs at all ages, although most frequently in middle aged persons.

Pathologically, the muscular coat is thinner and paler than normal, with more or less atrophy of the glandular tissues and an increase in capacity of the stomach. When obstruction exists at the pylorus, hypertrophy of the muscular coat may occur.

Symptoms.—The symptoms are those of the disease causing the dilatation plus those of persistent chronic catarrh. The patient complains of a sense of fullness in the epigastric region and there is flatulency, eructations and vomiting. The cavity of the stomach being much enlarged, great quantities which are usually considerably decomposed are vomited each day or two. There is often lessened acidity of the vomited mass, though in some cases it is increased. Passage of the food from the stomach to the intestine is delayed and the bowels are constipated, the fecal matter being dry and hard. The urine may be scanty and the skin dry. Anemia, debility and emaciation are always present to a greater or less extent, and on account of the absorption of poisonous matter drowsiness may occur.

Physical Signs.—Inspection.—In some cases the outline of the distended stomach can be plainly seen. There is prominence of the epigastric region, the tumefaction being at the pyloric end of the stomach. **Palpation.**—The resistance upon manipulation of a dilated stomach is like that of an air cushion. If the patient is made to drink a half tumbler of water, bimanual palpation will cause a splashing sound to be heard along the circumference of the stomach at its lowest point; and by moving the water about by changing the position of the patient, the outline of the stomach can be made. If the sound is not heard at the first manip-

ulation, it must not be concluded that the stomach is normal for the stomach may be so dilated and flabby that it falls behind the abdominal wall like an apron. **Percussion.**—The note is tympanitic over the greater part of the stomach until the lower curvature is reached when the sound is dull (due to the liquid contents of the stomach), followed by a tympanic sound again when the intestines are reached. When percussion is made the patient should always be in a standing position if possible.

When there is **pyloric obstruction** a tumor usually presents itself, and vomiting is more severe and peristalsis more active than when the dilatation is due to atony of the walls of the stomach from an obstructed innervation.

Diagnosis.—This is usually easy if due care is taken in making the examination. Goetz has shown by the use of his spinegraphometer that in cases of visceral prolapse the spine is commonly posterior in the dorso-lumbar region. The X-ray is of value in determining the size and function of the organ.

Prognosis.—In a case of nervo-muscular atony the prognosis is favorable. If due to a malignant disease recovery is usually impossible. In hypertrophy of the pylorus or the duodenum, recovery is probable by means of surgical interference.

Treatment.—When the dilatation is due to atony of the muscular walls of the stomach from obstructed innervation at the spinal column, treatment is usually successful. Attention should be given to the condition of the spinal column in the splanchnic region (fourth dorsal to twelfth dorsal), the spine being usually posterior. A thorough and persistent course of treatment must be given, not only to restore the normal activity of the nerves to the muscular coat and glands of the stomach, but to build up and restore strength in the weakened spinal column. Lesions in the spinal column, even higher than the fourth dorsal, may affect the innervation of the stomach. There are cases where lesions have been found at the fifth, sixth and seventh cervicals that interfere considerably with the action of the stomach, causing nausea, flatulency, eructations, and even vomiting. Such an affection may be through the fibers of the splanchnic nerves or through fibers of the vagi nerves.

The vagi nerves have an important bearing upon gastric dilatation as paralysis of the gastric branches of the vagi arrests the peristalsis of the stomach and thus tends to favor retention of food within its cavity. The stomach in such cases becomes enlarged, mainly by the weight of

the food and the presence of gases due to decomposition of the retained food. Thus lesions may be found higher than the lower cervicals and cause obstruction and paralysis of the fibers of the vagi to the stomach.

Direct stimulation over the stomach in the form of thorough manipulation of the stomach walls causes contraction of the muscular fibers of the stomach, mainly the circular fibers. This treatment, with additional treatment of the splanchnic and the vagi nerves, will tend to build up the weakened plexuses of the stomach. Much time can be saved by putting the patient to bed and treating him every day for several weeks. When the stomach is dilated or dilated and prolapsed, to any extent, it usually requires three to five months treatment at least; this time can be shortened one-half by keeping the patient in bed, treating the spine three times a week, and the abdomen every day. Light food at frequent intervals, upper thoracic breathing, and frequent drawing up and in of the abdomen should be required. The patient may also manipulate his own abdomen twice a day to advantage; teach him to manipulate, draw and pull it upward. There is no danger of too frequent treatment as long as there is no bruising of the parts; this, however, does not apply to the spine. It is not an uncommon thing to correct a dilated stomach or a dilated and prolapsed stomach that is an inch and a half or two inches below the umbilicus. Care must be taken in all cases that other viscera are not prolapsed. It is a common experience to find enteroptosis, which can usually be readily functionally corrected, with the stomach ptosis. But where the kidney, or possibly both, is much prolapsed only fair results can be secured until the kidney is replaced and kept there, and if necessary by surgical means. Also, note whether the liver is enlarged. (See special article on Prolapsed Organs).

When the disease is due to cancer and various growths of the pylorus or the duodenum, nothing can be done but palliate. Such cases require surgical attention. In all cases it is necessary that care and preoccupation of the patient should be removed. Baths, changes of air, a carefully regulated diet and caution in the use of liquids will be of great aid to the general health of the patient, and thus the weakened nervous system will be indirectly but greatly benefited. Too great care cannot be taken of the patient, as there is created in the organism a special aptitude for the tissues to become inflamed and thus weaknesses at various parts of the body may occur. Phthisis, typhoid fever and various diseases are apt to follow dilatation of the stomach, as the nutritive and resistive process of the body are impaired.

The meals should be taken regularly and with great care, the patient not eating too quickly nor too much. Solids should be used but little; the artificially digested foods, such as peptonized milk and beef peptonoids, probably being the best. Beef juice and scraped beef are excellent foods, as they are easily digested. Fatty and starchy foods should be avoided.

Washing out the stomach is useful, but it should not be indiscriminately employed. Lavage will not be necessary in all cases of mechanical obstruction. It relieves the distention, by removing the weight and the fermenting and decomposing material.

In **acute dilatation**, which may be due to prolonged diseases, general anesthesia, injuries of the spine, and to narrowing of the duodenum, vomiting, pain and collapse occur. Empty the stomach, and place patient in knee-chest position. Reach beneath the duodenum and raise this part of bowel. Start well down, as low as third or fourth lumbar. If this does not give quick relief stand patient on his head.

Gastropstosis and Enteropstosis¹

(GLENARD'S DISEASE)

Definition.—A displacement of the stomach and intestines.

Osteopathic Etiology and Pathology.—A weakened, debilitated spine is the common cause. A slight posterior curvature is a frequent occurrence. A debilitated spine impairs the innervation to the abdominal viscera and to the muscles of the abdomen. Many cases are of congenital origin due to lack of complete development and weakness of the supporting tissues. Other causes are muscular strain, repeated pregnancies, tight lacing and malnutrition. A downward displacement of the floating ribs, and a consequent prolapse of, and atony of the diaphragm, is an important cause.

Prolapses of the stomach and intestines are of frequent occurrence in both sexes, and very common in women. It is a condition oftentimes overlooked, and when recognized, little has been done in the way of a cure. It is the cause of much disturbance, not only to the stomach and intestines, but to the various abdominal viscera and to the pelvic organs, and it is the cause of a large percentage of prolapses of the uterus, (excluding lacerations from childbirth) for not only is the great suspensory ligament of the uterus (the peritoneum) prolapsed as a consequence, but all of the abdominal viscera and the parietes of the abdomen are also prolapsed and crowded down into the pelvis. The small or large intes-

1. See special article, Prolapsed Organs, Part I.

tine or the stomach may be prolapsed singly. This is frequently the case with the transverse portion of the colon, which may be elongated and tortuous and prolapsed nearly to the symphysis pubis. Prolapse of the liver, spleen and kidneys may occur singly or with a general displacement of all the organs.

Symptoms.—The abdominal walls are weak, oftentimes flabby. The viscera of the abdomen do not have normal resistance upon manipulation. The spinal column presents lesions. There is dyspepsia, flatulency, constipation, abdominal pains and various neurasthenic symptoms.

Diagnosis.—Is readily made by the lack of tone to the abdominal walls and viscera and the general debility of the patient. Inflation of the stomach with air will determine between gastropptosis and dilatation. The X-ray is of special value in determining position, function, spasms, kinks, etc. of the digestive tube. There are innumerable gradations and phases of this condition.

Treatment.—To remove the cause is of primary importance. This is to be followed by treatment of the spinal column, correcting its various derangements and improving the innervation to the atonied viscera and abdominal parietes. Direct treatment over the abdomen helps to give tone to both the viscera and abdominal muscles. In many cases the treatment will have to be a prolonged one in order that the tissues may regain their normal condition. Usually a treatment from two months to a year, or possibly more, is required. Exercises and manipulations that tone the tissues, correct the posture, and raise the chest, diaphragm, abdominal and pelvic viscera, and release spasms, kinks, and adhesions, are indicated. The diet of the patient should be nutritious, and sufficient in emaciated cases to increase his weight if possible. A supporting bandage will often give some relief. A few cases will require surgery.

Particular attention should be given to the colon, duodenum and diaphragm.

Relative to the treatment of gastropptosis and enteropptosis, W. E. Harris writes as follows: "I first set to work trying to correct the spinal irregularities; coupled with this I give deep and careful manipulation of the gastric and intestinal walls—treating my patient two or more times per week for a period of one to three years. A lesser period is not long enough to bring the desired result in such cases. I also instruct the patient to knead his own bowels, which I prescribe as a necessary proceeding, and to be performed twice daily on retiring and before rising. Of equal importance with the osteopathic treatment, come local, spe-

cific abdominal exercises. These are to be of the resistive type, and must also be taken for the general musculature. I have my patient retract the abdominal walls and voluntarily draw the abdominal contents towards the diaphragm, in regular series. These exercises must be faithfully performed and continued after the treatment has ceased in order to be of real value. I do not find our treatment, without the hearty cooperation of the patient in doing his exercises conscientiously, to be sufficient in itself. Have the patient avoid overloading the digestive tract. Use concentrated foods, in small quantities, i. e., only sufficient to sustain strength, twice daily and without taking fluids at meal times. Of course water, in small quantities and at frequent intervals, may be taken between meals. To summarize—First, corrective treatment. Second, resistive exercises. Third, attention to diet.” (See Dilatation of the Stomach.)

DISEASES OF THE INTESTINES*

Acute Diarrhea

Definition.—A diffuse inflammation involving the entire intestinal tract to a greater or less degree. Usually the seat of disease is found in the small intestine and the upper part of the large bowel.

