

PART V.

DISEASES OF THE URINARY SYSTEM.

I. DISEASES OF THE KIDNEY.

MOVABLE KIDNEY.

Synonyms.—Floating- Kidney; Dislocated Kidney; Wandering Kidney; Renal Mobilis.

Definition.—A condition where the kidney is released from its moorings of fat, peritoneum, and blood-vessels, and occupies an abnormal position. Various terms are used to designate this condition according to the degree of displacement; thus a palpable kidney is one where the lower edge of the organ can be felt only on deep pressure. A movable kidney is one where the displacement is sufficient to enable one, by firm pressure, to pass the fingers over the upper end of the organ during deep inspiration; while a floating kidney lies the field at large.

Etiology.—This condition may be congenital, though usually acquired. It is found more frequently in women than in men, and the right is the one most frequently affected, owing to its position beneath the liver, as with each inspiration the organ is depressed. Tight lacing favors its dislodgment, while repeated pregnancies give rise to relaxation of the abdominal walls. Tumors may also crowd the organ from its natural position. Resorption or wasting of the perirenal fat also favors this condition. In men, heavy lifting or trauma may give rise to it. It is not uncommon in neurasthenics. Drummond believed that in a majority of cases there was a congenital relaxation of the peritoneal attachments.

Symptoms.—There may or there may not be any subjective symptoms. In the former case, the discovery is made during an examination for some lesion foreign to the kidney, or discovered during an autopsy. The most common symptom is a dull, dragging pain in the loins and abdomen, being more prominent on the affected side. With this are associated symptoms of neurasthenia and hysteria, generally reflex, and due to pressure upon some organ or part. Or the patient, discovering a tumor, allows his imagination to run riot; cancer is his

diagnosis, and a legion of nervous symptoms follow.

Dyspeptic symptoms are quite common.

A twisting of the renal vessels, or strangulation or compression of the kidney, give rise to severe attacks of abdominal pain, vomiting, chills and fever, and frequently attended by collapse. These attacks are known as Diehl's crisis.

Palpitation of the heart is a common symptom with floating kidney. There are so many symptoms due to reflex conditions, that the patient's life is made miserable, not so much from the kidney direct as from the nervous derangement.

The physical signs of movable kidney are the most important evidences in the diagnosis of the lesion, and are determined by palpation, percussion, and inspection, which gives the only reliable information. In examining the patient we have him lie on his back with the abdomen relaxed. Place the left hand under the lumbar region, and with the right manipulate the abdomen from above downwards. During the manipulation, if no positive results are reached, have the patient take a full inspiration, when the kidney may be outlined. In thin subjects the tumor mass (kidney), can be readily felt, though rarely can it be grasped in the hand.

Diagnosis.—By careful observance of the physical signs just mentioned the diagnosis is comparatively easy, though gallstones may be taken for a movable kidney; here, however, there is marked jaundice, which is nearly always absent in movable kidney. Abdominal tumors of various kinds are sometimes confusing, but a careful manipulation will generally enable the physician to tell the one from the other.

Prognosis.—Unless complications occur, life is never endangered, and many times a cure may be effected by proper bandaging, the use of pads, rest in bed, attention to diet, and finally by surgical measures.

Treatment.—The treatment for misplaced kidney consists of mechanical, dietetic, and surgical measures, medical treatment being only used to allay reflex disturbances, and give relief when the patient is suffering pain.

Anders suggests that, since emaciation and resorption of perirenal fat is a cause of wandering kidney, the restoration of these will assist in a cure, and advises rest in bed and a diet that is fat-producing. While this may be true theoretically, it is not likely to effect a cure very often. After replacing the kidney, the patient should lie in a recumbent position for a few weeks, and before leaving the bed, a firm binder, with pad, should be applied. The bowels should be kept in a soluble condition to avoid severe straining at stool, and the patient should be cautioned against any severe physical exertion. A snug abdominal support may assist in the cure by holding up the intestines, thus acting as a support.

Should these measures fail, nephrorrhaphy, or stitching the kidney in place till adhesions fix it permanently, must be a final resort. After the operation the patient is to keep his bed for several weeks, to prevent the sutured organ giving way. Should this surgical measure fail, nephrectomy or extirpation is the final measure, though this should be avoided where possible, for the history of successful nephrectomies is not very brilliant.

CIRCULATORY DISORDERS OF THE KIDNEYS.

ACTIVE HYPEREMIA.

Synonyms.—Acute or Active Congestion of the Kidney.

Definition.—A temporary congestion of the blood-vessels of the kidneys, attended with little or no exudation.

Etiology.—Acute congestion is caused by the presence of irritants in the blood, either in the form of toxins, which are found in all the infectious as well as some of the other fevers, or by the ingestion of certain drugs, such as turpentine, potassium chlorate, carbolic acid and cantharides, santonin, copaiba, squills, and many others.

Severe injuries to various parts of the body may also give rise to congestion, while severe surgical operations, especially those on the bladder and urethra, or laparotomies, are frequently attended by acute congestion. The removal of one kidney is apt to be followed by congestion of its fellow. Sudden chilling of the body is a very common cause. The simple operation of introducing a catheter into a sensitive

urethra may be followed by acute hyperemia of the kidney.

Pathology.—The kidney is swollen, soft, dark-red in color, and if a section is made, the blood flows freely. In very severe congestion, the microscope will reveal cloudy swelling of the cortical substance.

Symptoms.—There is a sense of weight and oppression, rather than acute pain, in the lumbar region. The urine is scanty and, in some cases of poisoning, is almost suppressed. It is of a dark-red color, contains blood-corpuscles, some albumin, and, in severe cases, tube-casts. There may be slight elevation of temperature and an increased pulse-rate.

Diagnosis.—The diagnosis is readily made. Oppression in the lumbar region, scanty and highly colored urine, with normal or but slightly elevated temperature, can hardly be mistaken for any other condition.

Prognosis.—The prognosis is always favorable, save where the result of some major surgical operation.

Treatment.—The old alcohol sweat or spirit vapor-bath is an excellent measure at the beginning of an attack. Continue the bath until there is copious perspiration, when the patient is to be carefully covered in bed and given an infusion of couch grass (*triticum repens*), haircap moss, or marshmallow. Usually aconite and gelsemium is all that is needed:

Aconite	5 drops.
Gelsemium	20 drops.
Water	4 ounces. M.

Sig. Teaspoonful every hour.

Apis in drop doses is also a valuable remedy. If the bowels be constipated, a full dose of antibilious physic will greatly assist the specific in overcoming the acute congestion.

PASSIVE HYPEREMIA.

Synonym.—Chronic or Passive Congestion.

Definition.—A chronic engorgement of the renal vessels, which is

usually secondary to congestion of the other viscera.

Etiology.—The most frequent causes giving rise to renal congestion are chronic cardiac diseases, especially the advanced stage of valvular lesion after compensation gives way, and chronic pulmonary lesions, such as emphysema, adhesive pleuritis, fibroid phthisis, etc.; also chronic disease of the liver, such as chronic hepatitis and the various degenerations. It may arise from pressure upon the renal veins, from a gravid uterus, ascitic fluid, or tumors.

Pathology.—There is enlargement of the kidneys, which are dark-red in color, and firm and resisting to the touch. The capsule is but feebly attached or non-adherent. On making a section, the medullary substance is seen to be darker in color than the cortex, has a coarse, fibrous appearance, and bleeds freely; the Malpighian bodies appear as dark-red points, and are more prominent than under normal conditions. The most constant and characteristic lesion is the thickening of the walls of the capillaries both glomerular and medullary. Where the congestion continues for a long time, the appearance of the kidneys change; the enlarged organ, owing to disturbed nutrition, atrophies, and we have the “contracted kidney of congestion.”

