

PART VII. DISEASES OF THE BLOOD AND THE DUCTLESS GLANDS.

ANEMIA.

Definition.—By the term anemia is understood a change in the quantity or quality of the blood, and represents a variety of affections, deterioration of the blood being characteristic of each.

There may be a reduction in the volume of blood, without alteration of its composition, when the term oligemia is applied, or a reduction in the number of red corpuscles, is termed oligocythemia, and when the amount of hemoglobin is deficient oligochromemia is the term applied.

The simplest and perhaps best classification of anemia is into primary, or idiopathic, and secondary or symptomatic.

By primary, idiopathic, or essential anemia, is understood a disturbance of the blood or blood-making organs, or both, the anemia being the distinctive feature of the lesion, and all the other symptoms are secondary or dependent upon these.

By secondary anemia is understood a disturbance of the blood, due to some disease acting upon the blood or blood-making organs, the anemia being secondary.

Primary anemia is divided into two distinct forms: Chlorosis and progressive pernicious anemia.

CHLOROSIS.

Synonym.—Green Sickness ; Chloremia.

Definition.—A form of primary anemia affecting mostly girls at the period of puberty or early womanhood, and characterized by a marked deficiency of hemoglobin in the red corpuscles.

Etiology.—The disease is confined almost entirely to females. Noorden,

Eichorst, Jurgensen, Hayem, Luzet, and Liebermeister hold that chlorosis never occurs in the male; but of one hundred and eighty cases of chlorosis reported in the Leipsic Medical Clinic, eight occurred in males, though some doubt exists as to the correctness of the diagnosis.

The disease nearly always appears during the second decade, or between the fourteenth and twentieth year.

Unhygienic surroundings undoubtedly figure as a causal factor, for it is quite common in those closely housed, and where the air is bad, and where there is little sunshine. Factory girls, clerks, sewing girls, and those confined in badly lighted and poorly ventilated quarters, where the work is exacting and the hours long, and who eat hastily, improperly prepared food, are prone to chlorosis. While these conditions favor this lesion, it must also be recognized that girls reared in luxury are numbered among its victims.

Heredity is supposed to have some influence in predisposing to the disease, chlorotic children not infrequently having the history of anemia running back two generations.

There seems to be a close relationship between tuberculosis and chlorosis, since girls who have a strumous tendency are prone to become chlorotic. Some have claimed that it is due to mental emotion, and cite cases where chlorosis developed after sudden shock or violent emotion, homesickness, and disappointment in love.

Sir Andrew Clark considered it due to the absorption of toxic products from constipation.

A change of climate has been considered a cause, and girls who have emigrated to this country and become chlorotic have been cited as examples. It is more probable, however, that a change in the manner of living has been more responsible for chlorosis than climate.

We may infer that any condition that lowers the vitality and impairs the blood-making function is a factor in producing chlorosis.

Pathology.—The pathological conditions are not very well understood, few cases dying of the disease, and where autopsies have been held the conditions were not constant.

According to Rokitansky, incurable cases of chlorosis are characterized by a defective formation of the blood-vessels and genitalia. Virchow also found a congenital hypoplasia of the vascular system in several autopsies on chlorotic patients. In some cases the uterus and appendages were imperfectly developed. Fatty degeneration of the intima of the arteries is sometimes noticed, and the heart has been softened, dilated, and the left ventricle hypertrophied.

There is a marked reduction in the hemoglobin, and though the red corpuscles are changed in size, there is but a slight reduction in numbers. The specific gravity of the blood is reduced.

Symptoms.—The disease usually comes on gradually, the patient losing color and taking on a greenish-yellow hue; hence the term “green sickness,” characteristic of chlorosis. Sometimes the color of the cheeks and lips are retained, when the term chlorosis rubra is applied. The subcutaneous fat is retained, and in some cases increased. There is languor, weakness, with dyspnea, and palpitation of the heart on exertion. The patient complains much of headache and dizziness.

There is usually gastric derangement. The appetite is very poor or perverted, there being a craving for charcoal, chalk, slate-pencils, or even earth, pickles, and highly spiced articles of food. Following a meal, there are acid eructations, regurgitation of food or vomiting, the patient complaining of more or less pain. The tongue is usually pale, with a dirty coating, showing indentation of the teeth, or it is dry and brown.

Constipation is nearly always found, though a diarrhea frequently intervenes, owing to ingestion of some unwholesome food.

The pulse is small, frequent, and easily compressed, while the skin and extremities are cold. In some cases pulsation is visible in the carotids and superficial veins.

Examination of the heart reveals a soft systolic murmur, heard the most pronounced over the pulmonary area. Sometimes a systolic murmur is heard over the subclavian artery. A continuous murmur is often heard over the veins of the neck, and is called the venous hum or “bruit de diable.”

In some cases there is an absence of horizontal folds in the forehead when the patient is suddenly asked to look up without raising the head. This is known as the "Jeffrey's sign." Edema of the ankles appears, and is often noticed where the disease is of long standing. The urine is pale and of low specific gravity. The conjunctivas become pale, while the sclerotic coat assumes a pearly or bluish-white color, and is considered by some as pathognomonic of chlorosis.

Neuralgic pains of the head, ringing in the ears, mental depression, and gastralgia and hysterical attacks are often present. Menstruation is generally arrested or scanty, though menorrhagia sometimes exists.

Diagnosis.—This is usually readily made. When a young girl appears with a yellowish-green hue, dyspeptic symptoms, capricious appetite, dyspnea and palpitation on slight exertion, bluish sclerotic coat, scanty menstruation, or amenorrhea, constipation, and with a well-nourished appearance, headache with dizziness, and more or less hysteria, we have a group of symptoms that can not be mistaken.

Prognosis.—This will be favorable in all cases except those where there are congenital anomalies of the vascular and genital system.

Treatment.—Dr. Scudder used to say: "In the treatment of chlorosis we have three prominent indications to fulfill: First, to remove any disease which may exist independently of the chlorotic condition, and which may, by its continuance, tend to keep it up. Second, to restore the blood to its normal condition, by the use of tonics and iron, nutritious diet, appropriate exercise, the use of baths, etc. Third, to stimulate the uterine organs to a performance of their natural functions." I am satisfied if we can correct the first two conditions the third will right itself.

To restore the blood to its normal condition requires, first, good food, capable of making good blood; and, secondly, a good digestive apparatus to prepare it for its final elaboration into healthy red corpuscles. Taking for granted that the patient has a good food-supply, our first object will be to restore the digestive organs. Wrongs of the stomach and constipation of the bowels will receive first attention. It is folly for us to expect to make good blood by the administration of iron, when our patient has a bad stomach, as shown by the coated tongue, bad breath, more or less nausea, and with the bowels constipated.