Osteopathic Etiology and Pathology.—Acute diarrhea may be caused by overeating, drinking impure water, unripe fruits, and poisons produced in decomposed and fermented milk and other articles of food. This sometimes takes place in perfectly harmless substances in an inexplicable manner. Milk and ice cream may produce intestinal catarrh. Dr. Still often referred to the harm resulting from iced drinks. Changes in the weather, tending to weaken the system, often cause diarrhea; hot weather favors this, although a chilling of the system by a sudden fall in the temperature may produce the disorder. Dr. Still was of the opinion that sitting on the cold ground (a common habit of children) is a frequent source of intestinal derangements. Changes in the quantity and quality of the secretions also induce the disorder; thus the bile, if in too great a quantity, increases the peristalsis to such a degree that diarrhea is produced; if diminished, it favors the fermentation and decomposition of the food. Pancreatic diseases may be a cause of diarrhea. Infectious diseases, through their specific poisons, such as

*The student will receive many helpful suggestions by reading Macleod, Physiology and Biochemistry in Modern Medicine; Cannon, The Mechanical Factors of Digestion; Carlson, The Control of Hunger in Health and Disease; Gaskell, The Involuntary Nervous System; Pottenger, Symptoms of Nervous Disease.

cholera, dysentery and typhoid fever; inflammation, extending into the bowels from adjacent parts; inflammation caused by peritonitis and intestinal obstructions, as invagination and hernia; hyperemia, secondary to diseases of the liver, heart and lungs; cachectic states met with in Addison's disease; the last stages of Bright's disease; cancer and marked anemia are all among the causes of diarrhea.

As in constipation, diarrhea is oftentimes simply a symptom of various disorders; still, it may be the only symptom manifested. Lesions are found in various regions of the body, but chiefly in the lower dorsal and lumbar vertebræ and the lower ribs at either side. Also lesions may be found to the vagi, thus increasing the peristalsis or affecting the blood supply of the intestines. The lesions to the splanchnics may involve the motor, vasomotor or secretory fibers to the intestines. Oftentimes the innervation to the liver is disturbed, affecting the secretion of the bile. The left side of the spinal column is involved more often than the right side, by vertebral, rib and muscular lesions.

Nervous Diarrhea frequently follows fright and other causes of nervous excitement, and is often found in hysterical women. There is simply an increase in the peristalsis and secretion of the bowel, due to a vasomotor paresis of the intestinal vessels, producing an outflow of the serum.

The intestinal condition is one of hyperemia. The secretory glands are frequently inflamed. In decided cases the mucous membrane may be red and injected, but more often it is pale and covered with a layer of mucus. Sometimes the solitary follicles are considerably enlarged. These enlargements may become filled with pus, forming abscesses which rupture, leaving an ulcer. Peyer's patches may also be involved.

Symptoms.—The diarrhea is the important, and often the only, symptom of enteritis; the stools are frequent, varying from two or three to fifteen or more a day; they are thin and watery, varying in color according to the amount of bile they contain. They are usually of a yellowish or greenish color. They contain undigested food, mucus, columnar epithelium and mucous cells, micro-organisms and triple phosphate. The reaction of the discharge is either acid or neutral. There are colicky pains in the abdomen, rumbling noises or borborygmi, intense thirst, dry and coated tongue, with loss of appetite, and, rarely, a fever. When fever is pronounced care should be taken that some infectious disease is not the cause. **Chronic catarrhal diarrhea** may follow the acute form. If the stools contain much undigested food the inflammation is in the upper bowel; if thin, watery and containing mucus, the lower

bowel is involved. In prolonged cases the general health is affected. Definite tender areas along the spine and deep muscular contractions are invariably important etiologic and diagnostic clues.

Diagnosis.—This is ordinarily made easy by giving attention to the above symptoms. In distinguishing as to whether the large or small intestines are involved the following is important: In catarrh of the **small intestines**, diarrhea is not so well marked; there is much undigested food, but very little mucus; and there is usually pain of a colicky nature in the middle or inferior part of the abdomen. When the **large intestine** is involved there may be no pain; when present, it is intense and usually in the upper and lateral parts of the abdomen; there are borborygmi and thin, soupy stools, mixed with much mucus. If the lower portion of the bowel is involved there may be marked tenesmus, with marked contraction of the muscles over the sacral foramina.

Duodenitis is often associated with acute gastritis. Placing the patient in the knee-chest position one may be able to palpate the duodenum. If the inflammation involves the bile duct, there is jaundice; in these cases the urine may be bile-stained.

Prognosis.—Commonly favorable if early and prompt treatment is employed; though it should be remembered that some infections, or constitutional disease, or intestinal ulcer may be an underlying cause.

Treatment.—Many cases of acute diarrhea will recover by restricting the diet, with rest. Where improper food and water are the causes, an entire change of diet should be considered. Withdrawal of all food and the substitution of boiled milk will be of great aid. The bowels should never be confined if there is reason to suspect that all irritating matters have not been removed; and when fermentation and irritation exist in the lower bowel, an enema will often be beneficial. The spinal column should be examined, especially on the left side, from the fifth dorsal down to the coccyx. The vertebrae may become displaced and cause diarrhea, by derangement of the vasomotor nerves.

Either an increased blood supply through the intestines, or an affection of the motor nerves will produce an increased peristalsis. An active condition of Meissner's plexuses may be produced sympathetically, resulting in increased secretion of intestinal juice and thus in diarrhea. The ribs may become displaced and be a source of irritation to the nerves of the intestines. The muscles of the spine are apt to become contracted by colds, injuries, strains, etc., and stimulate or inhibit the action of certain centers in the cord and produce disordered intestines. Conversely the muscles of the back may be thrown into a contracted condition by

irritating substances in the bowels acting as a stimulus to the centers in the cord, and thus reflexly to the muscles. Trouble may arise in the colon and rectum by lumbar lesions, the slipping of an innominate, a dislocated coccyx, or contracted muscles over the sacrum. In a word, thorough inhibition, relaxing contracted muscles and correcting abnormal vertebrae and ribs are the osteopathic essentials of treatment for diarrhea. Inhibition of the lower dorsal and lumbar is very effective; it dilates the mesenteric vessels by way of vasomotor fibers, and thus controls secretions and lessens peristalsis. This has been clearly proven in the osteopathic experimental work of Burns and Pearce.

Hot fomentations over the dorsal and lumbar spine will frequently, through the nervous reciprocal relationship, be of decided value.

Direct treatment over the mesenteric circulation, i. e., through the abdomen anteriorly, will be helpful in some cases. It relaxes tissues, removes irritations and frees the circulation generally about the mesenteric vessels and intestines. When giving this treatment one should be certain of the underlying pathology. The liver should be kept active. Treatment of the vagus nerves is important, as they help to control the blood supply and the motor nerve force through the intestines. Daily hot baths and increased activity of the skin and kidneys are beneficial.

Chronic Diarrhea, and Mucous Colitis

Definition.—A chronic inflammation of the mucous membrane of more or less of the large intestines. There may be ulceration.

Osteopathic Etiology and Pathology.—Chronic diarrhea may be the result of repeated attacks of the acute form or may be caused by cancer, tuberculosis, Bright's disease, typhus fever, disease of the liver, organic disease of the heart and lungs, obstructions to portal circulation or impactions of any nature that occasion passive congestion. Frequently cases of long standing are due to chronic lesions of the lower ribs or lower dorsal or lumbar vertebrae. The lesions of the lower ribs usually consist of downward displacement of the ribs, affecting the innervation to the intestines directly, or possibly dragging the diaphragm downward to such an extent as to interfere with the blood and lymph vessels as they pass through it, thus causing congestion of the intestines by obstruction to the lumen of the vessels.

In many cases the **pathological changes** are simply those of the acute form. In more pronounced cases the mucous membrane becomes a brownish red, livid gray or slate color; this discoloration being due to hyperemia and blood extravasation. The mucous coat is also swollen

and thickened. Atrophy of the mucous membrane, and in some cases of all the coats, with destruction of the glands, may be a result of the chronic form. Ulcerative changes occur chiefly in the lower part of the ileum and colon; these may be follicular or there may be large ulcers and considerable areas of ulceration.

Symptoms.—Constipation and diarrhea frequently alternate; the stools are thin, mixed with a large amount of slimy mucus; the small intestine is most frequently involved, and the patient complains of pain in the umbilical region; there is distention of the bowels with gas; the health gradually declines; there is great pallor, and the patient becomes emaciated, gloomy and irritable.

Mucous Colitis is a chronic form of colitis, characterized by paroxysms of severe pain and the discharge of large masses of mucus, forming gray translucent casts, which are not fibrinous but mucoid in character. This disease occurs usually in women of nervous type, but is occasionally seen in men and children. When there is no underlying organic disease, it is probably largely a secretion neurosis. Mental emotions and worry, sometimes errors in diet, or dyspepsia bring on the attack. Over-fatigue is often an exciting factor. The nutrition is generally well maintained, but in other cases there may be a gradual emaciation and ultimate death. This is undoubtedly one of the most persistent and troublesome diseases that one will meet; still the osteopath can do much for these cases and not infrequently bring about a cure. But the treatment must be consistent and persistent.

Mucous colitis is not hard to diagnose, although many cases are treated for simple indigestion. It is needless to say that a correct diagnosis is paramount. In these cases there is almost invariably some visceral prolapse, which undoubtedly is the underlying cause, by favoring venous congestion of the bowels. The liver is usually congested; this alone may cause the venous stagnation, but more often it is simply due to the common cause. Back of the visceral prolapse and congestion will almost invariably be found a posterior dorso-lumbar curvature; still there may be a scoliosis or single lesions only, and a downward displacement and constriction of the floating ribs.

The **treatment** requires most persistent and careful work for at least three months, and probably six to nine months. Correction of the spine and floating ribs should be of first consideration; then intelligent treatment over the abdomen, by raising and toning the bowels, not only the bowels as a whole, but especially in the ileo-cecal, hepatic flexure, transverse colon, splenic flexure, sigmoid flexure, and rectal regions.

The direct treatment should be cautiously given when there are indications of ulceration.

Have the patient help himself by manipulating his bowels night and morning, drawing the abdomen up and in, and by thoracic breathing. Prescribe plenty of drinking water and reduce starchy and saccharine food to a minimum. Again emphasis is placed upon the necessity of persistent treatment, two and three times per week, for several months. The mucus is hard to remove. It is tenacious and frequently causes colicky pains.

To the student Von Noorden's¹ monograph on this subject is especially instructive. He notes that almost without exception the patients suffer for some weeks or months prior to the development of colica mucosa from obstinate constipation. For acute attacks, among other things, he advises rest in bed, hot applications, and high water injections. He believes in massage of the large intestine (particularly of the sigmoid flexure), in cases of atonic constipation and also in spastic constipation, provided the patient has a diet that leaves a large residue. "A coarse, laxative diet of Graham bread, leguminous plants, including the husks, vegetables containing much cellulose; fruit with small seeds and thick skins, like currants, gooseberries, grapes; besides, large quantities of fat, particularly butter and bacon."

Diagnosis.—Diagnosis is always easy. The presence of blood, pus, or fragments of tissue in the stool point to ulceration. Ulcers in the rectum, and as high as the sigmoid flexure, will be recognized by examination with the speculum.

Prognosis.—Osteopathy has undoubtedly changed the prognosis of other treatment. Many cases can be cured and most other cases greatly benefited. The deep seated ulcerations may cause circumscribed peritonitis, or even abscess, and the prognosis becomes grave as these complications arise.