Symptoms.— “The urine is diminished in quantity, the color is darker than normal, the reaction is strongly acid, and the specific gravity rises to 1,025 to 1,030, because the watery portion diminishes more than the other urinary constituents. Owing to the diminution of the percentage of water, the urates show a tendency to precipitate as the specimen cools, and form the well-known brickdust sediment (*sedimentum lateritius*), which is readily dissolved by heating to body temperature, by neutralizing or rendering the urine alkaline, and appears under the microscope as amorphous, golden-yellow granules, which occur either isolated or collected into cylindrical irregular masses. In addition to the pigment, which gives the sediment its brick-red or pink color (*uroerythrin*, urinary pink), the urine may, on account of the accompanying hepatic congestion, contain bile pigment, especially *urobilin*, less frequently *bilirubin*.” (Senator.)

There is weight in the loins, and the patient complains of backache. Gastric disturbance is common, and in long standing cases edema of the extremities follow. Accompanying these symptoms are those of the primary lesion, which may be cardiac, respiratory, or hepatic.

Diagnosis.—The scanty, highly colored urine, with but little albumin and few casts, enables us to recognize it from nephritis, the only disease with which it could be confounded.

Prognosis.—The prognosis will depend altogether upon the primary lesion and our ability to remove it. Chronic congestion may terminate in chronic nephritis.

Treatment.—An infusion of apocynum will be a good heart-tonic as well as diuretic, and is an agent that can hardly be dispensed with in the treatment of chronic congestion with cardiac complications. An infusion of digitalis is also a good remedy with the same conditions present. Cactus and crataegus will also be found useful. Should the liver be involved such remedies as leptandra, chionanthus, chelidonium, carduus marianus, polymnia, and agents of like character, may be used as indicated.

The bowels should be kept soluble, but we should avoid depleting cathartics. The diet should be nourishing, easily digested, and contain meat at least once per day. Fruits should be eaten freely.

ANOMALIES OF THE URINARY SECRETION.

ANURIA.

Definition.—Total Suppression of Urine.

Etiology.—Some cases of intense congestion in acute nephritis are attended, for a time, by complete suppression of the urine, though generally there is only partial arrest of the secretion.

Blocking of the ureters by renal calculi may also give rise to suppression.

Shock following major surgical operations and sometimes the catheterization of a patient may give rise to this condition. During the collapsed stage of cholera and yellow fever, no urine is secreted. Hysteria may be an exciting cause, Charcot reporting a case where no

urine was secreted for eleven days, and Bailey cites a case of a girl who passed no water from December 12th to March 1st, or during a period of fifty days. In the latter case, the physician was undoubtedly deceived.

Symptoms.—These depend largely upon the cause of the suppression and the length of time involved. If due to mechanical obstructions, there may be but little systemic disturbance or discomfort for some time. At other times, there is evidence of uremic poisoning very early, the first symptom being that of irritability, to be soon followed by twitching of the muscles, nausea, vomiting, convulsions, and a profound coma.

Diagnosis.—Is made by the use of the catheter, no urine being present in the bladder. The skin is cool and the temperature often subnormal.

Prognosis.—This will depend upon the cause giving rise to it.

Treatment.—Where the suppression is due to mechanical obstruction, surgical measures will be the only method of relief. To establish the secretion, give the patient a spirit vapor-bath, and after profuse perspiration and complete relaxation, place the patient in bed, with hot applications to loins and feet, and administer gelsemium in five-drop doses in hot water. In extreme cases, wet cups to the back will bring relief. If gelsemium does not establish secretion, give an infusion of marshmallows, haircap moss, or triticum repens. The old compound tincture of Virginia snakeroot, given in hot water, is a very good agent.

Pilocarpin.—Where the skin is dry and the pulse full and bounding, one-eighth or even one-fourth grain of pilocarpin, used subcutaneously, will prove the quickest and most efficient remedy. Pilocarpin causes the system to relax quicker than almost any other agent, and as an eliminator of morbid material has few equals.

Strophanthus.—This is an excellent remedy where the suppression is due to cardiac lesions. One or two drams to four ounces of water, of which a teaspoonful should be given every hour.

Hydragogue cathartics may be given freely, and their full effects afford relief to the congested kidney.

HEMATURIA.

Definition.—The presence of blood in the urine.

Etiology.—Hemorrhage from the kidney may be caused by severe acute or chronic hyperemia of the kidney, from nephritis and embolic infarctions due to ulcerative endocarditis. Malignant disease of the kidney, or tuberculosis of the organ, will also give rise to it, while the ingestion of large doses of turpentine, cantharides, and potassium chlorate, carbolic acid, and like remedies, is followed by hemorrhage. Injuries or blows over the kidneys are sometimes attended by severe bleeding. Stone in the ureter or bladder, or the passage of a small calculus through the urethra, may be the exciting cause. A severe cystitis is sometimes attended by hemorrhage. Certain diseases, like malaria and leukemia, may be attended by blood in the urine.

Some cases occur from unaccountable causes, and may be termed renal hemophilia. I have an interesting case, a “bleeder” —hemophilia—who bleeds from the slightest provocation, most frequently from the nose or gums, though on three different occasions the hemorrhage has been from the kidneys.

Symptoms.—There is a sense of fullness and weight in the loins, and sometimes pain of a dull, aching character. There is almost a constant desire to micturate, attended with tenesmus and burning. If the result of an injury, the pain may be intense and of a sickening character, with marked prostration. The pain may extend down the ureter to the penis or testicle.

Diagnosis.—The diagnosis is easily made as to the presence of blood in the urine, but it is not always easy to tell its source.

The color of the urine will vary from a smoky hue to a dark coffee color, and between which there may be every shade of red. The microscope will reveal the presence of red blood-corpuscles thus distinguishing it from hemoglobinuria, in which they are entirely absent. If the hemorrhage be from the kidney, the blood is apt to be more uniformly mixed with the urine, and there will often be cylindrical clots the shape of the ureter or mold of the kidney. If from the bladder, the first urine voided may be quite clear, or at least much lighter than the last portion. When the quantity of blood is very slight, the color may not be deep

enough to reveal it, and reagents will have to be used to determine its presence.

At times the clotted blood may completely fill the bladder. If there be doubt as to the source of the hemorrhage a cystoscopic examination of the bladder, and catheterization of each ureter, will determine the location, and remove all doubt.

Prognosis.—This will depend entirely upon the cause: where the result of grave lesions, the prognosis will be unfavorable.

Treatment.—In acute hematuria, the patient should be placed in bed, a towel wrung out of cold water applied around the abdomen, the patient being warmly covered with blankets, and hot-water bottles placed to the feet. Internally, five-grain doses of gallic acid may be given every thirty or sixty minutes, or we may give five drops each of the oil erigeron and cinnamon, every ten, twenty or thirty minutes. Where the hemorrhage is more passive in character, hamamelis, hydrastis, or carbo vegetabilis may be given. Ergot should be given hypodermically in extreme cases. Should the heart's action be strong, as shown by the full, bounding pulse, veratrum should be administered.

Where the hemorrhage is due to congestion of the kidney or nephritis, means should be directed to overcoming these conditions, and such remedies as gelsemium, apis, eryngium, and rhus tox. will be useful. Also infusion of couch grass, marsh-mallows, haircap moss, and remedies of like character.

HEMOGLOBINURIA.

Hemoglobinuria is the result of the destruction of the red blood-corpuscles, whereby the coloring matter is set free and eliminated by the kidneys, the coloring matter being found in the urine.

Etiology.—The destruction of these blood-cells is nearly always due to the presence of some toxin; either some one of the many toxic drugs, such as turpentine, carbolic acid, potassium chlorate, phosphorus, arseniuretted hydrogen; or of the infectious fevers, as typhoid, typhus, yellow fever, scarlet fever, diphtheria, malaria, syphilis, and all cachectic conditions, and those generated during metabolic changes. It

may be due to the ingestion of certain fungi, as false mushrooms or tainted food of any kind, or from the ptomaines developed in milk, cheese, canned goods, etc.

Paroxysmal Hemoglobinuria.—This form is very rare, and consists of the occasional passage of blood urine, in which only the coloring matter is present. While the cause is not known, it seems closely associated with the tendency to cold in sensitive people. It has also been associated with Raynaud's disease.