First clear the tongue, restore the appetite and overcome the constipation. Where the tongue is heavily coated, the quickest way to get relief is the old lobelia emetic, with copious draughts of warm water. By its action the stomach is thoroughly emptied of a viscid and offensive mucus and put into condition for the digestion of food and the absorption of medicines. It is, however, unpleasant treatment, and has largely gone out of use. The more modern method is, to wash out the stomach three or four times a week with the lavage tube. If the tongue has a dirty, pasty coating, sodium sulphite will accomplish the same results. Where the tongue is moist and yellow, with offensive breath, nothing quite equals potassium chlorate and phosphate of hydrastin. If the tongue be slick and dirty, sulphurous acid will correct the wrong. As soon as the tongue cleans, and the appetite improves, nux and hydrastin can be given with benefit, or drop doses of Howe's acid solution of iron. Cuprum is a good remedy where the skin is of a greenish-yellow color, and the tongue clean. Of the tincture add ten to twenty drops to half a glass of water, and give a teaspoonful every three hours.

For the constipation the small Podophyllin and hydrastin pill, with daily massage of the bowels, will prove curative. If very obstinate, an occasional fifteen or twenty grain dose of sodium phosphate will act as a persuader. As a tonic, the old compound tonic mixture (triple phosphate of quinine, strychnia, and iron) is one of the best.

As the patient improves, pulsatilla, viburnum, macrotys, and such remedies as act upon the reproductive organs may be used, though in most cases, as the general health improves, the menstrual function takes care of itself. The patient should live as much out of doors as possible, though exercise should never be carried to the extent of weariness. The diet should consist of broiled steak, lamb-chops, roast-beef, fresh eggs, farinaceous vegetables and ripe fruit.

PROGRESSIVE PERNICIOUS ANEMIA.

Synonyms.—Idiopathic Anemia; Essential Anemia; Corpuscular Anemia.

Definition.—A grave blood-disease, characterized by a progressive

decrease, in the number of red corpuscles and by fatty degeneration of the various viscera, and a characteristic, lemon-yellowish decoloration of the skin.

Etiology.—Pernicious anemia depends upon an insufficient and defective formation of red corpuscles, and is found more frequently in middle life than in the young, and among the poor classes rather than the well-to-do, though it may be found in children and persons of wealth.

It is not a common disease, though in Switzerland it prevails more frequently than in any other country. Addison was the first to clearly describe pernicious anemia as an idiopathic disease, and though there have been many who have doubted that it could exist as a distinct lesion, we will have to admit that there are cases of anemia, when there is no appreciable cause,— cases that have not been preceded by tuberculosis, Bright's disease, malignant growths, renal, hepatic, or splenic affections, wasting diseases, hemorrhages, or chronic diarrheas.

Pregnancy and parturition may be associated with anemia. The course of pregnancy may be attended with so much nausea and vomiting that the function of blood-making is seriously impaired, and anemia of a permanent character develops. Generally, however, the anemia develops post partum. Atrophy of the stomach has been regarded as a cause of anemia, the two being often associated, though Grawitz regards the atrophy the result, rather than the cause.

In rare cases, parasites may be the producing cause, by impairing nutrition and establishing toxins that result in cell destruction ; the *anchoylostoma duodenalis* and the *bothriocephalus* being the ones most frequently responsible for the disease.

Exhausting diseases and profuse hemorrhages may also figure as contributing causes, but after we exclude these we still find cases of pernicious anemia that can not as yet be accounted for. Quincke and Peters think that the increased hemolysis is due to the large amount of iron found in the liver at this time. Hunter called attention to the urine of anemic patients. He found it darker in color and containing pathological urobilin. His findings naturally strengthen the views of the last-named writers.

Pathology.—The skin presents a characteristic lemon-tint. There is but little emaciation. The fats are well preserved and of a yellow tinge, while the muscles may be pale or of a reddish color, resembling horse-flesh. The heart is flabby, and contains but little blood. There is fatty degeneration of the organ, the muscular fibril being replaced by fat. The spleen is but slightly enlarged, and shows a cloudy swelling or fatty degeneration. The liver and kidneys present the same characteristic changes, and in addition, there is an excess of iron. In the liver it is deposited in the outer and middle zones of the lobules while in the kidneys it is found in the convoluted tubules. Hemorrhages occur in the retina, skin, and other portions of the body. There is nearly always a change in the bone-marrow, it becoming reddish, and soft in character. The stomach is usually diminished in size, with atrophy of the gastric tubules. The intestinal glandula share in the atrophy. Punctate hemorrhages occur in the brain, and the spinal cord, and posterior sclerosis of the cord is not infrequent.

Fatty degeneration of the various viscera, and even the intima of the smaller vessels, is perhaps the most constant lesion, if we except the blood changes.

The blood shows a marked diminution of the red corpuscles as well as other changes in these cells. It is pale, thinner, and does not coagulate readily. The red blood-corpuscles are often reduced to 1,000,000 per cubic millimeter, and in extreme cases to 500,000, while 143,000 has been recorded. The blood-disks are found widely separated, and not forming rouleaux.

These blood-cells are of various sizes and shapes, the giant cells predominating, though there is a wide range between the megalocytes and the microcytes. In form they may be spherical, oblong, dumb-bell shaped, or of other irregular shapes. There is also a reduction of hemoglobin. The leukocytes are diminished in number, but do not assume the peculiar shapes noticed in the red blood-corpuscles.

Symptoms.—The disease comes on so insidiously that the patient is unable to refer to the day that the disease arrested his attention. He, perhaps, has noticed for some time that his strength was failing, and that he was getting pale; that his appetite was poor, and that he tired readily on exertion. Among the earlier symptoms are shortness of breath, slight palpitation of the heart, dizziness, ringing in the ears,

and headache. Dyspeptic symptoms are common, and nausea and vomiting, with diarrhea, are often present. The patient takes on a lemon-color tint, and the skin is waxy in appearance, and, though emaciation does not take place, the tissues lose their tonicity and become flabby.

Respiration is short and hurried on the slightest exertion, and there is sometimes pain, more often a sense of constriction of the chest. The pulse may be full, but is soft and easily compressed; generally, however, it is small and feeble. Hemorrhage may occur in the retina, giving rise to disturbed vision. There also may be bleeding from the nose, lungs, urethra, and uterus. As the disease progresses, the ankles swell, debility increases, and the patient takes to his bed.

In advanced cases there may be an irregular fever, anemic fever, though the temperature range is usually low. The lips and gums are pale and bloodless. The mind wanders, and he sinks into a half-torpid state. If we examine the heart during this stage we find the cardiac sounds feeble and hemic murmurs common, especially over the base of the heart.

Treatment may give rise to some encouragement, but a relapse occurs sooner or later, and the patient dies from exhaustion.