Treatment.—As diarrhea may be caused by lesions anywhere from the sixth dorsal to the coccyx, a most thorough examination is necessary. On the one hand, diarrhea may be due to a marked lateral or posterior spinal curvature, which is plainly seen upon inspection, but on the other hand, it may be due to a slight twist or deviation from normal of a vertebra which would require considerable osteopathic ability to exactly locate. Diarrhea may result from subluxation in the lower costal region, one or more of the three lower ribs on either side being involved. Record of one case, in particular, of chronic diarrhea is of interest as it was due

1. Von Noorden, Colitis, 1904.

to a rib dislocation. It was the case of a man fifty years of age, who had suffered from chronic diarrhea, several stools a day, for over thirty years. He was completely cured in one treatment by correcting the dislocation of the vertebral end of the tenth rib on the left side. This case is cited to impress upon the student the necessity of precise diagnosis and treatment. Rarely will diseases be cured by a single treatment, but when such happens it exemplifies the potency of the osteopathic lesion. Treatment on the left side is usually more effective in diarrhea than treatment on the right side. When diarrhea is a symptom of some constitutional disturbance, correction of dorsal, lumbar and rib lesions, with thorough inhibition, careful dieting and rest, will commonly suffice provided the primary disease is intelligently looked after.

Chronic lesions of the vagi nerves may exist and produce chronic diarrhea in the same manner as in acute diarrhea. Rest and a liquid diet, preferably boiled milk and albumin water, will be a helpful treatment; the diet requirement is to have a minimum amount of waste, so that the residue will cause the least possible irritation. Beef peptonoids with the milk will be a nutritious addition to the diet, and change of air and surroundings may be an aid to a more speedy cure. The skin and kidneys should be kept in a healthy condition and, if necessary, the bowels thoroughly emptied by injections.

Diarrhea of Children

Three forms of diarrhea are recognized in children: Acute dyspeptic diarrhea, cholera infantum, acute enterocolitis.

Acute Dyspeptic Diarrhea

This disease is most frequently due to errors in diet; the mother's milk may be altered in quantity or quality from taking improper food; the child may be over-nursed, or the foods given in place of the mother's milk are at fault. Too often a filthy bottle is the cause. The predisposing causes are dentition and extreme heat; and these, combined with constitutional weakness, bad hygiene and a weak spine, diminish the resisting power of the infant. Hence, in artificially fed children of the poorer classes, this disease is very prevalent.

Pathologically, there is catarrhal swelling of the mucosa of both the small and large intestines. The amount of mucus is increased, and there is more or less involvement of all the lymphoid tissue. The submucous membrane is often infiltrated. If there is much inflammation ulcers may occur.

Symptoms.—The child may seem to be in its usual health, with slight restlessness at night and an increased number of stools. This restlessness may be due to nausea and colicky pain. The stools are copious and offensive, containing undigested food and curds. In children over two years old these attacks may follow the eating of unripe food or drinking tainted milk. In other cases the onset may be sudden with vomiting, purging, and griping pains. The fever may rise rapidly to 103 or 104 degrees or more, sometimes followed by convulsions. The stools become more numerous—there may be twenty in the twenty-four hours—gray or green in color, and sometimes containing much mucus, rarely blood.

Diagnosis.—The sudden onset and the character of the stools, which never have a watery, serous character, distinguish this from cholera infantum. And the small amount of mucus which the stools contain distinguishes them from those of ileo-colitis. This form often precedes the onset of specific fevers.

Prognosis.—Among the better classes this is generally favorable, but among the weak, half-starved children of the poor it is often unfavorable, especially in hot weather.

Treatment.—The child should be clad warmly, kept absolutely clean and given a change of diet and air if possible, with frequent baths. Sterilized milk should be given at regular intervals; or if the diarrhea continues, beef juice and egg albumin instead. The bowels should be thoroughly cleansed by injections. The spine should be thoroughly treated through the lower dorsal and lumbar regions, and if the abdomen is not sensitive, a light treatment to the bowels directly will aid recovery. Frequently it will be found that the muscles of the neck and upper dorsals are considerably contracted, especially where the child has fever and is very restless.

For **acute intestinal indigestion** Ruhrak gives the following dietetic treatment: "Withhold all food for the first twenty-four hours, except a little albumin-water. This is best given in small doses at not too great intervals. Plain boiled water may be used instead. Very weak tea to which a little red wine has been added may be given if the child is weak. On the second day the albumin or barley-water may be given with the addition of weak strained broth, and on the third day malted milk may be added to the list. After four or five days cow's milk diluted and boiled or peptonized may be tried. It is best mixed with a farinaceous gruel or with malted milk to start with. It may be given

every other feeding for a day or two if it agrees, and the former feeding gradually resumed.

"In nursing infants withhold the breast twenty-four hours and feed as above. After that the breast may be given once for a few minutes and the feeding pieced out with albumin- or barley-water. If it agrees the breast may be given for three or four feedings, every other feeding followed by albumin- or barley-water. On the following day the breast may be given at each feeding. The time of nursing should be increased gradually until the child is back on its old schedule."

Cholera Infantum

Definition.—An acute, catarrhal inflammation of the mucous membrane of the stomach and intestines, with some disturbance of the sympathetic ganglia. This is a disease of childhood during the first dentition.

Etiology and Pathology.—Probably due to the poisonous products of decomposing and fermenting foods acting upon the system. The predisposing causes are hot weather, dentition, bad hygiene, the previous presence of some slight dyspeptic derangement, dyspeptic diarrhea, and enterocolitis.

The **pathological** changes are similar to the morbid anatomy of catarrhal gastritis and enteritis. The serous discharges and rapid collapse are due to the intense irritation of the sympathetic system. The kidneys and liver may become involved, and bronchopneumonia is a possible complication.

Symptoms.—The disease is of sudden onset, setting in with severe vomiting, which is increased by giving food or drink. The stools are copious and frequent, at first containing some offensive fecal matter, and later becoming watery, and odorless. There is decided fever, reaching as high as 105 degrees. The pulse is rapid and feeble, ranging from 130 to 160. Prostration, pinched features, hollow eyes, depressed fontanelles and loss of weight are characteristic symptoms. The tongue is coated at first, but soon becomes dry and red, and thirst is intense. Even at this time a reaction may set in, but more commonly death results with symptoms of collapse and high temperature. In other cases there are restlessness, convulsions and coma. As there is no cerebral lesion, this condition is probably due to toxic agents absorbed from the intestines.

Diagnosis.—This is not difficult, as the toxic symptoms, the severe vomiting, the profuse watery discharge, rapid emaciation and prostration, and the hyperpyrexia are significant.

Prognosis.—Grave, even with the most favorable surroundings, although in numerous instances osteopaths have successfully treated this disorder. Much depends upon the promptness of treatment.

Treatment.—A change of air, complete rest, removal of all foods for a short time, and absolute cleanliness are of great importance. Thorough treatment should be given along the entire spine, particularly to the splanchnics of the stomach and the intestines, and to the vagi nerves in the cervical region. Frequent bathing with cool water, or better still, wrapping the child in cold, wet sheets, will reduce the hyperpyrexia.

Thorough cleansing of the stomach and intestines with warm water occasionally gives excellent results. In **collapse** the use of a hot bath is indicated, followed by wrapping the child warmly in blankets and placing him in a horizontal position. The food of the child should consist of peptonized milk, raw beef juice, diluted egg albumin, barley water and chicken broth. Nourishment should be given gradually, and **only** after the intense symptoms have subsided.

Acute Enterocolitis

In enterocolitis the ileum and colon are chiefly affected, especially the lymphatic glands or lymph follicles.

Osteopathic Etiology and Pathology.—Warm weather, the artificial feeding of children, dentition and bad hygiene are predisposing causes. The disease usually occurs between the ages of six and eighteen months, but it is not infrequent in the third or fourth year. This disease is not confined to the warm weather, but may set in at any season of the year. Previous light attacks of diarrhea are often a predisposing factor. Lesions in the spine occur from the eleventh dorsal to the fourth lumbar.

The mucous membrane is congested and swollen, and the solitary follicles and Peyer's patches are swollen and often ulcerated. The changes may end here or the ulcers enlarge and extend into the muscular coat with the separation of a slough. There may be infiltration and thickening into the submucous and muscular coats, followed by induration of the tissue, producing abnormal rigidity.

Symptoms.—The disease may be a sequel of dyspeptic diarrhea or cholera infantum. The temperature increases and the stools change in character, being at first yellow, and later green. They contain traces of blood and mucus. Vomiting may be present, but is not a constant symptom. The abdomen is distended and tender along the course of the

colon. The disease may abate here, recovery from the condition being slow; or the symptoms may increase in severity with persistent, small, painful stools, mainly of blood and mucus, tenesmus, and with scanty urine. The child grows pale and emaciated, and assumes a senile appearance. These cases last five or six weeks, death being preceded by coma and convulsions; though a few recover. Relapses are not uncommon and should be guarded against. **Ulcerative and membranous** forms may occur. Pneumonia and nephritis are possible complications.

Diagnosis.—**Enterocolitis** is distinguished from dyspeptic diarrhea by the greater severity, more fever, greater prostration, the stools containing more mucus and even blood, and by the greater pain and suffering. **Cholera infantum** may be recognized by the abrupt onset, very high fever, constant vomiting, and early collapse. If typhoid fever seems a possibility, the Widal test should be used.

Prognosis.—Grave; recovery follows prompt treatment with favorable surroundings.

Treatment.—Attention should be given to the condition of the spine from the eleventh dorsal to the fifth lumbar. An inhibitory relaxing treatment over the sacral foramina will lessen the tenesmus. When the ileum and colon are involved, disorder is usually present at the third and fourth lumbar vertebræ, although the lesion may be higher. Relaxation of all muscles in this region and correction of the vertebral lesions are essential.

Irrigation of the bowels once a day with a pint of cold water is very beneficial and even pieces of ice may be introduced into the rectum. Fresh, pure air, rest and cleanliness, with a restricted diet and daily warm baths are important. In a word, hygienic and dietetic treatment similar to that for acute diarrhea should be employed.

In all forms of diarrheal diseases in children much depends upon previous **osteopathic** attention, **diet, hygiene, and environment.**

Cholera Morbus

Definition.—An acute, gastro-intestinal catarrh of sudden onset, characterized by violent abdominal pains, incessant vomiting and purging.

Etiology and Pathology.—This disease greatly resembles Asiatic cholera; so much so that one seems justified in suspecting that cholera morbus, like true cholera, is due to a specific organism. No single bacillus has yet been designated as the specific germ, although one has been recognized resembling very much the common bacillus of true cholera.

Until this has been fully decided, cholera morbus must be regarded as severe inflammation of the mucous membrane of the stomach and intestines, due to some poison generated from the improper food, which seems to be the cause of the disease, such as indigestible fruits, cabbage and cucumbers. It is most prevalent in hot weather, but is also caused by exposure to cold and damp. The condition of the mucous lining of the intestines is the same as in acute diarrhea. In fatal cases of cholera morbus there is the same shrunken, ashy appearance of the skin that characterizes cholera.