Pathology.—The pathology of the disease is unknown.

Symptoms.—The attack may come on suddenly, with chilly sensations, followed by febrile reaction, though in some cases the temperature may be subnormal. It generally follows exposure to cold, and is of short duration, usually subsiding within twenty-four or forty-eight hours. During the paroxysm, there may be vomiting and diarrhea, with pain in the lumbar region.

Diagnosis.—This can only be made by a microscopical and chemical examination of the urine. The urine has a red, brownish-red, or black color, and deposits a heavy sediment of the same color. The microscope reveals the absence of blood-corpuscles and the presence of granules or castlike formations, and sometimes crystals.

Prognosis.—It is generally favorable, though in malignant malarial hemoglobinuria fatal results may follow.

Treatment.—This will depend upon the causes giving rise to the disease. Rest in bed is necessary in all cases. Gallic acid, ergot, and the mineral acids should be tried. Erigeron and cinnamon must not be overlooked.

ALBUMINURIA.

Definition.—The presence of albumin in the urine.

Etiology.—The terms albuminuria and Bright's disease were used synonymously for a number of years, and to detect albumin in the urine was proof sufficient for a diagnosis of nephritis.

It is now recognized, however, that there are several conditions other than nephritis giving rise to albuminuria, several of which are innocent, provided they are not persistent.

The presence of albumin in the urine, in all probability, indicates some change, however slight and transient, in the epithelium of the glomeruli or the capillaries of the tuft, which permits the escape of the normal constituents, serum-albumin and serum-globulin, from the vessels into the renal tubules.

The principal causes giving rise to albuminuria are acute and chronic congestion of the kidneys, acute and chronic nephritis, the various degenerations of the kidneys, the toxin of scarlet fever, diphtheria, typhoid fever, measles, influenza, and numerous infectious diseases, certain blood changes that occur as the result of arsenic poisoning and poisoning from other minerals, and of certain diseases, such as scurvy, leukemia, syphilis, and others of like character. Pregnancy and certain lesions of the nervous system, as epileptic seizures, apoplexy, etc., may also be attended by albuminuria. We may divide albuminuria, for convenience, into functional and structural, eliminating from the latter those cases not due to nephritis.

Paroxysmal or Cyclic Albuminuria.—This variety is characterized by a regular rise and fall in the quantity of albumin during the twenty-four hours. Usually the amount is small, with but few if any casts.

The albumin appears shortly after rising in the morning, gradually increases during the day, grows less on lying down, and disappears during the night, to reappear the following morning.

The quantity varies according to the mental or physical exertion of the patient, and the character and quality of the food taken.

It occurs mostly in young men whose general health has become impaired. These patients are generally emaciated, lose flesh and strength, suffer with headache and general languor, disorders of the stomach and bowels, and are inclined to be hysterical. Where these conditions have existed for some time, it is often quite difficult to diagnose the functional from the structural form.

Dietetic Albuminuria is that form where albumin appears in the urine after the ingestion of certain articles of food, notably eggs, cheese, and pastry, or any full meal, especially where digestion is faulty or where severe exertion takes place immediately after a meal. The quantity is usually small, with but few and only temporary casts.

Neurotic Albuminuria is that form which follows periods of great emotional excitement, hysteria, and severe mental strain. Epileptic seizures, apoplexy, tetanus, and injuries of the head, also give rise to it.

Albuminuria Following Exertion.—This is due to congestion of the kidneys, and appears after severe or prolonged exertion. It is often found in the urine of athletes after contests of running, rowing, or any of the various contests where prolonged strength is required. The quantity is usually small, and disappears after a few hours of rest, to return again when the same conditions again appear.

The Blood Changes, as seen in syphilis, lead, mercury, and arsenic poisoning, severe anemia and puerperal eclampsia, when not due to nephritis, give rise to albuminuria.

Febrile Albuminuria.—The various febrile and inflammatory diseases may give rise to slight albuminuria. The presence of albumin in the urine is due to some change in the epithelium of the glomeruli, caused by the toxins of the fever, and although there is a cloudy swelling, there is no structural change.

This may accompany diphtheria, typhoid fever, the eruptive fevers, tonsillitis, and like diseases.

While these various forms of albuminuria are not regarded as serious, yet if persistent, they should be regarded unfavorably, as they usually lead to structural changes.

Diagnosis.—The diagnosis of albuminuria is made by finding albumin in the urine, by one of the several tests described. The differential diagnosis, however, will require a more careful study. In renal or structural albuminuria, the quantity is persistent, usually large, and contains a larger per cent of tube-casts. There are also symptoms of dropsy, cardiac derangement, and more or less anemia.

In functional albuminuria, the quantity is small, with but few casts, and is not constant.

Tests for Albumin.—The urine to be tested should be free from any morphologic constituents, and should therefore always be filtered. Care should be taken that it be free from leucorrhoeal and menstrual discharges. Two samples should be taken; one before breakfast and after a night's rest, the other at the close of the day.

1. *Boiling Test.*—This is the most common, easy, and reliable test for albumin. Fill a test-tube about one-third full of urine: if neutral or alkaline, add one or two drops of acetic or nitric acid. Hold the tube slanting, that the heat may strike the upper portion of the urine, and bring to a boiling point. If albumin or the phosphates be present, the upper portion becomes turbid, which is clearly shown against the clear urine in the bottom of the tube. Then add a few drops of nitric acid, which will thicken the turbidity if albumin be present, and clear it if it be absent.

2. *Heller's Nitric-Acid Test.*—This requires a little more care in the test, and is no more reliable. It is as follows: put a little nitric acid into the test-tube, and then carefully pour a little urine down the side of the tube; as it comes in contact with the acid, a white ring is formed at the point of contact. Uric acid, urates, and certain coloring matters, form a pink or red zone, which is just above the junction of the two liquids. Hemialbumose will give the same white zone, but does not respond to the boiling test as does serum-albumin.

3. *Johnson's Picric-Acid Test.*—Place a little urine in a test-tube, and carefully place a few drops of a saturated watery solution of picric acid upon the top of the urine; if albumin be present, a turbidity or white zone immediately forms at point of junction. Heating strengthens the evidence already manifest.

4. *Ferrocyanid-of-Potassium and Acetic-Acid Test.*—Fill a test-tube one-third full of urine, and add a few drops potassium-ferrocyanid solution. After thoroughly mixing the urine and the reagent, add ten to fifteen drops of acetic acid. If albumin be present, a cloudiness more or less pronounced takes place, depending upon the amount of albumin present. As this precipitates all forms of albumin, either acid or alkaline, and does not precipitate mucin peptones, phosphates, urates, vegetable

alkaloids, or the pine acids, it becomes a very reliable test.

5. *Magnesium Nitric Test.*—To five volumes of the saturated solution of sulphate of magnesium add one volume of strong nitric acid. Fill a test-tube one-third full of this solution, and with a pipette allow the urine to flow down the side of the tube; at the point of contact a cloudy ring will form.

6. *Quantitative Test.*—To determine the proportion of albumin per thousand, Esbach's albuminometer will be used. This tube bears two marks: one, U, indicating the point to which the urine must be added; and one, R, the point to which the reagent is added. The lower portion of the tube up to U bears a scale reading from one to seven. The tube is filled to U with filtered albuminous urine, and the reagent added till the point R is reached. The tube is then closed with a stopper, inverted twelve times, and set aside for twenty-four hours. At the expiration of this time serum-albumin, serum-globulin, and albuminose, as well as uric acid and creatinin, will have settled down, when the amount per mille, in grams, may be directly read off from the scale. The solution used is composed of ten grams of picric acid and twenty grams of citric acid dissolved in 1,000 c. c. of distilled water. (Simon.)

Prognosis.—This depends entirely upon the cause and length of time that albumin has been found in the urine. Albuminuria due to fever and hemic changes is nearly always transient, and disappears with the subsidence of the fever.