Diagnosis.—This is usually not very difficult, though it may be mistaken for malignant growths, kidney lesions, and various grave diseases. The age of the patient and the slow, insidious manner in which the disease begins, should arouse our suspicions. The increasing pallor changing to a lemon-tint, with waxy skin, the inelastic, doughy tissues, the absence of emaciation, the tired, wearied condition of the patient on the slightest exertion, the quick and hurried breathing, would suggest anemia. If retinal hemorrhages are found, they confirm the diagnosis. Microscopical examination of the blood not only reveals a marked decrease in the red blood-disks, 1,000,000 or less per millimetre, but also reveals large nucleated red blood-corpuscles, megalocytes and various sized and shaped corpuscles.

Cancer is apt to occur late in life; there is greater emaciation, more pain, and a local tumor can usually be outlined.

Prognosis.—All writers agree that pernicious anemia is a very grave

disease, and that very few cases recover. Under the administration of arsenic, some cures are recorded, though a patient, seemingly cured, is apt to have a relapse within five years and die. A few permanent recoveries are recorded.

Treatment.—All schools of medicine agree that arsenic is the one remedy that promises greater relief than any yet tried. While administering this agent, we are stimulating the blood making organs, with the hope of getting a better elaboration of blood. Pure air, outdoor exercise, and an easily digested diet will assist materially in bringing about the desired result. If the patient complains of great weariness, rest in bed should be enjoined. Daily or triweekly injections of normal saline solution may prove of some value. Should recovery take place, the patient should, at the first indication of its return, resort to arsenic.

SECONDARY ANEMIA.

Synonym.—Symptomatic Anemia.

Etiology.—All cases of anemia occurring in the course of other affections; or due to hemorrhage, are classed as secondary anemias, the various causes being included in the following classification :

Hemorrhage.—The loss of blood may be rapid and in large quantity, giving rise to an acute anemia, as where the hemorrhage is due to injury of the blood-vessel, either from serious wounds or from the rupture of an aneurism, or from flooding during parturition. In these cases, there is loss of all the constituents of the blood. When sudden and in large quantities there is danger of fatal syncope. Severe hemorrhage may arise from gastric or duodenal ulcers.

The patient may lose considerable blood in hei nophilia, scurvy, and purpura, though in these cases the loss is not so rapid.

The loss of blood may be small in quantity each day, but when continued for several days or weeks, gives rise to severe anemia; thus in epistaxis, bleeding piles, uterine hemorrhage, or cirrhosis of the liver, we have examples of a large loss of blood, extending over a period of days or weeks, and which may be considered as chronic anemia.

Inanition.—This may be due to insufficient food, or the quantity may be sufficient, but lack the constituents necessary for the elaboration of a normal blood supply, or, having a sufficient quantity and quality of food, there may be wrongs of the digestive apparatus whereby digestion and assimilation are impaired, thus cancer of the esophagus or stomach, or atrophy of the gastric mucous follicles, or cirrhosis of the liver, would result in a failure to manufacture good material into blood.

Wrights of the sympathetic nerve, as seen in lesions of the rectum, uterus, and urethra, may so impair the blood-making organs as to give rise to anemia.

Albuminous Waste.—A long, continuous drain upon the albuminous material of the blood, as in chronic nephritis, long-continued suppuration, chronic diarrheas, profuse leucorrhœa, and prolonged lactation gives rise to anemia.

Toxic anemia results from certain organic and inorganic agents; thus, arsenic, lead, phosphorus, and mercury are well-known blood destroyers, and the poison from venomous snakes acts in the same way. Of the chronic infections, syphilis, tuberculosis, and malaria are marked examples, and, not infrequently, typhoid fever, pyemia, septicemia, diphtheria, and kindred diseases give rise to anemia. Various intestinal parasites also play some part in producing anemia.

Pathology.—The condition of the blood varies from the slightest impairment to the gravest form of anemia, depending upon the severity and duration of the producing cause, and upon the power of blood renewal. The number of red corpuscles and the percentage of hemoglobin are proportionately diminished, while the red corpuscles remaining, vary in size and shape, some being unnaturally small (microcytes) and others unduly large (macrocytes), while still others are of irregular sizes (poikilocytes). Nucleated red cells are also found, and usually there is an increase in the leukocytes, the exceptions being in tuberculosis, enteric fever, measles, influenza, and malaria. The alkalinity of the blood is generally slightly diminished, the specific gravity reduced, and the watery elements increased, rendering the blood more fluid, and the color of the entire fluid being more pale than normal blood.

The fluid and albuminous principles of the blood are quickly restored,

the corpuscular elements following next in order, and the hemoglobin last, in some cases the last constituent requiring months before it reaches the normal standard.

Females can lose a much larger quantity of blood and recover quicker than males, though infants of both sexes do not bear the loss of much blood.

Symptoms.—Pallor of the skin, colorless appearance of the ears, and particularly of the mucous membranes. are among the early symptoms of anemia, though we must remember that not all pale people are anemic, nor that all anemic people are pale.

Cardiac Symptoms.—The pulse is usually small and rapid, of low tension, though a high-tension pulse is sometimes encountered. Palpitation and attacks of syncope are not uncommon. The heart, being poorly nourished, is apt to lose its muscular tone, attended by slight dilatations; as a result, a systolic hemic murmur may be heard over the pulmonary area, and transmitted to the axilla. The murmurs arise from dilatation of the left ventricle, which gives rise to relative mitral insufficiency.

Dyspeptic symptoms are nearly always present; the tongue is pale, broad, and flabby, the appetite poor, some headache, and generally there is constipation.

Pulmonary symptoms are present when the anemia is well developed. A slight hacking cough is common, and dyspnea, on slight exertion, usually attends, and occasional sighing may be noticed.

Cerebral Symptoms.—Cerebral anemia is indicated by spots appearing before the eyes, ringing in the ears, and vertigo. Mental apathy and inability to concentrate the mind is not an uncommon symptom. The patient complains of a pain in the top of the head.

Nervous symptoms are not infrequently present, the patient being irritable and restless at night, though drowsy and passive during the day. The patient may complain of hot or cold flashes, crawling or creeping sensation of the skin, and vague pains in different portions of the body. Menstruation is disturbed; at first there may be menorrhagia, but later, the flow becomes pale, scanty, and finally ceases. Generally

debility is noticed, and in extreme cases a low temperature is noted.

Edema of the ankles and legs are common, and where tuberculosis or cancer are present, emaciation is a marked feature.

Diagnosis.—A grouping of the above symptoms are so characteristic that the diagnosis is rendered comparatively easy, but a positive diagnosis is only made by examination of the blood.

Prognosis.—This depends upon the primary lesion that gives rise to the disease, and our ability to overcome it.

Treatment.—The treatment depends upon the cause. If due to traumatic hemorrhages, and they have been arrested, rest, good nutritious food, and plenty of fresh air and sunshine, will be all that is required. If due to hemorrhoids, they should be removed; or from menorrhagia, suitable treatment should be instituted to overcome it.

The patient should be examined very carefully as to the cause or causes giving rise to it, and the treatment directed to removing it. The idea that iron and arsenic are to be given whenever anemia is present, is a fallacious one.