Symptoms.—The onset is sudden, with intense cramps in the epigastrium and frequently in the lower limbs; nausea; vomiting, and purging of bilious material, which later becomes almost like water, and in severe cases the discharge becomes serous, finally resembling the rice water discharges of true cholera. There are also intense thirst, moderate fever, rapid emaciation and loss of strength; the surface becomes cold and covered with clammy sweat; the pulse is frequent and feeble. The patient becomes restless and anxious.

Diagnosis.—**Asiatic Cholera.**—There is no way of distinguishing between Asiatic cholera and cholera morbus, except by examination of the discharges for the bacillus. Similar attacks are produced in poisoning by arsenic, corrosive sublimate and certain fungi, and are only discriminated from it by clinical history and cause.

Prognosis.—In the majority of cases the prognosis is favorable, death rarely occurring. The duration is from twenty-four to forty-eight hours.

Treatment.—A strong inhibitory treatment to the gastro-intestinal nerves is at once demanded. This relaxes the muscles of stomach and intestines, dilates the blood-vessels and lessens peristalsis. The treatment should be kept up until relief is given. In some cases, gentle treatment over the stomach and intestines quiets the distress. Inhibition at the occiput gives relief, especially to the nausea and vomiting. Hot applications should be applied to dorsal and lumbar spine.

The vomiting is relieved principally at the fourth and fifth dorsal vertebræ on the right side near the angle of the ribs. Cold carbonated water and pieces of ice swallowed are useful. The diet must be regulated, the further after treatment being symptomatic. Clear the bowel by warm enema if any irritating matter is still present.

Inasmuch as food passes through the small intestine in 4 to 6 hours, and requires 20 hours to pass through the colon, the colon should be emptied by high irrigation in all acute intestinal disorders.

Intestinal Colic

This is a painful spasmodic contraction of the muscular layer of the intestines.

Osteopathic Etiology.—Lesions of the splanchnics derange the intestinal nervous mechanism, with a consequent upsetting of circulatory equalization and chemical function of the intestines. Thus irritations and obstructions of the reflex arc predispose to lowered resistance, congestions, and disturbed chemism. Indigestible food, flatulency and impaction of feces oftentimes produce intestinal colic. Exposure to cold and emotional upsets may be factors. Foreign bodies, intestinal worms, abnormal amounts of bile discharged into the intestines, and reflex causes from diseases, as from the ovaries, uterus, liver, kidneys, etc., will produce the disorder; also lead poisoning, syphilis, rheumatism, locomotor ataxia, chronic malaria and hysteria.

Kerley says: "Children who take too much milk, too strong milk, or who take milk too frequently are the usual subjects of colic. Probably the most frequent cause of colic is indigestion of the proteid of the milk; either the proteid is in excess or the child has poor proteid capacity. Not a few cases of colic are due secondarily to defective bowel action."

Symptoms.—Severe paroxysms of pain, centering around the navel and diffused throughout the entire abdomen. The pain is of a piercing, cutting and twisting nature, relieved upon pressure. The abdomen is distended and the patient restless and continually changing his position. The attacks alternate with periods of complete quietude. In severe attacks the features may be pinched and the surface cold, with feeble pulse, vomiting and tense abdominal walls, all indicating incipient collapse. The duration of the attack is from a few minutes to several hours, eased at intervals and usually ending by a discharge of flatus.

Differential Diagnosis.—In **lead colic** the history, the slate-colored skin, blue line on the gums, sweetish metallic taste, constipation, slow pulse, retracted abdominal walls, and lead in the urine will designate this disease. **Biliary colic** presents pain in the hepatic region, radiating to the back and right shoulder; also jaundice, calculi in the stools and bile in the urine. Tenderness over the gall bladder is important. **Nephritic colic** is accompanied by pain radiating down one or both ureters to the inner side of the thigh, with retraction of testicle of side affected, or the labia, and blood, mucus, pus or calculi in the urine. In **uterine colic** there is dysmenorrhea and pain in the pelvis. In **ovarian colic** there is extreme pain upon pressure over the ovaries, and hysteria. **Ab-**

dominal aneurism presents tumor, pulsation, bruit. In **inflammatory** and **ulcerative** disorders of the abdomen there is tenderness upon pressure, and fever. The pain of acute appendicitis is at first general, centering in the right iliac fossa in about 24 hours. The X-ray may be of definite aid in renal and biliary conditions and various disorders, such as intestinal adhesions, angulations, etc.

Treatment.—Relief of pain is the first indication and is best accomplished by strong inhibition in the splanchnic region, which relaxes the spasm of the intestinal muscles, by normalizing the reflex arc. If disorders of the spinal column are located, it is of primary importance that they be corrected. In cases of irritation of the intestinal mucous membrane, a contraction of muscles of the spine will be found according to the area of the intestines involved, e. g., irritation of the mucous coat of the jejunum causes contraction of the muscles at the tenth and eleventh dorsals. It is a visceromotor, viscerosensory or viscerotrophic reflex sign. On the other hand, a lesion at the tenth and eleventh dorsals may produce colic or other disorders of the jejunum. The portion of the bowel affected, therefore, can be often told by noticing the places of muscular contraction along the spinal column. Generally the jejunum and ileum are the portions of the bowel affected in intestinal colic. The pain can frequently be controlled if in the jejunum, at the tenth and eleventh dorsals; if in the ileum, at the twelfth dorsal; if in the ileo-cecal region, including the vermiform appendix, at first to third lumbar; if in the colon, at the third to the fifth lumbar; and if in the rectum, over the sacral and coccygeal nerves. Occasionally the duodenum and jejunum are reached by nerves as high as the fifth dorsal (usually vasomotor nerves, not sensory), and the other portions of the bowel lower, according to their respective positions. The relief is given by way of the splanchnics and sympathetics to the mucous (sensory) coat of the intestines, although inhibition relaxes intestinal muscles (motor nerves) and dilates blood-vessels (vasomotor nerves). Though precisely localized inhibition is of decided value, still if normal alignment, through adjustment, can be secured results are usually quicker and more satisfactory.

Anterior treatment to the abdomen helps to relieve the contracted fascia of the mesentery, with a consequent freeing of the circulation. It aids peristalsis of the intestines and expulsion of the irritating material. This probably produces considerable effect by way of the axone reflex. Direct treatment to the abdomen for the peristalsis relieves also constipation, impactions and the enteralgia, the latter principally by firm

pressure. Peristalsis is also increased by stimulation of the vagi and inhibition of the splanchnics. The latter treatment, of course, is not given to relieve pain directly, but to facilitate the removal of irritating substances if such are the source of trouble. If this does not produce a movement of the bowels promptly, a warm enema will assist greatly. The cecum and sigmoid should not be overlooked.

Flatulency can be relieved by direct pressure upon the solar plexus, which apparently removes obstructions to the abdominal nervous system (particularly the nerves of the digestive glands, as fermentation and flatulency are due to a disproportionate secretion of digestive juices) and thus the gaseous formations are absorbed. Additional treatment to the lower dorsal vertebrae and lower ribs to relieve nerve lesions and increasing both thoracic and abdominal circulation may be indicated.

As stated in the etiology of intestinal colic, the splanchnic nerves contain not only sensitive fibers, but motor and vasomotor fibers as well. The same is true of the vagi nerves; they exert upon the intestines not alone a motor influence, but also a blood control; consequently, our work in a certain region can be for more than one purpose. Hot applications to the abdomen may be of benefit. And hot fomentations to the spine for 20 or 30 minutes (affecting reciprocal innervation) is often of great benefit. The diet should always be regulated for a few days at least.

Constipation¹

Constipation is an unnatural retention of feces from any cause. The following causes are frequently met with: A deficiency of the bile or other secretions that aid peristalsis; many acute and chronic diseases which lessen the secretions and impair peristalsis, such as anemia, hysteria, chronic affections of the liver, stomach and intestines and acute fevers; certain drugs and strong purgatives; strictures; concentrated food; sedentary habits, over-fatigue and neglect of the calls of nature. Atony of the colon may be caused by chronic disease of the mucosa and by general disease causing debility. There may be weakness of the abdominal muscles, due to obesity and the distention of frequent pregnancies, or obstructions, such as displaced uterus, pregnancy, prolapsed cecum, sigmoid or rectum, and displaced coccyx. Constipation is really a symptom, in most cases, of some disease; many times it is about the only symptom observed. One has to take into consideration the many causes that would produce constipation when the treatment of a case is undertaken.

1. See Philosophy and Mechanical Principles of Osteopathy, p. 190.

A disordered structure may be found in almost any region of a body, which would bear directly or indirectly in the causation of constipation.

Irregular habits often bring on the most obstinate cases of constipation in later life. There may also be local causes, such as disturbances of the normal secretions, impairment of intestinal walls, due to inflammation, and mechanical obstructions caused by tumors, intussusception, twists, etc. Constipation in infants is usually caused by errors in diet, but may be congenital.

In all obstinate cases the X-ray should be employed in diagnosis.

In the majority of cases lesions will be found in the vertebrae of the lower dorsal and lumbar regions, or in the lower ribs of either side. The lesions may affect the vascular supply and innervation of the intestines directly, or the lesion may cause the constipation by affecting some other digestive organ first. Lesions to the vagi affecting the peristalsis of the intestines are common.

The usual **symptoms** are frequent stools, debility, lassitude, headache, loss of appetite, anemia, furred tongue and fetid breath. Serious symptoms may result in long continued cases, such as piles, ulceration of the colon, perforation, enteritis and occlusion. The fecal mass may become channeled and diarrhea may occur from the irritation. In long standing cases of constipation, if the patient suddenly develops diarrhea the rectum should be well examined to see if there are impacted feces present. Neuralgia of the sacral nerves may also be caused by impacted feces in the sigmoid flexure.

Treatment.—Naturally, owing to the numerous etiological factors, each case is a special study and the treatment is necessarily varied. Many cases will present slight impaction of the bowels, a sluggish liver, spinal lesions and so on, which simply require a specific treatment and all the symptoms will be removed. On the other hand, constipation may be due to prolonged ill health and thus require a careful, systematic treatment, not only of the bowels, but of the entire system. Of primary importance in these cases is regulation of the diet, plenty of exercise, sufficient sleep, and regularity in going to stool at a fixed hour each day. The effect of attention to the latter point, in some instances, will be sufficient to perform a cure. Too much cannot be said in regard to the beneficial effect of systematic habits.

Lesions may be found in the spinal column producing constipation from about the fifth dorsal to the coccyx, although principally the lower three dorsal and upper two lumbar vertebrae are at fault. Constipation may be caused by defects at any point in the intestines, and consequently

the sections of the spinal column sending nerves through the intervertebral foramina to the several sections of the bowels should be examined. At any point from the fifth dorsal to the coccyx, certain vasomotor, motor and secretory nerves of the intestines may be affected by various lesions. The vasomotor nerves keep up the vascular tone of the bowels, the motor nerves the peristaltic action and the secretory nerves attend to the intestinal juices. In constipation, disorders of the spinal column are generally found on the right side. There is no good reason offered as to why this is so.* In those cases where the liver is impaired, the answer might be because most of the nerves to the liver are on the right side, but the right side is just as often affected when the lesions are in the lumbar region and the nerve supply to the hepatic region intact. Dr. Still considered the fifth dorsal of importance.