If the patient be a young man, and there is no increased arterial tension, the albumin may disappear spontaneously after a few months' time. Occurring in a patient past forty years of age, with increased arterial tension, it would indicate a more serious kidney lesion.

In cyclic and dietetic albuminuria the prognosis is generally favorable. In all cases of persistent albuminuria, however, there is in all probability glomerular changes that are apt to lead to structural changes. If the kidneys are affected, and there be increased arterial tension, and tube-casts be present, the prognosis must be guarded, and if the patient be an applicant for insurance, his application should be refused.

Treatment.—The treatment is largely dietetic and hygienic. The

patient should eat sparingly of meats and eggs, the principal diet consisting of vegetables, fruits and milk. Exercise in the open air, short of weariness, should be taken, and no severe work, either mental or physical, allowed. Drop doses of Howe's acid solution of iron, when an acid is indicated by the red tongue, will give favorable results.

PYURIA.

Definition.—Pus in the urine.

Etiology.—Pus may arise from an abnormal condition of some part of the urinary tract, or it may break into it at any point and be discharged with the urine.

Pyelitis and Pyelo-Nephritis.—Calculi, tuberculosis, or other sources of irritation may give rise to inflammation of the pelvis, pus flowing with transitional epithelium. Where the pus is due to an abscess, it may be intermittent, days or weeks intervening, when the urine is free. When due to a calculus or tuberculosis, it is usually constant. In these cases the mixture of urine and pus is acid, but where the pyelitis and pyelo-nephritis follow cystitis, the urine is alkaline, contains more or less mucus, and is thick and gelatinous. In such cases the symptoms of bladder trouble are generally pronounced.

Cystitis.—When due to cystitis, the pus is peculiarly offensive, is thick, stringy, tenacious, contains mucus, and is alkaline in reaction. The pus and urine are so thoroughly mixed, that, when due to pyelo-nephritis, the triple phosphates are frequently present. The stringy mucus generally passes with the last portion of the urine.

Urethritis.—When due to urethritis, there is generally the history of gonorrhoea, the quantity is small and passes ahead of the urine.

Leucorrhoea.—As in gonorrhoea, the quantity is usually small and mixed with large flakes of vaginal epithelium. Where there is any doubt as to the source, the urine should be drawn with a catheter.

Rupture of Abscesses into the Urinary Passages.—In these cases there are generally symptoms of an abscess at some part, either in the kidney or right iliac fossa—suppurative appendicitis. This form is usually

accompanied by a sudden discharge of a large quantity of pus in the urine. It may be but for a short time and disappears as suddenly as it came, or gradually grows less, several days passing before there is a complete subsidence of pus.

Diagnosis.—We diagnose pus in the urine by the greenish, yellow, or yellowish-white tinge, the thick, ropy, tenacious character of the urine due to mucus, the ammoniacal odor, and generally alkaline reaction; by the presence of pus corpuscles, or leukocytes, as determined by the microscope. Phosphatic urine somewhat resembles pus in the urine, though in such cases the sediment is more white and the microscope at once reveals the difference.

Potassium-Hydroxid Test.— “Permit the urine to settle. Decant the clear liquid, and add to the sediment a solution of potassium hydroxid-caustic potash. If pus be present, a gelatinous mass results; if pus is found in the sediment, albumin may be expected in the clear liquid previously decanted.”

Treatment.—This will depend somewhat upon the location of the pus-producing part. Thus, if of the bladder or urethra, the treatment will be quite different from abscess of the kidney.

We are to remember that pus in the kidney does not materially differ from pus in any other organ, and the remedies used for pus in the urine will be the same as those for suppurative processes wherever found,—such remedies as calcium sulphide, echinacea, baptisia, sodium sulphate, potassium chlorate, and the mineral acids as they may be severally indicated. The bowels should be kept soluble, with an occasional hydragogue cathartic, to flush the system and rest the kidney. The skin should be kept moist with an occasional dose of jaborandi or pilocarpin. Uva ursi, either tincture or infusion, will be found to give good results, and should be taken freely and continued for a long time.

The diet should be nourishing, easily digested, and fluids should be restricted to the smallest amount compatible with health.

If the pyuria be due to cystitis, irrigation of the bladder with a boracic acid solution or a weak solution of potassium chlorate with phosphate of hydrastin, should be used. Specific agrimony, elaterium, cantharidis,

red onion, cocklebur, triticum repens, verbascum, chimaphila, and helonias are indigenous remedies, and will prove of great benefit.

CHYLURIA.

Definition.—Chyle in the urine.

Etiology.—This very rare and interesting condition in temperate regions is due to lymphatic connection with the urinary passage. In the tropics it is due to parasitic origin and caused by rupture of the renal lymph vessels, which become obstructed and weakened by the filaria sanguinis hominis.

Symptoms.—There are no subjective symptoms. The urine has a milky appearance. If there is a large amount of chyle present, the fat particles rise to the top, forming a pellicle on the surface, while the fibrin settles to the bottom, forming clots. If ether be added to the urine, and the mass agitated, the fatty particles give way, the urine becoming clear. Since the chyle contains serum-albumin, it will respond to the same tests for that substance.

Microscopic examination reveals myriads of small, bright, round granules, similar to those of milk, which will dissolve in ether.

Diagnosis.—This is made by the milky appearance and the condition of the urine already noted.

Prognosis.—This is unfavorable as to a permanent cure, and though the urine may be clear for a time, yet, after a varying interval, new lymphatics rupture, and the urine again shows the milky appearance.

Treatment.—As yet no satisfactory treatment has been found for chyluria. Such dietetic and hygienic measures should be used as will add tone to the general health. Change of climate may, by adding new vigor, bring about a cure.

GLYCOSURIA.

Definition.—The presence of sugar, glucose, in the urine.

Etiology.—There are quite a number of causes that give rise to glycosuria. The first, and by far the most serious, is diabetes mellitus, and when due to this cause it is generally permanent. Intermittent and paroxysmal glycosuria may arise from gout, the eruptive fevers, cholera, malaria, hepatic cirrhosis, and organic diseases of the nervous system, especially diseases of the medulla.

Great mental emotion or shock may also be followed by glycosuria, as also may injuries of the brain. Pregnancy may be a cause. Gibier, of New York, has demonstrated on dogs, and proven that certain toxic drugs give rise to this condition; Morphia, atropia, chloral, hydrocyanic acid, and alcohol being a few of the many that produce such a result.

Diseases of the pancreas may also give rise to it. Obesity may be responsible for temporary glycosuria, while the ingestion of large quantities of food rich in saccharine or starchy substances, and beer, give rise to what is known as dietetic glycosuria.

Diagnosis.—The urine is increased to fifty or sixty ounces per day, is clear, of a pale yellow color, and of high specific gravity, 1,025 or more. It has a ripe-fruit odor, and an acid reaction. The finding of sugar or glucose by one of the following tests, makes the diagnosis positive:

1. *Fehling's Test.*—This test is made by using Fehling's solution which consists of two parts,—a copper solution, and a soda solution. Since a solution made according to the original formula soon decomposes on standing, and since the solution is too concentrated to obtain a delicate reaction, I give the following modification of Fehling's solution, taken from Ogden's work on clinical examination of the urine. This is not only a permanent solution, but at the same time furnishes a rapid and yet delicate reaction.

The solution is divided into two parts; viz., copper solution (A), and alkaline tartrate solution (B).

(A) Cupric, sulphate, 34,639 grams; distilled water, ad-1,000 c. c.

(B) Sodio-potassium tartrate (Rochelle salt), 173 grams; sodio-hydrate (specific gravity 1,120), 500 c. c.; distilled water, ad-1,000 c. c.

These solutions, A and B, are to be kept in separate bottles and in a dark place. Equal parts of the two solutions produce diluted Fehling's solution.

Process.— “Place equal parts of the two solutions, A and B— about one finger breadth of each—in a test-tube, and boil. If the Fehling's solution remains clear on boiling, then add twenty to thirty drops of the suspected urine which is free from albumin.