Wrongs of digestion are to be corrected, constipation must be overcome, and the nervous system built up. Each case will need a special study, and special remedies required for individual cases. Copper, iron, and arsenic will be useful agents in connection with the specially indicated remedy; but, above all, do not forget to give the patient fresh air, plenty of sunshine, nourishing food, sponge-baths, and moderate exercise.

LEUKEMIA.

Synonym.—Luekocythemia.

Definition.—A constitutional disease, of unknown causation, and characterized anatomically by changes in the spleen, lymphatic glands, singly or combined, and accompanied by a marked increase in the white corpuscles and a decrease in the red.

History.—This rare, but peculiarly interesting disease, was first

described by Dr. Hughes Bennett in 1845, and a few weeks later, though independently, by Virchow. Bennett, in holding an autopsy upon a man who died with a very much enlarged spleen and liver, found the blood filled with corpuscles resembling pus-cells, and yet there was no evidence of phlebitis, nor any reason to suggest pyemia, there being no local suppurative process. He therefore came to the conclusion that he was dealing with new pathological conditions in which pus-corpuscles were generated within the blood. He did not undertake to say, however, what relation, if any, the spleen and liver bore to the diseased condition.

A little later Virchow, independently, described a similar case, but declared that the corpuscles in question were not pus-cells, but white cells of the blood in very greatly increased quantities, and that there was a direct relation between the enlarged spleen and the increase of white corpuscles, and suggested the name leukemia. Bennett chimed priority of discovery, and named the lesion leukocythemia. Since then, much attention has been given to the disease, though but little light has been thrown upon the causation.

Varieties.—The older writers recognized two forms of leukemia—the splenic, in which the spleen was enormously enlarged, and the lymphatic, in which, while the spleen was somewhat involved, the chief characteristic was the enlargement of the lymphatic glands. These were for a time regarded as distinct pathological types, but since Neumann's discovery that the bone-marrow is the principal seat of the origin of the blood, especially of the leukocytes, and since it has been demonstrated that in both splenic and lymphatic leukemia the marrow-cells are involved, and that the spleen is enlarged to some extent even in the lymphatic form, the old division has been discarded, and that of Ehrlich and Lazarus has been generally accepted; namely, (1) Myelogenous leukemia (a growth of myeloid tissue); (2) Lymphatic leukemia (a growth of lymphoid tissue).

MYELOGENOUS LEUKEMIA.

Synonyms.—Myeloid Leukemia; Splenic Myelogenous Leukemia; Splenic Leukemia; Leukocytic Leukemia.

Etiology.—This is a very rare disease, and but little is known as to its

determining cause. It occurs more frequently in males than females, and between the ages of twenty and fifty, though no age is exempt. It is found in all parts of the world, and among all races, though, according to Eichorst, the Jews are the most likely to suffer. Heredity seems to play an important part, while syphilis, malaria, unhygienic conditions, and injuries to the bone or spleen have been considered as predisposing, though they may be only coincident factors. Whether it be due to auto-infection or to bacteria is yet to be determined, though, whatever the cause, it affects directly the blood-making organs.

Pathology.—*The Blood.*—This is generally of a pale or creamy color, and contains Charcot-Leyden crystals. When leukocytosis is extreme, it resembles lymph or is milk-like or puriform, while at other times it may be of chocolate color.

It is less alkaline than normal blood, is of lower specific gravity, undergoes decomposition more rapidly, and does not coagulate so readily. The most characteristic factor of the disease is the great increase in the number of the leukocytes, there being 100,000 to 200,000 white corpuscles per cubic millimeter in a case of moderate severity, and a corresponding increase in the more severe cases, the relation of the white corpuscles to the red being as 1 to 2 or 1 to 1, and Robin states that the leukocytes may even double those of the red.

The Bone-Marrow.—Changes in the bone-marrow occur in both the long and spongy bones, the characteristic lesion being the “pyoid” transformation. The light appearance of the normal marrow is replaced by a yellowish or puriform color; this may be uniform, or scattered areas may be seen. In the early stage it may be firm in consistency, but as further changes take place, there is a tendency for it to liquify.

There is a marked increase in the colorless marrow-cells, and round hemoglobin free cells, with large pale nuclei and many fine granules possessing neutrophilic properties.

Spleen.—The spleen in the early stage is hyperemic, of a dark color, and very much enlarged, not infrequently extending downward to the spine of the ilium and forward to the median line. Infiltration and proliferation of lymphoid cells take place, the spleen becomes hard, and on section it presents a variegated appearance, due to small areas of fatty degeneration or necrosis, which are scattered throughout the

organ, and which are due to pressure from the excessive infiltration; or there may be fibroid degeneration. In some cases there is hyperplastic thickening of the capsule with adhesions to the surrounding structures.

The Lymphatic Glands.—Though they are usually somewhat enlarged, they are secondary to myeloid leukemia, and may not be noticeable. It is simply an infiltration of the gland with leukocytes, and not a hypertrophy of lymphoid tissue. Similar infiltrations of leukocytes are found in most of the organs of the body.

The Liver.—In most of the cases examined the liver is found enlarged; but how much of this is due to hyperplasia of the liver tissue, and how much to a lymphomatous development, has not been determined.

Heart and Vessels.—Infiltrations are found in the heart and sometimes in the walls of the blood-vessels, but are due to secondary conditions.

Leukemic Retinal Changes.—With the ophthalmoscope, small infiltrations may be seen in the retina as small whitish spots, while the retinal veins are greatly enlarged, though the arteries remain normal.

Symptoms.—It is somewhat astonishing how well nourished many of these patients are, even after the alterations of the blood and enlargement of the spleen; many times the discovery of the disease is made when examining the patient for some intercurrent affection. In the advanced stage the patient complains of feeling weak and prostrated, bodily effort being difficult. The patient complains of pain in the side, there is hurried and oppressed breathing, more or less palpitation of the heart, loss of appetite and gastric disturbance, hemorrhage from the nose or gums; in fact, there may be hemorrhage into the various organs; pain and tenderness in the sternum and long bones, pallor of skin and mucous membranes, and marked anemia are the most characteristic symptoms. The temperature is quite erratic, in some cases being normal, subnormal in others, while a third class will show fever.

Diagnosis.—The diagnosis can only be made by the aid of the microscope, and, according to Lazarus, must show the following four conditions:

“1. The granular mononuclear leukocytes (Ehrlich's myelocytes) must

constitute a considerable number of all the white blood-cells. Their appearance in the blood is always somewhat abnormal; yet in nonleukemic cases, even when their percentage is moderately high, their absolute number is small, in fact far below the smallest numbers ever observed in myeloid leukemia.

“2. The eosinophilia mononuclear and polynuclear cells must be considerably increased. Their percentage may not be greater than a high normal (three-quarters per cent), yet their actual number per cubic millimeter is incomparably greater than in the most marked cases of pure eosinophilia yet observed.

“3. The mast cells must show a great absolute increase.