The **vagi nerves** have important bearing upon the motor apparatus of the intestines. Lesions in the upper cervical, involving intestinal fibers of the vagi, occur occasionally. Stimulation of these fibers increases the peristalsis of the intestines. Mechanical stimulation of the mid and lower dorsal region, as shown by osteopathic experiments, increases peristaltic action and vasoconstriction in the stomach and intestines.

The value of **direct treatment** over the intestines from the duodenum to the rectum in most cases of constipation cannot be overestimated. It aids peristaltic action, removes impactions, stretches adhesions, strengthens weakened muscles of the intestines and abdomen, and in general gives tone to all of the abdominal organs. The treatment should not be given in a hap-hazard manner, but each effort should be for a definite purpose. Care should be taken not to bruise the intestines or other organs, as by gouging or severe punching; the flat surface and the palms of the hands should be used. This means that the part of the bowel involved should be treated intelligently, the osteopath reaching underneath the section and the patient drawing the bowels up and in. Obstructions and impactions of the gut, especially at the ileo-cecal and sigmoid regions, should be carefully corrected. At all angles of the gut, impactions and prolapses may occur.

*There are several possible suggestions. (1) Developmental (See Mayo, Relation of the Development of the Gastro-intestinal Tract to Abdominal Surgery. Jour. A. M. A. Feb. 7, 1920. (2) Owing to the appendix, cecum, ascending colon, duodenum, and biliary tract being frequently disordered. (3) Imbalance of muscular tension, owing to the muscles of the right side being often the better developed. Muscular lesions and lymphatic involvement of the cervical region seem to occur oftener on the right side than on the left.

J. H. Sullivan¹ makes the following observation concerning severe, deep abdominal treatment: "I have noted that this often resulted in the reverse of good effects. In constipation, naturally then, I am chary about treating abdominally, confining my work principally to the biliary regions, the ileo-cecal and left iliac regions and have attained good results when a promiscuous working of the abdomen had not so resulted." This emphasizes the point that specific treatment is as much indicated for the abdomen as it is for the spine.

Frequently there will be found a spastic condition of the pelvic colon, often associated with congestion and adhesions. This probably sets up a reversed peristalsis. Treatment by inhibitory relaxation, with patient in knee-chest position, and adjustment of lumbar and innominate lesions, is indicated.

Direct treatment to the liver and biliary ducts is necessary in many cases, as the bile secretion is often defective; thus a slowness or inactivity of the liver and bile ducts might cause costiveness.

Some cases result from anesthesia of the rectum, due to pressure of the fecal matter collecting in the rectum. Simple dilatation of the rectal sphincters and a stimulating treatment through the sacral nerves will bring about a healthy activity of these parts. Occasionally the coccyx becomes displaced and produces paresis of the rectal nerves; or a displaced uterus or a tumor may produce the same result.

The use of **proper food** is essential. Coarse food leaves a great amount of residue, and on the other hand, dainty food leaves but little residue, both causing costiveness. As a rule increase the amount of fruit and vegetables. The patient should drink considerable water, and the time is of importance. Have a glass of cool, not iced, water taken on arising and if breakfast is delayed sufficiently, another in half an hour. Most people do not drink enough water. Unless contraindicated eight or ten glasses daily should be insisted upon. An enema² occasionally is indicated and is a great aid when used, particularly in cases of paralysis of the intestines and in impactions. Correct breathing and out door life are beneficial.

Treatment of the Constipation of Infants.—Repeated small enemata at a fixed hour each day will often be satisfactory but be certain that the tissue is not irritated. Two ounces of tepid water at a time should be injected. Careful spinal treatment and massage to the abdomen will be useful, as will slight dilation of the anus, which is usually done

1. Journal of Osteopathy, May, 1900.

2. For points on enema, see treatment under Intestinal Obstruction.

with the little finger, but in obstinate cases a soap stick may be used. When there has been continued straining at the stool, the sigmoid and rectum will often be found prolapsed, causing a mechanical obstruction. With the finger well lubricated this can be corrected and often is all that is needed. These directions, with care in the foods, are usually sufficient in any case not congenital. In chronic constipation *Ruhrhah* outlines dietetic treatment as follows: "In infants see that they get sufficient fat and protein; well-cooked and sweetened oatmeal gruel is useful. Orange juice, baked apple, or prune juice taken on an empty stomach is of service. Olive oil, the malted foods, or malt extracts are useful. In older children fresh fruits, vegetables, and oatmeal porridge are of value. Graham bread, dates, figs, and prunes may be used."

Intestinal Obstruction

(ILEUS)

This is due to a sudden or gradual closure of the intestinal canal at any point. Closure of the gut may be caused by strangulation, intussusception, twists and knots, abnormal contents, strictures, tumors, kinks, spastic states, adhesions, etc.

Strangulation.—This is the most frequent cause of acute obstruction of the bowels. There may be stricture of the bowels due to inflammatory processes producing bands or adhesions, or due to the adhesion of a bowel to an abdominal wound; a vitelline remnant, as a blood vessel, may remain and act as a strangulating cord, or in Meckel's diverticulum one end may be attached to a mesentery or abdominal wall and thus form a ring through which the gut may pass and become strangulated.

Strangulation may take place through the foramen of Winslow or the foramen ovale, or between the pedicle of a tumor and the abdominal wall.

Peritoneal pouches, mesenteric and omental slits, adherent appendix or Fallopian tubes and diaphragmatic hernia may be other causes. An internal strangulation (hernia) may take place in the crural or inguinal canal, in the umbilicus, in the sacro-sciatic notch or in the opening through which the infra-pubic vessels pass. In strangulation there is a constriction of a portion of the bowel causing an arrest of the circulation of blood at that point, and more or less stoppage of fecal matter of the intestine.

In ninety per cent of cases the strangulated part is in the lower abdomen and sixty-seven per cent occur in the right iliac fossa, according to Fitz.

Intussusception or Invagination.—Intussusception is a slipping of a part of the intestine into another part immediately below it, as the slipping of a part of a finger of a glove or a coat sleeve into another part. The portion involved may be anywhere from half an inch to a foot or more in length. This produces compression and inflammation of the intestine, and obstruction to the intestinal contents. It occurs principally in children and is more common in males.

Spasms of the intestinal muscles and perverted peristalsis are probably the most common causes. One part of the bowel may be dilated and an adjacent portion contracted, thus allowing an invagination. Diarrhea, habitual constipation and intestinal polypi are important exciting causes. Invaginations oftentimes occur just before death, probably due to irregular peristalsis.

Following engorgement and inflammation of the invaginated portion, a tumor is usually present, and lymph is exuded which may cause the layers of gut to adhere, so that the invaginated portion is firmly held. Necrosis and sloughing are then likely to take place.

Intussusception varies according to location and is named according to the part of the bowel involved. There are commonly recognized (1) Ileo-colic, when the ileo-cecal valve enters the colon. (2) Enteric, of the small intestines. (3) Colic, of the large intestine. (4) Colico-rectal, of the colon and rectum. (5) Rectal, of the rectum.

Twists and Knots.—These occur more frequently in males, usually between the ages of thirty and forty. In nearly all cases the twist is axial, accompanied by relaxed and lengthened mesentery. One portion of the bowel may be twisted about another, or a loop of bowel twisted upon its long axis. A bowel being impacted or overdistended by feces and gas, is quite likely to roll on its axis or knot and become dislocated, its weight and inactivity thus producing compression and obstruction of the bowels. The volvulus commonly occurs in the large intestine, at the sigmoid flexure and in the ileo-cecal and cecal regions. It occasionally occurs in the small intestine.

Abnormal Contents.—Obstructions may be caused by gallstones, enteroliths, lumbricoid worms, certain medicines (such as magnesia and bismuth), fruit stones, coins, needles, pins, buttons, etc., and fecal matter. Foreign bodies usually lodge in the ileo-cecal region and in the small intestine, while fecal impactions occur in the large intestine, more frequently in the lower part. Females are more subject to it than males.

Its causes are many and are similar to those of constipation. Spinal lesions are very frequent, probably causing paresis or paralysis of a seg-

ment of the bowel; or all the forces that maintain a normal activity of the intestines may become impaired. Hemmeter¹ says it is "more frequently the result of defective innervation of the intestine."

Impactions are frequently met with and are easily overlooked under any diagnosis which does not include thorough palpation of the abdominal viscera. The impaction may be so large as to produce dilatation of the bowel. The obstructive mass becomes very hard and dry and perhaps channeled, allowing some material to pass until, finally a large piece of fecal matter will obstruct the passage completely. In **diagnosis** it must not be confused with neoplasms, tumors, etc. Impactions may occur at any point of the colon and the weight so drags the bowel out of position as to be misleading. The principal points are the ileo-cecal region, sigmoid flexure, and rectum. Tenderness is usually present, as may be diarrhea which must not be taken as evidence that the bowel is clear. Impaction gives rise to many reflex symptoms and is often the real cause of many mistaken conditions.

Too much cannot be said on the importance of a thorough examination of colon and its connections, which should be routine of every examination as the large bowel is impacted much more often than suspected and may be the seat of many reflex and direct disturbances. The heart may be affected by weight upon the vessels, gastric disturbances and signs of autointoxication from absorption may appear.

Dilatation of the sigmoid flexure, especially when it is congenitally long, may even be so great as to crowd up and interfere with the liver and diaphragm; in these cases the coats of the intestines are usually hypertrophied.

Strictures and Tumors.—These usually occur in adults, more frequently in women and generally involve the large intestine and lower part of the abdomen, most of them occurring in the left iliac fossa. They frequently result in chronic obstruction. Occasionally, a stricture may be spastic, due to vertebral lesions, that is severe enough to cause complete blockage of intestinal contents. These are usually of the pelvic colon. There are cases where the opposite condition, paralysis of a section, generally of the small intestine, occurs. This may be due to injuries to the bowel, or to damage of the blood-supply, or to derangement of the innervation.

Scar tissue, following ulceration of the bowel; tumors of various kinds; and congenital defects, are possible sources of intestinal obstruction.

1. Diseases of the Intestines, Vol. I, p. 240.

Symptoms.—Acute Obstruction.—There is constipation, nausea vomiting, and pain. The pain is of a colicky nature and may come on abruptly. After the contents of the stomach have been vomited, the material becomes colored with bile, and finally stercoraceous vomiting occurs. Observing the contents vomited (gastric, bile-stained, and fecal) will greatly aid in the diagnosis. The contents of the bowel, below the obstruction, may be emptied or complete constipation may remain. All the symptoms, as a rule, rapidly grow more pronounced. The pain is more severe; tenderness occurs over the abdomen in limited areas; there is slight tympany; the eyes are sunken; the skin is cold and clammy; the pulse is quickened and feeble; there is rapid increase of leucocytes; the urine highly-colored; the tongue is dry and there is incessant thirst; tenesmus and tumor may be marked, and fever occasionally occurs. The above condition may continue from three days to a week, when collapse and death may occur, if relief is not obtained.