Do not boil after the addition of the urine.—If much sugar be present, a yellow or red precipitate of suboxid of copper readily appears. In case the quantity of the sugar in the urine is less than one per cent, the reduction will not appear until after several minutes, five to thirty. If a reduction does not take place in thirty minutes, it is advisable to let the test stand for from eighteen to twenty-four hours, since traces of sugar show evidence of a reduction of the copper only after several hours, when a small amount of the suboxid will be found in the bottom of the test-tube. Less time is required for the test, if the urine is gently heated previously to its being added to the boiling Fehling's solution. The non-appearance of a suboxid precipitate shows that the urine is free from sugar. Fehling's test, performed in this way, is one of the most delicate and reliable of tests.

2. Trammer's Test.—To a dram of urine in a test-tube add a few drops of a dilute sulphate of copper solution, and then add one dram of liquor potasse. bring this to the boiling point, and. if sugar be present, the copper is reduced, forming the yellow or orange-red suboxid.

3. Bottger's Test.—This test, to be of any value, must have any albumin that may be present removed, which may be accomplished by rendering it acid, boil and filter; to this filtered urine add from one-half to an equal quantity of liquor potasse, and a few grains of bismuth subnitrate. Boil for several minutes, and, if glucose be present, black metallic bismuth will be precipitated.

Prognosis.—This will depend altogether upon the cause. In diabetes millitus, the prognosis will be grave, while in most of the paroxysmal and intermittent forms, the glycosuria disappears with the removal of

the cause.

Treatment.—The treatment for glycosuria due to diabetes millitus will be considered under a separate article.

In the temporary form, the treatment will be largely hygienic and dietetic. The patient should be placed on veal, mutton, fish, or chicken, with very little bread. Fruits, except lemons, currants, sour cherries, plums, and the acid fruits, and all saccharine substances, should be avoided. He should avoid all worry, lead an even, temperate life, and be out of doors as much as possible. With improved health, the glycosuria disappears.

From the good report of *rhus aromatica* in diabetes millitus, we would prescribe the remedy here with all confidence, bearing in mind, however, that with the disappearance of the exciting cause, the sugar also disappears.

OXALURIA.

Definition.—The continued presence of an excess of calcium oxalate in the urine.

Etiology.—Oxalic acid is found in small quantities, a mere trace, in normal urine, and in still larger quantities, transient oxaluria, after eating certain fruits and vegetables; such as apples, pears, tomatoes, rhubarb, asparagus, cauliflower, spinach, beans, sorrel, etc. It is found in hypochondriasis, diabetes mellitus, catarrhal icterus, neurasthenia, gout, tuberculosis, and cancer. It is supposed to be due to disordered metabolism, especially of the fats and carbo-hydrates.

Symptoms.— “The symptoms of oxaluria are those of greatly depressed vitality. The appetite is irregular, and digestion imperfect, with well-marked dyspeptic symptoms. The secretions are deranged, the skin being very susceptible to external impressions, at times dry and harsh, again soft and flabby and covered with an unnatural perspiration; the bowels are usually torpid and sluggish and do not respond well to the action of medicine. The patient is low-spirited and melancholy, the temper is irritable, and there is great restlessness, and constant brooding over his condition. There is frequently a very disagreeable

impression of weight and pain in the loins and small of the back; the urine is voided with increased frequency, and with more or less heat and scalding.

“The patient becomes greatly emaciated as the disorder advances, and frequently sinks into a state of confirmed hypochondriasis. If the disease goes thus far, some other part of the system becomes the seat of the disease, as the lungs, liver, bowels, etc., which carries the patient off.”

Diagnosis.—The specific gravity of urine in oxaluria is usually from 1,020 to 1,030, and, as before remarked, in many cases it contains an excess of uric acid and urates, urate of ammonia being deposited on cooling, and sometimes tinted with purpurin.

The deposit of oxalate of lime occurs in the form of white, glistening powder, which, when examined under the microscope, is found to consist of transparent octahedra, with sharply defined edges and angles. The best way of making the examination is to allow a portion of the urine, passed a few hours after a meal, to stand until cool, then decant the major portion, and pour a part of the remainder into a watch-glass, when, on applying heat, the crystals of oxalate will be collected at the bottom.

Oxalic calculi are next in frequency to the uric; they are generally of a dark-brown color, rough and tuberculated, hard, compact, and perfectly laminated. It is insoluble in the alkalies, dissolves slowly in nitric and hydrochloric acid, if previously well broken up, and under the blowpipe expands and effloresces into a white powder. A variety of this species is remarkably smooth, and of small size, and from its shape has been described under the name of “hemp-seed.”

Prognosis.—Is generally favorable.

Treatment.— “In the treatment of oxaluria, the most prominent indications are, to improve the general health, and to establish secretion from the other emunctories. As there is a condition of confirmed dyspepsia, this must be managed as heretofore named. I might here remark that I have found the strong infusion of peach-bark given in quantities of two teaspoonfuls every three hours, and also the tincture of collinsonia in half-teaspoonful doses four times a day, very successful remedies in these cases. I frequently order the triple phosphate of

quinine, strychnia, and iron (compound tonic mixture) in half-teaspoonful doses two or three times a day. It should be given with water, as much as half a wine-glassful at every dose. The colorless fluid hydrastis fits some cases well, in doses of half a teaspoonful. The hydrastis is a very efficient agent in some of these cases, as is also the ptelea, populus and liriodendron. These remedies should in all cases be associated with the mineral acids, the nitric being recommended by Dr. Prout, but a combination of one part nitric and two or three of hydrochloric, by others.

“If there is a tenderness on pressure over the epigastrium, I would strongly recommend the irritating plaster. To overcome constipation of the bowels where it exists, we may employ the Podophyllin pill, named under the head of uric acid, or the powder of sulphur and phosphate of soda, named in preceding pages. The diet should be regulated with the greatest care, all agents that produce flatulence or acidity of the stomach being discarded, animal and vegetable food being used in about equal proportions. The same means to increase elimination from the skin, as in the case of uric acids, should be employed here, and especially should flannel be worn next to the skin, and warm clothing-, to protect the body against sudden changes in temperature. In many cases, all drinks but water will have to be excluded, and especially should wine, beer, and other stimulants be proscribed: a small portion of brandy being- allowed if absolutely necessary.”

INDICANURIA.

Definition.—The presence in the urine of an abnormal quantity of indican. It occurs in small quantities in health.

Etiology.— “Indican is formed from indol,— C_8H_7N ,— which is a product of the putrefaction of albuminous substances in the intestine. The indol is then absorbed from the intestines and enters the blood, where it becomes oxidized to indoxyl,— C_8H_7NO .—which immediately combines with potassium (and, to a slight extent, with sodium) sulphate to form indoxyl-potassium sulphate, in which form it is eliminated in the urine.” (Ogden.)

All disorders, therefore, in which large quantities of albumin are decomposed, must be considered as causal factors in indicanuria. Such

as carcinoma of the stomach, ileus, and all wasting diseases; cachexia, empyema, putrid bronchitis and gangrene of the lungs may be regarded as primary factors in giving rise to this condition.

Diagnosis.—This is made by using one of several tests, and demonstrating the presence of indican in the urine.

Tests for Indican.—Stokvis' modification of Jaffe's test is one frequently employed, and is as follows: place a few c. c. of urine in a test-tube; add an equal volume of concentrated hydrochloric acid, and two or three drops of a strong solution of sodium, or calcium hypochlorite. The mixture is shaken with one or two c. c. of chloroform. The indigo blue that follows reveals the presence of indican.

Take 15 c. c. of strong hydrochloric acid (C. P.) in a wineglass, add one or two drops of strong nitric acid (C. P.), stir; then add thirty drops of the urine to be tested, and stir immediately. An amethyst color soon makes its appearance, reaching its greatest intensity in from five to twenty minutes. If *normal*, a distinct but not intense amethyst color appears; if *increased*, the color is decided, and often very deep. (Og"den.)

PHOSPHATURIA.