“4. Nucleated red blood-corpuscles of especially normo-blastic type must be readily found. All of these characteristics must be present simultaneously.”

Prognosis.—Medication has thus far proven of but little benefit, the patient dying sooner or later.

Treatment.—As already stated, medicines have had but little influence on the disease. Rest in bed, a nutritious and easily digested diet. Fowler's solution of arsenic, iron in some form, bone-marrow and oxygen inhalation, have been recommended. Polymnia deserves a trial.

LYMPHATIC LEUKEMIA.

Synonym.—Lymphemia.

Definition.—A leukemia characterized by an increase in the lymphocytes and enlargements of the lymphatic structures.

Etiology.—As in myelogenous leukemia, various theories have been suggested, but none satisfactorily proven.

Pathology.—Hemorrhages occur in the skin, the retina, the mucous membrane of the intestinal tract, the pleura, pericardium and peritoneum, the pelvis of the kidney, and sometimes into the brain, and, if in the motor region, give rise to paralysis.

The lymph glands are universally enlarged, hard and firm in consistency, marrow-like and white, unless hemorrhage occurs, when they are pink.

The spleen may be normal in size, though usually slightly enlarged, and in children it occasionally is of enormous size. It is soft, confluent, and of a brownish red or chocolate color.

The Bone-Marrow—The changes in the marrow are constant and characteristic, usually affecting the tubular bones throughout their entire extent; the marrow is red in color, and the consistency of jelly.

The “characteristic change produced in the blood by lymphatic leukemia is the tremendous increase in the absolute number of circulating lymphocytes. While in healthy blood these constitute less than thirty per cent of the whole number of white cells, in this condition they form over ninety per cent of a total leukocyte count, which is many times the normal.”

Symptoms.—*Acute Lymphatic Leukemia.*—The onset is sudden and the course rapid, the disease terminating in a few days or weeks. The symptoms are those of an infectious disease, there being fever, nausea, vomiting, and diarrhea. Hemorrhages into the skin and mucous surfaces are characteristic, attended by anemia. The enlargement of the lymphatic glands is never so marked as in chronic lymphatic leukemia, in fact, may not be noticeable till near the close of the disease. As the disease progresses, it assumes a typhoid type, with delirium, coma, and finally death. A painful and somewhat characteristic symptom is severe ulceration of the mouth and gastro-intestinal tract. Acute nephritis is sometimes present.

Chronic Lymphatic Leukemia.—This form comes on slowly and insidiously, the enlargement of the lymphatic glands being the first symptom, many times, to call attention to the disease. The first to be noticed are the cervical, to be followed in turn by the axillary, inguinal, etc., till all the glands of the body become affected. They gradually increase in size, are usually soft, though they rarely suppurate. Occasionally they are quite firm. The spleen is enlarged, but not to the extent as seen in the myeloid form.

As the glands enlarge, the patient becomes anemic; there is failing strength, and emaciation more or less marked, are the danger-signals of an incurable malady. Hemorrhages may occur late in the disease.

The disease runs its course to a fatal issue in from one to three years, though occasionally it terminates in a few months, through some intercurrent disease, like pneumonia, tuberculosis, and kindred diseases.

The treatment of all forms of leukemia is unsatisfactory; the most we can do is to retard, to some extent, the progressive changes by symptomatic treatment. Outdoor life in a suitable climate, a nutritious diet, and arsenic, the bitter tonics, and iron, may accomplish some good.

HODGKIN'S DISEASE.

Synonyms. — Pseudo-leukemia; Lymphadenoma; Anemia Lymphatica; Lymphasarcoma; Malignant Lymphoma, etc.

Definition.—A chronic disease characterized by enlargement of the lymph glands, a progressive anemia, and often attended by secondary growths of lymphoid tissue in the liver, spleen, kidneys, bone-marrow, alimentary tract, and other organs.

Etiology.—The causes of this disease are as obscure as those of leukemia. About seventy-five per cent of all cases occur in males, and the majority of cases occur under forty years of age. Syphilis, malaria, tuberculosis, rickets, chronic diarrhea, and other affections are given by some writers as predisposing causes, but just how far these diseases have been coincident factors and how far they have really influenced the disease, it is impossible to say. Unhygienic conditions seem to favor the affection, since the majority of cases occur among the lower classes.

The course of the disease in some cases, especially the occurrence of fever of an irregular type, but a recurring type, and the rapidity with which some of the cases run a fatal course, strongly points to an infectious nature. Recent studies in bacteriology suggest micro-organisms as a probable cause, though nothing specific has yet been discovered.

Pathology.—The pathological changes found will depend upon the

stage of the disease. Generally the first changes are noticed in the cervical glands, and these in turn by the axillary glands, and finally the inguinal glands become involved. The affected glands are first isolated, and freely movable, and are about the size of almonds, but as the disease progresses, they become adherent, forming a tumor mass from the size of an orange to that of a cocoanut. These cervical lymphatics may form a chain extending down the trachea and large blood-vessels to the axillary glands.

The mediastinal glands, enlarging, may encroach upon the blood-vessels, and occasionally perforate the sternum and appear as external tumors.

Any of the glands of the body may become involved. When the mesenteric and retroperitoneal glands are the seat of the trouble, the diagnosis becomes somewhat difficult, laparotomy having been performed for abdominal tumors, only to find masses of enlarged lymph-glands.

As the disease progresses, lymphoid deposits take place in other organs, especially the spleen, thymus gland, and sometimes the liver and kidneys. More rarely the skin becomes the seat of lymphomatous growths. The consistency of the glands vary, being soft and jelly-like or firm, hard, and dry. The early stage generally reveals them to be of firm consistency; but as the disease advances, there is a proliferation of the connective tissue-cells, which may change the soft gland into one of almost stony hardness.

A cut section reveals this varied condition, and if made of the spleen, shows a dark-reddish, pulpy mass, interspersed by lighter sections of connective tissue. This gland rarely caseates, and when this does occur, it is probably due to secondary conditions, notably tuberculosis.

According to Stengel, the blood of pseudo-leukemia is distinguished by the absence rather than the presence of alterations from the normal. The reduction of red corpuscles is usually slight, except in severe cases, where they may be reduced to 2,000,000 or even 1,000,000 per cubic millimeter, with alterations in their size and shape. The white corpuscles are about normal in number, though they may be slightly increased or diminished.

Symptoms.—The disease comes on so insidiously that the earlier symptoms are negative. If the superficial glands are the first to be involved, and this is the rule, the patient will notice a bilateral enlargement of a chain of cervical lymphatics; even before this, however, he has noticed a progressive loss of weight and strength. As the disease advances, his attention is called to the enlargement of the axillary glands, and finally to the inguinal glands.

There is generally loss of appetite, furred tongue, and dyspeptic symptoms; especially is this marked where there is atrophy of the gastro-intestinal mucosa. There is more or less dyspnea, which may arise either from the anemia present, or from pressure from the enlarged mediastinal glands, or from the bronchial glands, and in some cases from pressure upon the trachea by an enlarged tumor mass of cervical glands.