Chronic Obstruction.—In fecal impactions constipation of long standing is commonly observed. In some cases the fecal mass has become channeled, allowing the bowels to remain open; the patient possibly not knowing that there is any trouble. In fact, diarrhea may be present, due to irritation above the impaction. Finally, however, obstruction occurs; the breath is offensive, the appetite is poor, the abdomen swells, and there is fullness and weight within the abdomen, accompanied by pain and vomiting. Upon examination before complete closure, the fecal impactions can easily be felt through the abdomen externally. The tumor is a yielding mass. It has been mistaken for an enlarged liver or gall-bladder, a kidney, or a tumor of the stomach or duodenum. Other symptoms may be present as hiccough, jaundice, tenesmus, tumultuous peristalsis, local peristalsis, local peritonitis and collapse. In stricture caused by cicatrices that may have been formed years before, complete obstruction takes place. Transient attacks often occur. Usually the general health is greatly impaired long before complete occlusion.

Diagnosis.—A diagnosis can usually be made by careful, thorough examination through the abdominal wall, in connection with the symptoms, and the physical signs. The region of intestinal trouble is manifested by contracted muscles at certain points along the spinal column, corresponding with the particular portion of the bowel involved, as indicated under intestinal colic. Examining the patient in the knee-chest position will often give a better opportunity to locate and outline the obstruction. Rectal and vaginal examinations should not be neglected. Intestinal obstruction may be confounded with tumors,

hernia, intestinal colic, enteritis, peritonitis, hepatic colic and renal colic. **Peritonitis** may be differentiated by the history, the early fever, diffused tenderness and absence of fecal vomiting. When **invagination** occurs, besides the symptoms of obstruction, the age, tenesmus, bloody discharges and the sausage-shaped tumor in the line of the colon, will be diagnostic. In **stricture**, the history, gradual onset, and ribbon-like and bloody stools will distinguish that disorder. In **tumors** the gradual onset, age, bloody discharges, and cachexia will be important symptoms. X-ray diagnosis may be of value in certain cases.

Treatment.—Treatment of the bowels directly is required, and each case must depend for its relief upon the ingenuity of the osteopath. Rules to be followed cannot be given, as cases vary in manner of involvement and in location, consequently the correction of the disorder depends as much upon the ability of the osteopath as does the determination of the diagnosis. Taxis is the method commonly used in relieving intestinal obstructions, though other methods may be employed.

In **invagination**, raising the buttocks and lowering the chest, with thorough injection of oil or tepid soapsuds, or an inflation of the colon with air, may give relief. In addition to thorough but cautious manipulation of the bowels as in **impaction**, irrigation of the lower bowel with warm water, soapsuds, or glycerine and water, will usually be of material aid. In **strangulation**, high injections of warm water, and assuming the knee-elbow or lateral position, may straighten out the acute obstruction. **Twists** and **knots** are best relieved by direct treatment, although injections may be of aid. **Kinks** of the pelvic colon, ileum, and duodenum are best treated with the patient in the knee-chest position. **Tumors** and **strictures** will require, sooner or later, surgical interference in most cases, but to treat as in impaction will be effective for a short time at least. If there is no indication of immediate **relief within three days, surgical interference should be instituted.** Besides the ordinary treatment for the nausea and vomiting, washing out the stomach will help allay such disorder, quiet the peristalsis and relieve the abdominal distention and pressure above the seat of obstruction. Strong thorough treatment of the spinal nerves to the stomach and intestines will be of great help in lessening pain, establishing normal peristaltic action and in suppressing inflammation. The vagi also should be treated for perverted peristalsis. Hot fomentations will be of service. The nutrition of the patient is best retained by rectal injections of food.

Spastic states, particularly of the pelvic colon, frequently cause constipation of various degrees of chronicity. Reaching beneath the

spastic area and inhibiting and raising (knee-chest position) the parts will often give marked relief.

Adhesions can often be stretched sufficiently to restore normal function of the bowels.

Treatment of **impactions** and **abnormal contents** requires an additional word. The first step is to free the colon of the fecal mass. The enema is of great assistance in this, for cases of long standing present a hard, dry mass, often adherent, and the mucous membrane is sensitive from inflammation. Much abdominal treatment must not be given until the mass is softened by water. When in the sigmoid or rectum it may, if not dislodged by repeated enemata, have to be removed by a colon spoon, perhaps under anesthesia. Impaction of the small intestine is rare and out of reach of the enema, although if taken as hot as can be borne, it will exert considerable influence high up. In these tendencies and in constipation, when the bowel must be kept open before treatment has produced much effect, there should be an effort made to break up any cathartic habit which may be formed. The enema is a most valuable aid, but it must be given correctly. The patient should be instructed that a fountain syringe is preferable, and that it must never be taken standing. This merely fills and distends the rectum, or lower sigmoid at the best, and is passed without any or with very little effect. Lying on the right side is a very good position, as is also on the back with hips elevated, but the knee and chest is best in most cases. The water should be a little above body temperature and can be saponified or used clear. The effect will be about the same. The tube should be perfectly smooth and well lubricated and introduction must be made with care so as not to bruise or irritate. The water, having been allowed to run to expel the air, may be now started and will separate the mucous folds and allow easy penetration. The rubber tube should be held between the thumb and finger, so the flow can be stopped as soon as it meets an obstruction. When this is passed the flow can begin again and continue until the required amount (from one to two quarts for an adult), has been taken, or until the feeling of distention becomes too great. By following this method, much of the distress and colicky pains which sometimes accompany an enema, may be avoided. Water should be held for some minutes, to allow softening of the fecal mass. In many impactions it is important to get the water into the ascending colon. For that purpose nothing is better than a Coles sigmoid irrigator. This is shaped somewhat like the letter S and is about a foot long from tip to tip. Its introduction is not difficult, but care must be used. Place the patient

on the right side and stand in front, having the bag suspended near. Introduce the tube and with slow, gentle pressure let it follow the course of the bowel. When the splenic flexure is reached, it will stop, but by letting a little water flow, the bowel will distend and it will pass. When in the full length, the end will be near the median line and in the transverse colon. Now let the water flow slowly, stopping frequently, and with one hand gently lift and work the abdomen. This will both soften the contents and aid the water in reaching the farthest point. It is not well to give more than a quart the first time, as there is apt to be some prostration. The tube also has the mechanical effect of raising and replacing the sigmoid, descending colon and splenic flexure. When there is lack of tone to the bowel or when very little stimulus is needed, a half pint of cold water taken in the morning, will often act quickly. Appliances which force the water into the bowel when the patient is sitting, are not recommended, as they tend to stretch the muscular coat by pressure from lifting a column of water.

Hernia.—There are several methods of replacing a hernia. The first endeavor, in every instance, must be to reduce it, whether it be strangulated, incarcerated or simply protruded. One of the easiest and commonest methods is to place the patient on his back, the buttocks elevated, the legs flexed upon the thighs, the thighs flexed upon the abdomen, and the limb on the affected side slightly rotated inward, so that the columns of the ring about the hernia may be relaxed. After the hernia is protruded a little more, so that its contents may be emptied readily, a gentle pressure with the thumb and finger is made upon the upper part of the tumor, when the rest will follow. A gurgling noise is heard upon reduction. Cases that cannot be reduced and are causing acute obstruction of the intestines, should be treated surgically. Incomplete hernia, which does not show externally, may be present and cause severe reflex symptoms. Considerable attention has been given to this by some investigators. The patient is placed in the Trendelenburg position and the bowel lifted out of the fossa. If any signs of hernia are present a well fitting truss will often cause it to heal. Exercises, in a few instances, will be beneficial.

Appendicitis

Appendicitis is an inflammation of the appendix vermiformis. In a few cases the cecum and surrounding tissues are involved (typhlitis, perityphlitis). The vasomotor nerve supply comes from the lower three dorsals and upper two lumbers. The sensory nerves make their exit from

the three lower dorsals. Appendicitis is nearly always predisposed by injury to the innervation of the vermiform appendix and immediate region, vertebral derangements or sub-dislocations from the tenth dorsal to the third lumbar. The vermiform appendix is a peculiarly constructed organ, and its function has not been determined with positiveness. It undoubtedly has a function and possibly a very useful one. Sir William Macewen¹ does not share in the general belief that the appendix is without function, but protests against its indiscriminate removal, believing it has a powerful influence over the function of the colon. "Yet thousands have been operated and show no ill effect." This is in keeping with the ideas of Dr. Still, who always maintained that the appendix is of importance to the human economy. Although the organ has been found in various localities of the abdomen, this fact and others do not necessarily indicate that it is a functionless relic. It is richly supplied with lymphatic and blood-vessels and has a peristaltic action peculiar to itself. When the organ is in perfect condition, foreign material probably would not find a lodging point in it, on account of its peristalsis. Dr. Still² suggests that the appendix has a sphincter, also the power to contract, dilate or shorten, should any foreign substance enter, and he worked with this idea in view with uniform success. The truth of this theory has been proved by Abrams³ who has demonstrated by the aid of the fluoroscope that peristalsis of the appendix can be stimulated by percussing at the 10th dorsal and it made to empty and fill itself. Abrams makes use of this fact in the treatment of catarrhal appendicitis. Appendicitis may also be caused by fecal impactions and foreign bodies in the bowel contiguous to the appendix. In these cases there is usually an impaired innervation from the spine, due to vertebral and lower rib lesions, resulting in a weakened muscular coat and catarrhal congestion of the mucosa. In a word, prolapse of the bowel at this point is a predisposing common cause. In various instances abrasions of the coats of the tube occur, or the innervation or vascular supply is impaired, and pathogenic bacteria, as bacilli coli communis, streptococci pyogenes, staphylococci pyogenes aureus, typhoid bacilli, tubercle bacilli and others, find a favorable lodging point and determine the nature of the disease. Injuries to the spinal column and displacements of the vertebrae in the lower dorsal and lumbar regions, straining and lifting, tight lacing, torsion of the appendix, traumatism, impaction of feces, concretions and foreign bodies,

1. The Lancet, (London,) Oct., 1904.

2. Philosophy of Osteopathy, p. 226.

3. Medical Record.

acute indigestion, indigestible food, overeating, exposure to wet and cold, and infectious diseases (as typhoid fever, tuberculosis and influenza), are all in the list of causes of appendicitis.

Pathologically, in most cases the inflammation is catarrhal. This includes many of the mild attacks. The mucosa is inflamed similarly to catarrhal processes elsewhere, although the inflammation may rapidly spread to the deeper structures unless immediately cared for. The inflammation may be so severe that the lumen becomes closed. This is termed **obliterating appendicitis**. When this occurs the attack may cease and danger from subsequent attacks are at an end, but inflammation may go on to purulent involvement and even to **ulceration, gangrene** and **perforation** or **peritonitis**. An **abscess** may be within or without the appendix. **Adhesions** are likely to form about the mass.