Definition.—The persistent presence in the urine of an excess of the phosphates.

Etiology.— “A considerable quantity of phosphoric acid is excreted from the blood through the kidneys in health, usually divided between four bases, soda, ammonia, lime, and magnesia, all of which are either soluble themselves, or rendered so by the presence of some acid, the presence of a very minute portion being sufficient for this purpose.

“It may also be deposited in a healthy condition of the system, as after eating, laborious exercise, and especially after severe mental labor; but the deposit continues for only a short time; where continuously deposited, it is always indicative of important functional, and sometimes organic, disease. Dr. Bird remarks that one general law appears to govern the pathological development of these deposits; viz., that they always exist simultaneously with a depressed state of nervous energy, often general, more rarely local in its seat. Of the former, the result of

wear and tear of body and mind in old people; and of the latter, the effects of local injury to the spine, will serve as examples. Three forms of phosphatic deposit may be named:

the *triple phosphate*, *phosphate of lime*, or calcareous deposit, and the *mixed deposit*, a combination of the two preceding. The first is always associated with dyspepsia, the digestive functions being poorly performed, the patient irritable and restless. with loss of flesh and strength, so that he is fatigued by slight exertion. The urine is usually copious, of a light amber color; or in some cases it is dark, and of a high specific gravity, 1,025 or 1,030. The deposit of phosphate of lime occurs from urine secreted in large quantity, of low specific gravity, and readily decomposed by the atmosphere. The mixed deposit usually occurs combined with a large quantity of mucus, the urine being pale, fetid, and depositing a thick, mortar-like sediment on standing. It usually occurs in cases of injury or severe diseases of the spine, organic disease of the kidneys and bladder, in the severe forms of dyspepsia, and in persons who have been exhausted by severe mental labor, anxiety, night-watching, and during the progress of cachectic affection that debilitates the system. The symptoms are those of imperfect digestion, mal-assimilation and malnutrition, and disordered innervation.

“Deposits of the phosphates are always white, unless colored with blood, are insoluble in ammonia or liquor potassae, but soluble in dilute hydrochloric acid. In a majority of cases, urine depositing much of the phosphates is alkaline, though they are deposited when it gives an acid reaction with litmus paper; but in this case the acidity does not depend upon free acid, but upon neutral salts. These deposits often settle to the bottom, like a thick cloud of mucus, for which it is frequently mistaken; we may at once detect their true nature, however, by the addition of hydrochloric acid, which dissolves the phosphates, but does not affect the mucus. When examined by the microscope, the triple phosphates present beautiful crystals, of the form of triangular prisms, small stellate concretions, and penniform crystals. The phosphate of lime does not occur in crystals, but occasionally in irregular, crystallized masses. Calculi of phosphate of lime are not of frequent occurrence, but it sometimes forms alternate layers with other matter. When it occurs it is usually small, of a pale-brown color, of a loosely laminated structure, not fusible with the blowpipe, but readily soluble in hydrochloric acid without effervescence. The ammoniaco-magnesian calculus is of a white color and friable, looking a good deal like a mass of chalk; it exhales an

ammoniacal odor before the blowpipe, is not affected by caustic potash, but is easily dissolved in dilute acids. Another form of phosphatic calculi has been denominated fusible; it is white, extremely brittle, easily separated into layers, and leaves a white dust on the fingers. It is not affected by caustic potash, is soluble in hydrochloric acid, and is melted into a transparent pearly glass under the blowpipe. Both of these last forms often attain an immense size, and frequently form incrustations on foreign bodies.”

Treatment.— “The general treatment will be somewhat similar to the other forms. The bitter tonics and iron, to improve the digestion and the quality of the blood, should be steadily employed. In some cases there seems to be such a loss of tone on the part of the stomach that tonics have no effect: in such cases I direct an emetic two or three times a week, with the happiest results. As in the case of oxaluria I have obtained most excellent results from the use of nux vomica and strychnia, and the collinsonia and agrimonia, quinine, to the extent of from two to eight grains a day, is often of marked benefit.

“The urine should be kept acid to prevent a deposit, and for this purpose dilute nitric acid is most frequently used. The bowels should be kept in a soluble condition, as heretofore named, and strict attention given to the skin, and its secretions favored by the use of the bath, friction, and wearing flannel and warm clothing”. The diet should be carefully selected, plain but generous, and, to the considerable extent, of animal food.” (Scudder.)

UREMIA.

Definition.—A toxemia occurring in the course of various diseases, generally those of the kidneys, and due to a retention in the blood of certain products that are usually removed by these organs. It is not yet positively determined whether these retained products are the normal constituents of the urine or the results of some derangement in the process of metabolism.

Although most common in nephritis, uremia is found as a result of, or accompanying, other diseases; notably, typhus, typhoid, diphtheria, scarlet fever, gout, cholera, yellow fever, etc.

Etiology.—Brown-Sequard believed uremia to be due to a disturbance of an “internal secretion,” which he believed the kidneys possessed. Traube's theory was, that it was due to an acute edema of the brain, and he cites cases of nephritis where a goodly portion of both water and solids are voided, and yet uremia exists.

Whenever the kidneys fail to void the normal quantity of solids of the urine, either from degeneration of the organs or from severe congestions, we have the conditions giving rise to uremia.

Strumpell well says: “Probably no one to-day doubts that uremia must be regarded as essentially an intoxication of the body by the retained products of tissue metamorphosis. Numerous experimental investigations have proved that, in animals, extirpation of the kidneys, or ligation of the ureters, will produce a symptom complex, characterized by vomiting, convulsions, and coma, almost completely analogous to the uremia of Bright's disease; but if we inquire what constituents of the urine are the particular occasion of the uremic phenomena, we can not as yet obtain any definite answer.”

For a long time it was believed that urea played a chief part in the development of uremia, but the result of experiments upon animals does not support this view. It is possible to inject enormous amounts of urea into the circulation or into the peritoneal cavity of animals without any symptoms of poisoning. Voit did indeed show that the healthy kidneys remove from the blood the excessive amount of urea with extreme rapidity, and that accordingly uremic symptoms do really appear, if, while we are feeding an animal with large amounts of urea, we impede the excretion of the urea by a simultaneous withholding of water. Yet the amount of urea necessary for the success of this experiment is greater than can possibly exist in the uremia of Bright's disease; and, moreover, the withholding of water might also prevent the excretion of other matters; hence we must seek for other poisonous substances as factors in the production of uremia.

Many experiments seem to indicate that the potassium salts are especially poisonous, while some" authors have laid the blame mainly on the extractive matters, such as creatinin. Bouchard has sought to prove that certain alkaloid substances (urotoxins), which are probably developed during the digestion of albumins, and are always demonstrable in normal urine, occasion the phenomena of uremia; but

to all these suppositions there are serious objections, so that really the substances which occasion uremic intoxication are as yet unidentified. It might be possible that the poison corresponding to uremia is not in every case the same.

Symptoms.—Uremia may be divided into acute and chronic, the symptoms depending somewhat upon the form the disease assumes. While acute uremia may attend any form of nephritis, it most frequently follows febrile conditions, such as scarlet fever, typhus fever, yellow fever, etc.

The acute form is characterized by the sudden appearance of nervous symptoms so usual to uremia, though in rare cases the acute form may be preceded by slight headache, general depression, more or less nausea, general malaise, and respiratory oppression.

The chronic form is characterized by the slower and more gradual invasion of the disease, so that months may elapse with the morbid processes involved, where but days, or at most weeks, terminate the acute form. For convenience of description the symptoms will be grouped according to the part affected,—cerebral, dyspneic, and gastrointestinal.

Cerebral Symptoms.—These show a wide range, embracing, in their entirety, headache, delirium, mania, delusional insanity, convulsions, coma, and paralysis. In some the symptoms resemble an attack of epilepsy, being preceded by headache, the patient complaining of spots before the eyes, with impaired vision, more or less vertigo, ringing in the ears, nausea and vomiting, and finally terminating in convulsions—uremic eclampsia.