Edema of the ankles is not uncommon in the late stages of the disease. The presence of albumin in the urine is not infrequent. Hemic murmurs are present, and palpitation is a common symptom. Fever is present at some stage of the disease in nearly all cases; in some it is of an irregular type, while in others it will assume a remittent form. Where the skin is affected, ulceration is apt to occur.

Diagnosis.—In the early stage, Hodgkin's disease is, not readily recognized, but when well advanced, the diagnosis is comparatively easy. A few characteristic points, if kept in mind, will enable us to distinguish it from tuberculosis, thus: in pseudo-leukemia the cervical enlargement is usually bilateral, and involves the anterior or posterior chain of lymphatics, and there is no tendency to suppurate, while in tuberculosis the enlargement is usually confined to one side, involves the submaxillary chain, and the tendency is to suppuration. In the former, there is splenic enlargement and more pronounced anemia. To differentiate from leukemia, a blood examination is necessary.

Prognosis.—The prognosis is grave, but few cases recovering. The disease usually ends fatally in from one to three years, though an acute case may terminate fatally in three months.

Treatment.—Before there is an involvement of the general lymphatic system, the removal of local tumor masses in the neck may help stay the progress of the disease.

A good nourishing diet, plenty of air and sunshine, will be important factors in prolonging life.

Arsenic in the form of Fowler's solution has perhaps been more successfully used than any other one remedy. Phytolacca, iris versicolor, and like remedies deserve a thorough trial..

ADDISON'S DISEASE.

Synonyms.—Bronzed Skin Disease; Melasma Suprarenale.

Definition.—A chronic disease characterized by progressive asthenia. A bronzed pigmentation of the skin, irritability of the gastro-intestinal tract, feebleness of the heart's action, with degeneration of the suprarenal capsules.

Etiology.—The disease occurs most frequently between the ages of twenty and forty, and affects males more frequently than females. Blows and injuries to the back would suggest traumatism as a predisposing cause; the lesion is almost constantly associated with tuberculosis of the suprarenal capsules. A rare disease and one of unknown etiology.

Pathology.—Both capsules are usually involved, though occasionally but one is found affected, and in still rarer cases neither appear to be the seat of the disease, the disturbance being confined to the sympathetic plexus around the organs.

The glands are usually enlarged, firm, and nodulated, irregular in form, showing the characteristic caseous masses of the tuberculosis. In rare cases the tubercular lesion seems to be primary and confined to the capsules, though generally associated with tuberculosis of the lungs, bones, and viscera in general.

In some cases, owing to interstitial changes, fibrous tissue preponderates, or the glands may atrophy, becoming sclerotic, or they may be replaced by fatty deposits. Malignant growths may destroy their function.

In a few cases the pathological changes seem to be confined to the sympathetic, and consist of degeneration, congestion, hemorrhages, and infiltration by leukocytes, or new connective tissue in the ganglia and nerve fibers. Parenchymatous or fatty degeneration is sometimes found in heart, liver, and kidneys. The spleen, in some cases, is enlarged, showing more or less degeneration of its tissue. The blood shows the same changes that are found in anemia.

Symptoms.—*Asthenia.*—Prostration comes on gradually, but sometimes quite rapidly, and is shown by general lassitude. The patient complains of always being tired, and is unrefreshed by his night's rest. He becomes weak, listless, takes but little interest in his surroundings, and grows peevish or despondent. The prostration is progressive.

Cardiac feebleness is manifested by occasional attacks of syncope, any one of which may prove fatal. The pulse shows characteristic weakness, though it may be quite rapid. The heart-sounds are quite feeble. As the disease advances, there is palpitation of the heart, and dyspnea of a distressing character upon slight exertion. Disturbance of vision, dizziness, ringing in the ears, headache, and various other cerebral symptoms appear. In the last stages, stupor, delirium, and coma may follow one another in quick succession, terminating in convulsions and death.

Gastro-intestinal symptoms are nearly always present. Nausea and vomiting are among the early symptoms, and may persist to the end. At times it is violent, coming on in paroxysms, and does not appear to be due to any wrongs of the stomach, as the tongue may be clean and digestion fair, but to irritation of the sympathetic. Diarrhea is the rule, and accompanies the gastric disturbance. Pain in the epigastric, hypochondriac, and lumbar regions is not uncommon.

Pigmentation of the skin gradually appears in the form of a bronze or copper color, after the constitutional symptoms become well marked, though it may be among the first symptoms observed. It usually begins upon the exposed parts of the body, as the face, neck, and hands, and where natural pigmentation is most marked, as around the areola of the nipple, in the axilla, and around the genital organs and in the groin.

The color varies from a yellowish-brown to an olive or bronze color, the patient assuming sometimes the hue of a mulatto. The mucous

membrane of the mouth and vagina may show bluish or purplish patches of discoloration.

Renal symptoms may or may not be present; thus polyuria is seen in some cases, while in others the quantity is but little affected. There is but little emaciation, though general evidence of anemia is present. The temperature is normal or subnormal.

Diagnosis.—In typical cases, the diagnosis is comparatively easy. The marked asthenia, feebleness of heart and circulation, gastro-intestinal irritation, anemia without emaciation, and the bronze or brown discoloration, are a group of symptoms that can hardly be mistaken. In atypical cases, where the constitutional symptoms are slight, the diagnosis becomes more difficult. It may be mistaken for malignant or tuberculous lesions of the abdomen, or cirrhosis of the liver, for pregnancy and uterine diseases, protracted cases of jaundice, chronic malaria, nitrate of silver discolorations, arsenic pigmentation, vagabond's disease, and other lesions that are attended by more or less pigmentation of the skin.

Prognosis.—The prognosis is unfavorable, the disease usually terminating fatally in from one to two years, though in rare cases the patient may live five or even ten years.

Treatment.—The treatment will be along the same line as suggested in leukemia, and will consist of hygienic, dietetic, and medicinal measures. The patient should avoid overexertion, either mental or physical, lead a quiet life in the open air and sunshine, take light, easily digested, and nutritious food.

Various drugs, such as iron, arsenic, the iodids, guaiacol carbonate, and many others, have been used, but are of doubtful value. The stomach may be quieted with small doses of ipecac, peach-tree infusion, bismuth, and rhus tox., and cactus may have some influence in strengthening the heart, but we are not to expect too much from medication. The administration of the extract of suprarenal capsules has many advocates, and a few cases have been reported benefited from their use, though the remedy has not been tried sufficiently long to warrant us in hailing it as a specific.

MYXEDEMA.

Synonyms.—Sporadic Cretinism; Athyria.

Definition.—A chronic constitutional disorder, due to functional derangement of the thyroid gland, and characterized by infiltration (myxedema) of mucin in the subcutaneous tissues.