Symptoms.—A sudden, violent pain in the abdomen, usually localized in the right iliac region, although at first this pain may be general. The point of greatest tenderness is detected over McBurney's point—a point at the intersection of a line between the umbilicus and the anterior iliac spine, with a second drawn along the outer edge of the right rectus muscle. The patient usually lies on the back with the right leg drawn up. The severity of pain is not indicative of the seriousness. If the pain ceases suddenly, it is commonly a serious indication. There is usually fever at the onset, the temperature being from 100 to 102 or even 104 degrees F., and very rarely preceded by a chill. In favorable cases the temperature gradually falls, reaching normal in from five to seven days. If recovery has not begun by this time an abscess is probably forming. If **suppuration** takes place the temperature continues with but slight fall, although in some cases there is a rise, or it may become almost normal. Pain in the right iliac fossa, without fever, rarely points to an acute attack of appendicitis. Vomiting and nausea are more or less frequent, and more commonly present in the event of perforation or rupture of an abscess. In favorable cases vomiting rarely lasts beyond the second day. In the majority of cases constipation is present from the beginning of the attack, due to paralysis of the bowels. There may be diarrhea, particularly in children.

“**Urine** is febrile in character with large quantities of indican. The **blood** shows leucocytosis. A leucocyte count of 20,000 is high and indicates an acute appendicitis, with pus, gangrene or peritonitis.”

On **inspection** of the abdomen at the onset of the attack, the sides look alike, but on **palpation** there is rigidity of the rectus abdominis muscle and the other muscles overlying the seat of inflammation. The

whole abdomen may be slightly distended. In the majority of cases there is a progressive development of a hard swelling or tumor in the right iliac fossa. These tumors vary in size, but are usually oval and the size of a hen's egg, and generally situated a little above Poupart's ligament. **Fluctuation** of the tumor is indicative of suppuration. There is often great irritability of the bladder and frequent micturition. A sudden fall in the temperature often indicates that a perforation has taken place, or that a small abscess has ruptured into the intestines. In favorable cases the temperature falls at the end of the third or fourth day, the pain lessens, the tongue becomes clearer and the bowels are moved. If the tumor persists, the patient is very liable to have a **recurrence** of the condition.

Rapid growth of the tumor and aggravation of the several symptoms point to suppuration, especially **extreme tenderness** over the point of inflammation. If the appendicitis goes on to suppuration, there is danger of rupture into the peritoneum. In a few cases the abscess may rupture into the bowel, in which case the patient recovers. Other terminations are lumbar abscess, hepatic abscess and perinephritic abscess. Death may be caused by septicemia or pylephlebitis. These events may be delayed a variable length of time, depending upon the extent and strength of the adhesions that form about the abscess. "The gravity of the appendix disease lies in the fact that from the very outset the peritoneum may be infected; the initial symptoms of pain, with nausea and vomiting, fever, and local tenderness, present in all cases, may indicate a wide-spread infection of this membrane." (Osler). He also says local signs are not so trustworthy as the general symptoms.

There is liability to **relapse in appendicitis**. The attacks may recur for years at different intervals. In some cases these intervals are very short. In some cases perfect recovery may take place after repeated attacks.

Diagnosis.—In many cases the diagnosis is easy, but other cases require careful study and close observation. Sudden pain becoming localized, tenderness and rigidity in the right iliac region are three symptoms that together almost positively indicate appendicitis. The leucocyte count is of particular value. A **pseudo-appendicitis**, with all symptoms of true appendicitis in the initial stage, may be caused by the downward dislocation of the twelfth rib on the right side, and occasionally the eleventh rib on the same side. The rib lies obliquely downward toward the crest of the ilium. In a few cases the obliquity of the lower rib is so great as to very nearly touch the ilium. The dislocated rib may

produce severe irritation, pain, tenderness, rigidity, and even inflammation, of the abdominal muscles. The patient nearly always complains of the pain being deeply seated, thus possibly confusing one. In **typhoid** there is a gradual development of the fever, characteristic temperature curve, enlargement of the spleen, epistaxis and diarrhea. The Widal test should be made. The absence of fever and intermittent pain in the abdomen, with complete constipation, fecal vomiting, general distention of the abdomen, bloody stools and marked tenesmus would determine **intestinal obstruction**. In **tubal disease** a gradual onset, a more dull and constant pain, the history, and pelvic examination will usually differentiate this disorder from appendicitis. Kelly¹ gives these points in differential diagnosis, between acute salpingitis and appendicitis: "In the former it will usually be found that there has been a yellowish vaginal discharge for some period before the attack. The local pain and tenderness, usually located deeper in the pelvis, is most intense on palpation in the region of Poupert's ligament. On vaginal examination exquisite tenderness is felt on either side of the uterus." In **biliary colic** the pain is higher along the biliary ducts and gallbladder, extending even as high as the shoulder, and jaundice is generally present. In **renal colic** the pain extends along the ureters down to the inner side of thigh and testicle, and back into lumbar region. There is absence of fever and rigidity. The pain in **perinephritic abscess** is downward into groin, as in nephritic colic, and there is tenderness of the lumbar region. Exploratory incision may be necessary.

Prognosis.—Naturally, the prognosis depends upon the character of the appendicitis, but on the whole the prognosis is favorable. A large proportion of cases recover. Surgical operations are many times deferred until too late; undoubtedly on account of the uncertainty of the condition. Still, on the other hand, many serious cases recover under the proper treatment when an operation seemed almost absolutely necessary; all going to prove the fact that very much depends upon diagnosis of the true condition. The statement that there is "no medical treatment for appendicitis," seems rather broad in view of the report of the medical inspector² of the French Army in Algeria. Out of 668 patients suffering from appendicitis, 188 were operated upon and 23 died, while 408 were treated medically and only three died. He concluded that a meat diet tended to increase the number of cases. "It is exceedingly common and the prognosis is, on the whole favorable. Tafft, of Copenhagen,

1. The Vermiform Appendix and Its Diseases, p. 711.

2. Dr. Chauvel, 1902.

found adhesions in the neighborhood of the appendix in 35 percent. of all bodies subjected to post mortem examinations¹.

Treatment.—Confine the patient in bed at once. Cases have undoubtedly been lost by not enforcing this point. Attempts should be made to correct the disordered condition of the dorsal and lumbar regions. Thorough and careful treatment should be given at this point, and in most instances the pain can be relieved by correction of the disordered vertebrae. If the case is seen at the beginning of the attack, careful manipulation that especially lifts the cecum and surrounding structures and local application of ice are indicated. However, great care should be exercised here, for some of the most severe cases show no induration. Temperature, pulse, and blood picture are invaluable as guides. When the case is advanced, extreme care should be used in manipulating over the swollen and inflamed region. Hot applications will be helpful in such instances.

When due to fecal impaction and foreign bodies, thorough, direct, elevating treatment over the involved region, and high rectal injections are indicated. This applies to the onset, for if the disease has progressed to the point where pus may be present, the **bowel** must be **absolutely at rest**. Do not give or allow to be given purgatives at any stage of the disease. When **sure** that **there is no pus**, direct, careful work over the cecum and appendix is allowed and is of value. It should be a lifting of the colon and relaxing of nearby tissues, to promote the circulation. Treatment of the spine is necessary in all cases, to relieve pain, to correct the nerve and vascular supply, and to increase peristalsis so as to remove irritating bodies from the vermiform appendix. "Colitis follows appendectomy more frequently than any other abdominal operation. The explanation for this is that the appendicitis is seldom localized in the appendix but is complicated by colitis, or rather the colitis is complicated by the appendicitis. In such cases, removal of the appendix aggravates rather than alleviates. A conclusion to be drawn is, to carefully palpate the colon in all appendicitis cases and reserve diagnosis, prognosis and advising of an operation until it can be definitely determined as to the location, extent and degree of the disease. The formation of pus is an indication requiring immediate evacuation.

"If good surgical advantages are available and the case begins with considerable virulence and a surgeon can be had within the first twenty four hours, it is in all probability best to operate; but if the case begins slowly or no good hospital advantages are available, or if the case

1. Rose and Carless.

is not seen until some forty eight hours have elapsed after the onset, in all probability it is strictly an osteopathic case and should not be touched by surgery. Some advocate in all instances to wait until pus is formed before operative procedure is resorted to. This is a rather dangerous attitude to take, for I have seen hundreds of cases operated and have operated upon a great many myself and I have never seen a case die unless it was a pus case."—S. L. TAYLOR.¹

The case should be most carefully watched, and a surgeon should be promptly called for consultation if the occasion demands it in the least; and if thought advisable, operation should be resorted to before too late. Do not assume too much responsibility in these cases. The patient should be nourished on a restricted diet of milk and animal broths. Asa Willard² strongly recommends no food by mouth, as it is bound to set up peristalsis and cause increased irritation. He sustains the strength by rectal feeding. This view is held by other authorities, even to withholding water when the inflammation is at its height. Tasker confirms the advisability of restricted feeding and advises resting the bowel even to the point of discontinuance of food. The course of the attack is usually so short that there is no danger of starvation and little loss of strength results. This point is a highly important one in cases of any degree of severity.

In **chronic cases** of a fibrotic character, no pus, carefully lifting the parts and loosening adhesions in addition to spinal adjustment will often restore normal circulation. These conditions aside from the local disorder frequently cause hyperchloridia and other digestive disturbances.

Diseases of the Liver and Bile Duct

Primary diseases of the liver will invariably present osteopathic lesions from the fourth or fifth dorsals to the eleventh or twelfth. The ribs on the right side are commonly involved. These lesions probably disturb the liver by way of the vasomotor fibers. Displacements of the duodenum, of the hepatic flexure and transverse section of the colon and displacements of the right kidney are frequent sources of liver disorders. Care should be taken in differentiating primary from secondary diseases, for naturally the relative importance of the various factors in treatment will vary. In many secondary diseases there will be found predisposing osteopathic lesions, and these secondary disorders and degenerations can at least be palliated and occasionally the degeneration

1. Clinical Osteopathy.

2. Journal of the American Osteopathic Association, Dec., 1902.

retarded or stopped by persistent osteopathic treatment, diet, and hygienic measures.

Hyperemia of the Liver

This is an abnormal fullness of the blood-vessels of the liver, followed by an enlargement of that organ. It is active when there is abnormal pressure in the portal veins (afferent vessels); passive when there is excessive pressure in the sublobular veins (efferent vessels).

Osteopathic Etiology and Pathology.—**Active hyperemia** is usually due to indiscretions in diet. After each meal a physiological hyperemia of the liver occurs, which is greatly increased by habitually overeating and overdrinking. This condition may lead to functional disturbance and possibly to organic change. Traumatism and lesions of the vertebrae and ribs, irritating vasomotor nerves, are important. Habitual constipation, malaria, heat, and arrested menstrual epoch, and infectious fevers are also causes of the active form. Enteroptosis is not a rare cause.

Passive hyperemia is due to obstructions of the efferent circulation. Valvular heart disease is the most common cause. Lung diseases, as emphysema or cirrhosis; obstruction to the vena cava or interference with the flow of blood through the liver; and diseases of the pleura, are among the causes.

Most cases of congestion of the liver present lesions to the vasomotor nerves of the liver, fifth to ninth dorsal. Especially are the ribs over the liver apt to become displaced and affect the organ.