At other times the convulsive seizure may occur without any warning. The attacks may be general or local, as in Jacksonian epilepsy. During the interval between attacks the patient usually remains unconscious. The temperature may rise after an attack, though often the thermometer shows either a normal or subnormal range. Not infrequently blindness—*uremic amaurosis*—follows the convulsive attacks, and in rare cases occurs independently of them, though usually they are of but short duration, disappearing in two or three days, there being no structural changes in the visual apparatus. Uremic deafness is a rare result.

Following an attack, there is always unconsciousness for hours, though coma may develop gradually with the convulsions. The pulse is generally slow, full, and tense, though during a seizure it is small and frequent.

Mania may develop quite suddenly, the delirium being active in character, exhausting the patient rapidly and terminating fatally in a short time. At other times, the insanity may be mild in character, the patient being the victim of various delusions, that may lead to self-destruction, if the patient is not closely watched.

Uremic Dyspnea.—Very often, difficult respiration is the first symptom that causes the patient to consult the practitioner. At first it may be brought on by physical or mental exertion, or it may occur at an early hour in the morning. As the disease progresses, the respiration becomes more and more involved, and is especially severe at night. Finally the patient is unable to lie down, but must assume the sitting posture in order to breathe. The breathing may be noisy and stridulous, or it may assume the Cheyne-Stokes type. This renal asthma is one of the most distressing symptoms of uremia.

Circulatory Symptoms.—The heart's action is labored, the pulse being slow and oppressed, save in some acute attacks or during convulsions, when it becomes rapid, though small and feeble.

Gastro-Intestinal Symptoms.—Gastro-intestinal irritation may occur early in the disease, and become persistent and distressing. The tongue is heavily coated and foul, the breath has a decidedly urinous odor, while the lips and gums are swollen and of a dark purplish color. Vomiting is sometimes persistent and distressing, lasting for days. Associated with this gastric disturbance is a uremic diarrhea, though it may be independent of the vomiting. According to Grawitz the irritant action of the ammonium carbonate on the intestinal mucosa may give rise to catarrhal or diphtheritic inflammation and ulceration.

Uremic pruritus is probably due to irritation of the cutaneous nerves by crystals of urea.

The temperature is usually normal or subnormal, though uremic fever may accompany the convulsions. A urinous or ammoniacal odor is quite

characteristic towards the termination of the disease.

The urine is decreased in quantity, is dark, sometimes coffee-colored, and highly albuminous.

Diagnosis.—We must differentiate uremia from apoplexy (cerebral hemorrhage), cerebral tumor, meningitis, alcoholism, opium-poisoning, and infectious diseases. If you bear in mind certain characteristic symptoms, however, the diagnosis should not be difficult. The history, high arterial tension, accentuated second sound of the heart, albuminuria, low temperature, vomiting, foul tongue, and urinous breath and convulsions, can hardly be mistaken for the symptoms of any other lesion.

In apoplexy, the sudden loss of consciousness, the unequal or dilated pupils, and the absence of albuminuria and urinous breath, suggests cerebral hemorrhage.

In alcoholism, the pupils are commonly dilated, there are no convulsions, and the breath is not urinous or ammoniacal.

In opium-poisoning, the pupils are contracted. The eye-ground in uremia will reveal albuminuric retinitis.

It can be distinguished from the infectious diseases by the history and characteristic symptoms already noted; from meningitis, by the mode of onset, the delirium, and attendant fever.

Prognosis.—This must be guarded, as the disease is always grave, though not necessarily fatal.

Treatment.—The object of treatment is to eliminate the toxic excrementitious materials from the blood. To assist the kidneys in their work, we stimulate the skin and bowels by the free use of diaphoretics and hydragogue cathartics. A hot infusion of asclepias may be given freely, after the use of hot packs or the alcohol sweat, to keep up free diaphoresis. The compound powder of jalap (antibilious physic) should be given till free, copious stools are produced. Gelsemium, two to five drops in hot water, may then be given with benefit. Echinacea will be found beneficial in these cases. Where there is great prostration, the subcutaneous injection of a normal saline solution will prove of much

benefit. Santonin, two or three grain doses of the first trituration, will increase the action of the kidneys and help in the process of elimination. Hot diuretic infusions, such as triticum repens, uva ursi, buchu, epigea repens, and althea, will stimulate the kidneys to increased action. For the convulsions, hypodermic injections of morphia will generally afford relief.

ACUTE BRIGHT'S DISEASE.

Synonyms.—Acute Nephritis; Exudative Nephritis; Catarrhal Nephritis; Tubal Nephritis.

Definition.—Acute inflammation of the entire structure of the kidney, varying in degree and form, and due to the action of cold or toxic agents upon the kidney.



FIGURE 31. CORTEX TUBES. ACUTE EXUDATIVE NEPHRITIS. (Delafield.)

Since every part of the kidney may be involved, writers have described a tubular, a glomerular, an interstitial, and a diffuse nephritis, while Delafield describes three varieties: (1) Acute degeneration of the kidney; (2) *Acute exudative nephritis*; (3) Acute productive nephritis. These various forms, however, are only interesting in an etiological and pathological sense, and are of no practical value.

Etiology.—Acute nephritis is a disease of early life, though it may occur at any age. It is found more frequently in males than in females, owing to greater exposure in the male. The chief exciting causes are:

Cold.—Exposure to cold and dampness is perhaps the most frequent cause, particularly exposure due to a drinking spree.

Alcoholic intemperance, aside from the exposure that usually attends overindulgence, is a cause, and albuminuria is not uncommon in beer-drinkers.

The *toxins* from the infectious fevers, particularly *scarlet fever*, which usually manifests itself during convalescence, is a frequent cause. It may also follow diphtheria, typhoid fever, measles, chicken-pox, influenza, small-pox, relapsing fever, cholera, yellow fever, typhus, cerebro-spinal fever, dysentery, tuberculosis, erysipelas, acute articular rheumatism, malaria, and more rarely syphilis.

Certain *toxic drugs*, such as turpentine, carbolic acid, cantharides, potassium chlorate, salicylic acid, phosphorus, lead, arsenic, mercury, iodoform, and the mineral acids.

Chronic skin-diseases and severe burns may also prove exciting causes.

Pregnancy.—It is not uncommon during the last months of pregnancy, especially in primipara, for a nephritis to develop. This is due partly to pressure on the renal vessels by the gravid uterus, and partly to the altered blood changes.

Pathology.—The appearance of the kidneys and the anatomical changes depend upon the degree of the inflammation, the portion involved, and the stage of the disease.

While the volume of the organ is always increased, there may be no perceptible change to the naked eye where the inflammation is mild. The fibrous capsule is loosely attached, and may be easily stripped off, unless previous inflammation has resulted in firm attachments. In the more severe form, however, the organ is swollen, of a dark-red color, and when incised, the cut surfaces drip blood, and the tissue is soft and friable. The pyramids and malpighian bodies are found deeply stained,

which change to a mottled appearance as the disease progresses, the anatomical changes that take place are responsible for the differentiation of the different forms of nephritis which have been given by authors, and are as follows:

Glomeruli.—The epithelial cells of the tufts are the principal seat of the inflammation when due to the toxic effect of drugs or infectious diseases. The cells at first become swollen and granular (cloudy swelling), but later they may become irregular in form and undergo fatty or hyaline degeneration. Accompanying these changes, exudative processes are taking place in the interstitial tissue, which make the entire process a true nephritis. In some cases of scarlatina, the parenchymatous degeneration is almost entirely confined to the glomeruli, when it is termed glomerulo-nephritis.