Varieties.—Three varieties are given: (a) True myxedema, or adult myxedema; (b) Sporadic cretinism; (c) Operative myxedema, or cachexia strumipriva.

The removal of the thyroid gland in lower animals demonstrates that the myxedema of adults, cretinism, and the cachectic condition following the removal of the thyroid gland for goitre, represent the same morbid condition though under different circumstances.

Etiology.—The secretions from the ductless glands possess various constituents that are necessary to normal metabolism, and when their function is impaired, and these constituents are absent or perverted, disorders of nutrition follow.

The thyroid secretion contains such a constituent, which has been named thyroidin, and when this is absent, myxedema results. More cases have been found in England and Switzerland than from all other countries. Women suffer more frequently than men, the ratio being 6 to 1.

It occurs most frequently between the ages of thirty-five and fifty. Pregnancy seems to predispose to it; at least married women who have borne children suffer more often than the unmarried.

Heredity may play some part as a predisposing factor, and exophthalmic goitre may bear some relation to the disease.

Actinomycosis has been reported as destroying the gland in a reported case of myxedema.

Pathology.—Lesions of the thyroid are constant, there either being atrophy or degeneration. The gland may be congenitally absent, as in cretinism. Occasionally it is larger than normal, the secreting structure

being- replaced by interstitial fibrous tissue. Myxomatous changes in the blood-vessels and kidneys have been recorded.

Symptoms.—The disease comes on insidiously, the first symptoms appearing in the face, which loses its expression and takes on a coarse or bloated appearance. There is puffiness of the eyes, and the patient is dull and stupid. The tongue is broad, thick, and more or less coated. The nose increases in breadth, becomes flattened, and is inclined to turn up at the end. The lips become thick, the lower sometimes being slightly everted; the ears are enlarged, and the hair becomes coarse and is inclined to drop out. The skin becomes dry and harsh; the teeth decay, and the nails are dry and brittle.

The extremities become large and clumsy, and the hands and feet are swollen and become less flexible, and the body generally increases in bulk. The movements of the patient are slow. The heart's action is feeble, though the pulse may be rapid. The temperature is normal or subnormal. There may be traces of albumin and sugar in the urine.

The mental faculties become dulled, the patient reasoning with difficulty, taking on more and more the appearance of imbecility as the disease progresses.

Headache is often present, and the special senses, smell, taste, sight, hearing, and touch, become impaired.

Diagnosis.—The general swollen or bloated appearance, yet absence of pitting on pressure, the dry, harsh skin, the dull besotted appearance, the clumsy movements, are symptoms not likely to be mistaken for any other lesion.

Prognosis.—The disease is one of marked chronicity, lasting five, ten, or fifteen years. Since the introduction of the thyroid-gland treatment, many favorable reports have been received as to its curative action.

The thyroids of sheep and calves are used, and may be given raw or cooked, or in the form of glycerin extract, or the dry powdered extract.

All forms of myxedema seem to respond to this treatment, if reports are to be relied upon. If the gland be destroyed or removed, the treatment is to be continued at intervals during life.

CRETINISM.

This form of myxedema follows either a congenital absence of the gland or loss of its function during the first few years of life. The chief symptoms are those that arise from lack of development, the child retaining an infantile appearance, both in its physical and mental make-up.

The first physical or abnormal conditions may not appear for six or eight months after birth, at which time it is noticed that the child's development seems to be arrested. The awful dread arises in the mother's mind that the baby is not "bright," which becomes verified as the months pass. The physical development is also remarkably retarded. The anterior fontanelles remain open, and the head becomes enlarged, narrow in front, but large posteriorly. The face becomes large and bloated, the nose broad, flat, and slightly turned up at the end, the eyes appear to be widely separated, the ears are large, the tongue is broad and thick, and often protrudes from a large mouth. The complexion is waxy or of a dull, chalky color. The hair is coarse, and usually thin. Dentition is delayed, and the teeth early decay.

The neck is short and the clavicular fossæ are filled with fatty tumors. The body is short and stunted, the skin dry and harsh, the arms and legs are short, and the hands and feet puffy and enlarged. The abdomen is bloated and prominent, and the child is unable to stand alone. The whole appearance of the child is repulsive. The condition may not arise until three or four years after birth, and follow some one of the infectious fevers, which in some way impairs the function of the thyroid gland. There is arrest of mental development in either case, and the child becomes an imbecile.

Prognosis.—Congenital cases usually live but a few weeks or months, while those developing early in childhood may live for years.

Treatment.—The treatment is along the same lines as for myxedema in the adult.

OPERATIVE MYXEDEMA.

Removal of the thyroid gland for surgical reasons has resulted in the gradual production of the same conditions that are found in myxedema of the adult or cretinism. These results are not apt to follow if a portion of the gland remains; hence the surgeon should be careful never to remove the entire gland, unless due to malignant growths. We are not to understand, however, that myxedema strumipriva always follows a complete thyroidectomy, for accessory glands elsewhere may prevent such a result.

GOITRE.

Synonym.—Bronchocele.

Definition.—This is a hypertrophy of a part or the whole of the thyroid gland, and occurs sporadically or endemically.

Etiology.—The exciting cause is unknown. Goitre occurs sporadically or endemically, and Sievere speaks of an epidemic occurring at Serdoba, Finland, where a teacher and fifteen children were suddenly attacked. Locality seems to favor the disease, for while it occurs in all countries, in certain districts, which have many points of resemblance, it occurs in far greater numbers, and is thus said to be endemic in such localities. Mountainous districts seem to favor its propagation. Thus it is common in Switzerland and Italy, in the Himalayas, and in the hilly districts of China.

In Ontario, Canada, many cases are seen. It is found more frequently in women than men, especially in this country, and is accounted for on the grounds that women drink more water than men, while in India both sexes drink the same amount of water, and are equally affected with goitre.

The disease usually appears shortly after puberty, especially in girls, where there is some derangement in the menstrual flow.

There seems to be some constituent of the water-supply in certain sections that favor the formation of goitre, though what that constituent is, no one has been able to determine. A change in the water-supply, where goitre has prevailed, has led to a disappearance of the disease

Heredity.—In some families heredity seems to play an important role.

Pathology.—The gland undergoes various degenerative changes, and has been divided by Murray into four varieties: (a) Hypertrophic or parenchymatous goitre; (b) Adenoma of the thyroid gland; (c) Fibrous goitre; (d) Cystic goitre. Besides these types there may be various combinations.

In parenchymatous or hypertrophic goitre there is a hyperplasia of all the original tissue-elements. It may be confined to one lobe or involve the whole gland. “Adenoma of the thyroid occurs as an encapsulated growth, there being one or more nodules in one or both glands; the structure resembles that of the gland itself.

“In a fibrous goitre we have, in addition to overgrowth of the glandular substance, a large increase in the fibrous tissue, which may occur as bands running through the substance of the goitre or as fibrous nodules.