Pathologically, the liver is enlarged and engorged with blood. The appearance of the organ depends upon the duration of the hyperemia. In passive hyperemia the central portion of the lobule and the area of the hepatic vein are deeply colored. The periphery and the area of the portal vein are pale. This alternation of the dark and light color gives rise to the nutmeg liver, which is so noticeable upon section. In cases of long standing, atrophy of the liver cells and overgrowth of connective tissue result.

Symptoms.—**Active Hyperemia.**—Dull aching and a sense of fullness in the right hypochondrium, aching of the limbs, coated tongue, nausea, vomiting, constipation, highly colored urine, and slight jaundice.

In **passive hyperemia** the symptoms are the same, but less marked. The onset is gradual and the liver may attain considerable size. In severe cases following tricuspid regurgitation the liver may pulsate. In severe cases dropsy takes place.

Diagnosis.—Active hyperemia is occasionally confounded with catarrhal jaundice. Usually congestion of the liver is easily diagnosed.

Prognosis.—In active hyperemia the prognosis is good, unless repeated attacks lead to atrophic degeneration. In passive hyperemia the prognosis depends entirely upon the cause.

Treatment.—Active hyperemia.—The treatment consists of measures which tend to diminish the congestion, principally a thorough, direct manipulation over the liver by raising and spreading the ribs. Careful and thorough treatment to the dorsal splanchnics of the liver is also indicated. The substitution of a scanty for a heavy diet is essential. The foods given should be such as are easily digested, as milk and broths; fats and sugars are to be avoided.

In **passive hyperemia** the treatment consists of correcting the disorder causing it. Often heart diseases are the cause. A thorough depletion of the bowels will aid largely in relieving ascites that may follow passive congestion (See ascites).

In liver congestions it is well to pay attention to the intestinal condition in order that the circulatory mechanism here may be thoroughly coordinated with the hepatic.

Simple Catarrhal Jaundice

Definition.—Jaundice due to inflammation of the terminal portion of the common duct, not the result of impacted gallstone. The disease probably starts as a catarrhal inflammation of the stomach and upper portion of the small intestine. The bile is retained and absorbed.

Osteopathic Etiology and Pathology.—A frequent predisposing cause is the subdislocation of the tenth rib on the right side, thus interfering with the innervation to the bile ducts, and causing congestion of the mucous membrane of the common duct; although lesions above and below this point may occur. Extension of gastro-duodenitis into the common duct is a common source of the inflammation. Sagging of the duodenum will disturb the bile-duct through its being a portion of the duodeno-hepatic ligament. Duodenal catarrh usually follows errors in diet, exposure, malaria, Bright's disease, portal obstruction and chronic heart disease. Infectious fevers, as pneumonia and typhoid fever, and emotional disturbances are among the causes. Catarrhal jaundice may occur in epidemic form.

Pathologically, the duodenal end of the duct is most commonly involved. The mucous membrane is swollen and the orifice fills with mucus. The inflammation may involve the common and cystic ducts

and even the hepatic. The liver is enlarged and the gall-bladder distended.

Symptoms.—The only symptom present may be simply the jaundice. There is always tenderness upon pressure over the ducts. The patient many times complains of a stabbing pain when pressure is exerted over the duodenal opening. Usually the course of the bile duct can readily be felt upon deep pressure, owing to the tumefaction. Accompanying this condition may be general malaise, loss of appetite, nausea, vomiting, constipation or irregular action of the bowels, pains in the back and limbs and a slight fever.

Diagnosis.—Where jaundice is present without pain, it generally indicates catarrhal jaundice. The absence of emaciation or of evidences of cancer or cirrhosis usually makes the diagnosis easy. Good general nutrition and a negative physical examination favor simple jaundice as to the diagnosis.

Prognosis.—The prognosis of catarrhal jaundice is favorable, unless accompanied with infectious diseases or hypertrophic cirrhosis. When diseases are associated with jaundice the danger is usually from the disease. The duration of the disease is generally given as from two to eight weeks, but osteopathic treatment generally lessens that time at least one-half.

Treatment.—The treatment is directed toward relieving the inflammation of the bile ducts and increasing the flow of the bile into the intestines. Great relief to the patient will be experienced from thorough treatment over the bile ducts, especially at the duodenal end. Press slowly but firmly over the region of the ducts, then execute a downward motion with firm pressure over the course. This performance should be repeated several times, until the tenderness in this region is almost or entirely relieved. The idea of this treatment is, **first**, to slowly but firmly bear down upon the abdominal muscles over the congested tissues, so as to relax the tissues and get as close to the ducts as possible, and **second**, with the downward movements to reduce the congestion of the ducts and at the same time to remove any mucus or other material from the orifice, thus allowing a freer flow of bile. It will be recalled that the normal flow of bile is under very low pressure. Care should be taken not to gouge or dig into the tissues with the ends of the fingers, but to use the flat surface of the fingers. Any gouging or severe treatment will not allow one to accomplish his purpose, owing to the stimulus or irritation it would give the abdominal muscles and thus cause them to contract; and furthermore, it would more or less bruise the parts. An inhibitory

treatment should be given along the spine on the side affected to help relax the abdominal muscles before this treatment is administered. In all circulatory disturbances of the bile-duct and other hepatic tissues lift the duodenum at about the second lumbar where it lies beside the ascending colon. This tends to release portal vein, hepatic artery and bile-duct, the duodeno-hepatic ligament.

Direct treatment is given to the liver by more or less kneading or working the organ and also by raising and spreading the ribs. This treatment is to stimulate the activity of the liver. Reaching under the cartilages of the eighth and ninth ribs on the right side and bearing inward and downward will empty the gall-bladder and thus be of aid in relieving the tension in the biliary passages. It is probably a stimulus to these cutaneous fibers that causes a relaxation of the sphincter muscles of the gall-bladder and thus allows it to empty. Stimulation of the tenth nerve contracts the gall-bladder. Then it should also be noted that work over the duodenal end of the bile-duct relaxes the orifice while through reciprocal relationship the fibers of the gall-bladder contract. When all of the muscles of the hepatic region have been carefully relaxed and softened, a thorough examination can then be made of the vertebrae and ribs that might embarrass the innervation or vascular supply of the liver. Lesions of the vertebrae and ribs affecting the liver may occur from the sixth to the eleventh dorsal. Lesions to the vagus and phrenic nerves may occasionally involve the organ.

Irrigation of the large bowel with cold water may be employed. The cold excites peristalsis of the gall-bladder and ducts. Drinking freely of water will be helpful. A non-stimulating diet should be given. The stomach may not be in a condition to bear solid food; and furthermore, food on entering the duodenum will increase the local inflammation of the common bile duct. Give diluted milk, buttermilk, light meat-broths, clam-broth, egg albumin and pressed beef juice. After the pain, vomiting and fever subside, the diet can be gradually increased.

Cholecystitis

Cholecystitis is an inflammation of the gall-bladder caused by infection. Stagnation of bile due to obstruction (especially gall-stones) of the bile-ducts, or a slowing of the bile flow owing to deranged innervation from osteopathic lesions or sagging bowel, are predisposing factors. Fibrotic changes in the appendix are fairly common sources that derange the nervous reflexes of the biliary function. The disorder may be associated with specific fevers.

Exciting factors are the colon bacilli, streptococci, staphylococci, typhoid bacilli, and pneumococci.

Symptoms.—The gall-bladder feels hard and full. There is inflammation and thickening of the mucous membrane, with considerable increase of mucus. Owing to the infection there may be ulceration and suppuration, with possible perforation and peritonitis. When the inflammation extends outside of the bladder there are usually adhesions.

The onset is commonly sudden, with pain and tenderness in the right hypochondrium. Great care should be taken in deciding the location of the inflammation, for the pain and tenderness may be over the stomach, or along the duodenum or ascending colon as low as the cecum. Nausea, fever, constipation, and possibly jaundice, are other symptoms.

Treatment.—Exercise special care in treating these cases. Although in many instances the inflammation will rapidly subside, still owing to suppuration there is danger of aggravating the condition. It is better, in doubtful cases, to confine the treatment to spinal work, and to influence drainage by placing the patient in knee-chest position and carefully raise cecum, ascending colon and duodenum. Rest, restricted diet, plenty of water, and hot fomentations will be beneficial. In severe cases surgical interference is indicated.

Jaundice

(ICTERUS)

Jaundice is a symptom and not a disease. It consists of the discoloration of the skin and other tissues by material derived from the bile. The discoloration may vary from a mere paleness to a yellow or brown olive hue.

Toxic jaundice occurs in acute yellow atrophy, pernicious anemia, pyemia, specific fevers, and the action of poisons.

Obstruction by foreign bodies as gall-stones and parasites are important causes. Inflammation and swelling of the biliary ducts and duodenum are common causes as well as stricture of the duct by tumors and various growths, either internal or external, to the biliary ducts. In some instances pressure from without by the pancreas, stomach, kidneys, enlarged glands, fecal matter, a pregnant uterus, etc., has been the cause. Irritations and obstructions of the splanchnic nerves, due to lesions in the lower dorsal vertebrae and the ribs from the sixth to the eleventh, will often markedly affect the liver. Also lesions at these points may predispose to inflammation and tumefaction of the bile ducts.

Symptoms.—Besides the discoloration of the skin, there is itching of the skin, on account of bile pigment deposits; even eruptions may occur. The mucous membranes are often colored and a constant symptom is the bright yellow discoloration of the sclerotic coat of the eye. The secretions are colored. It may be first noticed in the urine. The perspiration is colored, rarely the saliva and tears. There is frequent sweating.

As very little bile passes into the intestine, the feces are pale and gray, and sticky. The bowels are generally constipated, but diarrhea may occur, owing to decomposition resulting from absence of the normal ingredients. Other symptoms may be associated with the gastrointestinal derangements, as nausea, fetid breath and loss of appetite. A slow pulse may occur, due probably to some stimulating effect on the inhibitory action of the vagus nerve. Lesions are often found at the atlas and axis, affecting the vagus. Pain back of the right scapula is a symptom of liver trouble; it has been suggested that it is due to a stimulus passing up the vagus to the spinal accessory, and thence to the trapezius muscle.

Various cerebral symptoms may be present, as great depression, irritability, headache and vertigo. In severe cases there may be delirium and coma.

In **hemolytic** and **toxic jaundice** the destruction of blood is due to some toxic agent. The feces are not clay colored and the urine is less stained with bile. The general symptoms may be very severe depending upon the underlying cause.

Diagnosis.—To mistake for jaundice the dirty yellowish discoloration of the skin commonly termed sallowness is an error often made. This condition indicates malaria, uterine disease or general ill health. Very likely it is an anemia and is readily diagnosed from the jaundice as the secretions and conjunctiva are not stained. Addison's disease somewhat resembles jaundice, but the feces are normal, the urine and sclerotic coat are not colored, but exposed portions of the body and flexures of the joints are deeply stained.

Prognosis.—Depends entirely on the cause producing it. Ordinary cases run from two to six weeks, while others may not recover for several months. Jaundice from impaction of the bile ducts may be manifest for only a few days. Toxic form may terminate fatally, owing to the disease causing it. The extent of resorption of bile and destruction of red-blood cells in the liver varies to a considerable degree.

Treatment.—The treatment for the different forms resulting sec-