“Cystic goitre occurs, either as a result of expansion and coalescence of the follicles of an already enlarged gland, or as the result of softening of portions of the goitrous tissue; such goitres often contain a large amount of fibrous tissue and are distinguished as fibrocystic goitres.” (Murray, “Twentieth-Century Practice.”)

Symptoms.—As a rule the first evidence of goitre is a visible enlargement of the neck, and though, on swallowing, a pronounced tumor mass is seen to move upward, the patient experiences no pain. The growth develops slowly, is not attached to skin nor deeper tissues as a rule, and may be readily moved. They vary as to size, from one that is barely perceptible to one of enormous proportion, interfering with the movements of the head. When deep seated and it presses upon the trachea and esophagus, respiration and deglutition are rendered difficult, and dysphagia occurs more frequently than dyspnea. Cerebral disturbances, with convulsions, have been reported, though such symptoms must be exceedingly rare.

The general health is not affected, unless inflammation and suppuration attack the goitre, in which case there will be more or less systemic disturbance.

Diagnosis.—Goitre is easily diagnosed from other cervical affections. The constant location, the absence of pain, and the vertical movement during deglutition, can hardly be mistaken for other affections.

Prognosis.—This is favorable so far as the life and general health is concerned, but too much must not be expected from medication, except in recent cases. Where fibroid changes have taken place, thyroidectomy promises the only relief.

Phytolacca.—I know of no one remedy that promises more in the cure of goitre than phytolacca, when given in tangible doses. Two drams of the tincture to water four ounces, and a teaspoonful every four hours. *Iris versicolor* may be used in alternation or combination with the above. Galvanism has been successful in my hands in a few cases.

Colorless iodine should be thoroughly applied night and morning. Thyroid feeding has been highly extolled, and may be given a thorough trial.

EXOPHTHALMIC GOITRE.

Synonyms.—Graves' Disease ; Basedow's Disease.

Definition.—A disease characterized by enlargement of the thyroid gland, tachycardia, protrusion of the eyeballs, tremors, and generally derangement of the nervous system.

Age, sex, and heredity may be mentioned as the predisposing causes of the disease.

Age.—Although Deval records a case following scarlet fever in a child two and a half years old, and Charcot mentions a case at sixty-eight years of age, the disease is very rare at the extremes of life. Bramwell states that in women the disease occurs most frequently between the ages of fifteen and thirty, and in men between the ages of thirty and forty-five.

Sex.—Women are very much more prone to exophthalmic goitre than men. Out of four hundred cases recorded, forty-three were males and

three hundred and fifty-seven females, a ratio in favor of women of 83 to 1.

Heredity.—The frequency with which several members of a family have been recorded as suffering from the disease, leaves but little doubt as to the influence of heredity.

Of the exciting causes no specific factor has been found, though nearly all writers agree that wrongs either of the cerebro-spinal or sympathetic system of nerves lie at the foundation of the disease. Thus great and prolonged worry, excessive grief, anger, or fright, excessive mental or physical exertion, and severe shock precede the disease. There are other exciting causes such as nasal affections, pregnancy, sexual excesses, severe acute diseases, goitre, and others; the variety and number of causes assigned to the disease being the best proof that the true etiological factor is still unknown.

Pathology.—The chief feature in the hypertrophied thyroid gland is the increase in the secreting structure together with increased vascularity. It is uniformly enlarged. The protrusion of the eyeballs is due to dilatation of the blood-vessels of the orbit and an excess of the retro-orbital fat. There are no constant changes in the heart. In some there is dilatation and hypertrophy, though many cases show no changes whatever. The same may be said of the nervous system; no constant lesion can be found peculiar to exophthalmic goitre. The thymus gland is often found enlarged.

Symptoms.—The disease may be divided into acute and chronic.

Acute Form.—This is a rare form, and may speedily terminate in death. It is characterized by exceedingly rapid heart-action, great irritability of the stomach and bowels, resulting in persistent vomiting and purging, protrusion of the eyeballs, tremor, and sometimes marked cerebral disturbance.

Chronic Form.—In most cases the invasion is gradual, the tachycardia being the earliest and most constant symptom. It varies from 80 to 90 or 100 beats per minute to 120 to 150 or even 300 per minute, depending upon excitement and physical exertion. Gradually the thyroid increases in size, though in rare cases it remains almost unnoticeable. The bulging of the eyeball is also progressive, and when developed is most

characteristic.

Von Graefe's Sign.—This consists in the failure of the upper eyelid to descend upon the eyeball when it is directed downward. Normally, as the eyes follow a descending object from a level above the eyes to one below them, the lids descend with the downward movement of the eyeball, and in none is the white sclerotic coat brought into view, but in exophthalmus the white sclerotic is markedly visible, constituting Von Graefe's sign.

Tremor.—This is also a constant symptom, and is best observed by having the patient extend the hand, palm upward.

General nervousness is also found in most cases, the patient being exceedingly nervous and restless, is easily disturbed, and magnifies small incidents and happenings out of the ordinary; is inclined to be pessimistic and melancholy. Insomnia is very common, the patient having great difficulty in getting to sleep.

Gastro-intestinal disturbances are the rule, diarrhea occurring at intervals and lasting from one to three days. Gastric distention of the stomach, attended by irritation, is a frequent complaint. Respiration may be increased in frequency, due either to cardiac disturbance, anemia, or to pressure from the enlarged thyroid. At times it is normal.

Cutaneous Symptoms.—Pigmentation, while not a constant symptom, is often present, being especially prominent at those parts where the pigment is naturally abundant, such as the areolar tissue around the nipple, and in the genital region. The face is sometimes of a darker hue than in health. Profuse sweating is not an uncommon symptom.

The general health is always more or less impaired. Wrongs of digestion, impaired innervation, and impaired circulation, soon give rise to muscular weakness, anemia, and more or less emaciation.

Diagnosis.—The diagnosis of Graves' disease is readily made by the presence of tachycardia and muscular tremors, even though other characteristics are absent, and when we add to the above symptoms, enlargement of the thyroid and the bulging of the eyeballs, the white sclerotic coat showing, there is no room for doubt.

Prognosis.—The prognosis is unfavorable as to cure, though the patient may live for years. A few cases will entirely recover.

Treatment.—The treatment will be hygienic, medicinal, and surgical. When possible, the patient should be sent to a climate of equable temperature, where there is a maximum of sunshine and of moderate elevation, from 2,500 to 3,500 feet.

Medicinal.—Aconite, veratrum, belladonna, cactus, strophanthus, ergot, digitalis, sodium salicylate, and many others, have been advocated, and when specially indicated may be of some benefit, though too much should not be expected from medicines. Galvanism has been highly extolled, and may prove beneficial in some cases.

Surgical.—Although of the one hundred and ninety cases reported by Starr where operative measures were taken, twenty-three resulted fatally, yet it promises more in the way of permanent relief than does medication, and with improved surgical measures the death rate of 12 per cent will be materially lessened.