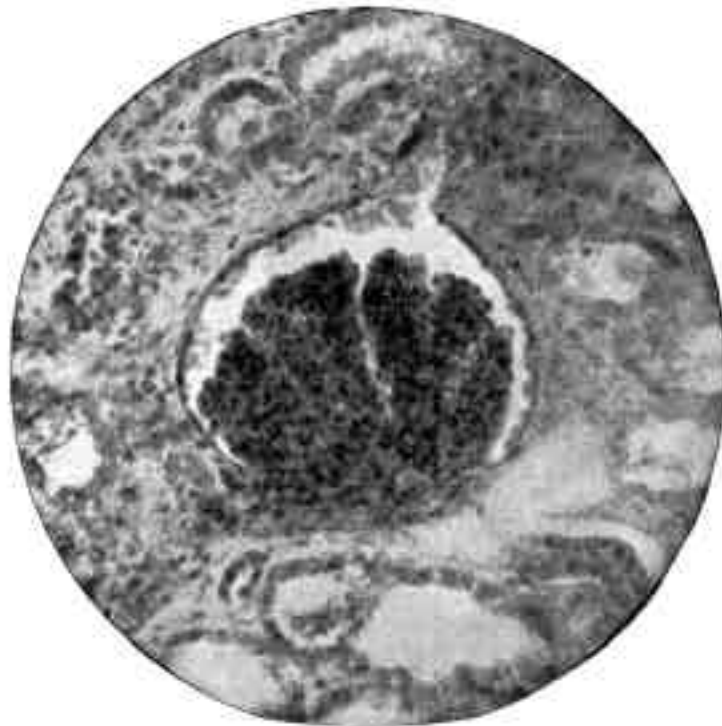


FIGURE 32. A GLOMERULUS. ACUTE EXUDATIVE NEPHRITIS. (Delafield.)

Changes in the Tubules.—The tubular epithelium undergoes similar changes; viz., cloudy swelling, followed by fatty and granular degeneration. This lessens the caliber of the tubule, and, as a result, the tubule becomes choked with the altered contents. The convoluted tubules contain, in addition to the changed epithelial cells, leukocytes and blood-corpuscles.

Interstitial Changes.—In nearly all cases of nephritis, an inflammatory exudate, consisting of serum, leukocytes and red blood-corpuscles, takes place between the tubules. Later, round-cell infiltration may take place, and where this exudate becomes organized, we have a fibroid degeneration of the kidney, with permanent impairment of its function.

Symptoms.—The onset is usually sudden when due to exposure to cold, and frequently during the convalescence of scarlet fever. The patient will be seized with a chill, or chilly sensations will appear, with nausea and vomiting, and often in children a convulsion—uremic—ushers in the disease. The latter may also be the initial symptom in the adult. Edema rapidly ensues, the eyelids and face becoming puffy within twenty-four or forty-eight hours, to be soon followed by dropsy in the ankles. The fever varies, though usually never very high, ranging from 101° to 103°. The pulse is generally hard, with increased tension and accentuation of the second cardiac sound.

The *urinary symptoms* are characteristic. The urine is scanty, highly colored, smoky, and contains albumin, red and white blood-corpuscles, hyaline, granular, and epithelial casts. The quantity varies from a few ounces to two pints, though in very severe cases there may be suppression. The specific gravity at first is high, 1,025 or higher, but later it falls to 1,010 or 1,015. There is a frequent desire to void water, attended with more or less tenesmus.

Anemia develops very early, and, where dropsy becomes extensive, ascites, hydrothorax and hydropericardium become prominent features, dyspnea being one of the most distressing symptoms.

The disease may come on very insidiously. The patient has but little pain, and for some time is not aware of his true condition. The skin becomes pale, and sometimes a little waxy. It is dry and constricted, there is slight headache, and the patient desires to micturate quite often, though the quantity is small. The eyelids are puffy on rising; but this disappears as the day advances. There is loss of appetite, nausea, and sometimes vomiting. Headache is a general complaint.

Gradually dropsy becomes more marked, there is more or less dyspnea, and the symptoms are those of the chronic form. The urine is small in

quantity, four to six ounces, is dark red, and loaded with albumin and casts.

Diagnosis.—This will depend upon the history of the case, the general appearance of the patient, and the presence of albumin, hyaline, granular, and epithelial casts, and white and red blood-corpuscles in a highly colored urine.

Whenever a patient complains of headache, and there is pallor of the skin, puffy eyelids, muscular twitching, nausea, and vomiting, the urine should be examined.

The pregnant woman's urine should be tested occasionally, after the sixth month, especially if diminished in quantity. We are to remember, however, that we may have albumin in the urine in both pregnancy and febrile diseases, and not have nephritis; in these cases, however, there are but few casts.

Prognosis.—This depends somewhat upon the character of the inflammation and the cause giving rise to it.

When due to cold or pregnancy, the prognosis is favorable, and the duration not long. Scarlatinal nephritis is more serious, though not necessarily fatal. If the edema disappears, and the urine increases in quantity and becomes lighter in color, the case is favorable. The nephritis following or accompanying typhoid fever and diphtheria is also favorable.

When severe, and due to phosphorus or mercurial poisoning, or when it occurs in cholera or yellow fever, the outlook is not so favorable; also when there is great dropsical effusion, the fluid involving the cavities, as in ascites, hydrothorax, and hydropericardium.

Treatment.—The patient should be put to bed, kept between blankets, and not allowed to get up till all traces of the disease have disappeared. In the treatment of nephritis the profession seems divided as to the use of diuretics and the use of fluids; one advocating the flushing of the kidneys with various diuretics, while another will advocate the withholding of fluids, even in the way of nourishment, confining the patient to a strictly dry diet and limiting the water-supply to eight or ten ounces per day. I believe that there is a happy medium between these

two extremes.

Where there is active fever, and the inflammation sthenic in character, diuretics should not be used, though water may be taken in moderate quantities. In such cases we begin our treatment with the appropriate sedative, aconite or veratrum, as the case may require, and combine with it *gelsemium* if the face be flushed and the patient restless, showing evidences of nervous irritation. *Rhus tox.* will replace the *gelsemium* if we have the sharp stroke of the pulse, elevated papilla on tongue, with pinched features. In the child there is sudden starting in the sleep. In such cases *rhus tox.* is the remedy. If there is much tenesmus, *viburnum* will be useful, while *eryngium* and *apis* will be called for when there is a sensation of burning in the bladder and urethra on micturition.

Echinacea will be a splendid agent, with the first evidence of uremia. As soon as the fever subsides and the acute symptoms pass off, mild and unirritating diuretics will be useful. A hot infusion of *althea*, *verbascum*, *apium*, *polytrichum*. etc., will increase the flow of urine, when the more tonic diuretics, *hydrangia*, *agrimony*, *collinsonia*, *uva ursi*, etc., will give good results.

Pilocarpin.—Where the skin is dry and harsh, with high temperature, and the pulse is full and strong, a hypodermic injection of one-eighth grain of *pilocarpin* will be found very beneficial.

Apocynum.—For the puffiness of the eyelids and face, and later for general dropsy, *apocynum* is one of our best agents.

Fowler's Solution.—For the anemic condition as shown by the pale, waxy skin and the colorless tongue, *Fowler's solution* ten drops, to water four ounces, a teaspoonful every hour, will be found to be beneficial. If there be hemorrhage, gallic acid in five-grain doses will bring prompt relief.

The bowels should be kept soluble during the entire course of the disease, and perspiration encouraged. Where nausea and vomiting are present, the stomach may be washed out, by having the patient drink freely of warm mustard or salt water, after which *rhus tox.*, *ipecac*, *nux vomica*, and like remedies may be used.

The diet should be bland and unirritating, and consist mostly of milk; buttermilk or whey may also be used, as may also chicken, clam, or mutton broth. Later, gruels, the cereals, and fruits may be added, but meat and potatoes should be restricted until the patient is well in the convalescent period.

As a drink, pure water is perhaps the best, though a little cream of tartar, with lemonade and sugar, makes a good diluent drink.

The acetate and citrate of potassium and the benzoate of sodium, well diluted, render the urates less irritating, and favor their elimination, and will be found useful in the later stages.

During convalescence the child should be guarded from taking cold. Where possible, a change to a warm, sunny, and equable climate will prove highly beneficial.

CHRONIC BRIGHT'S DISEASE.

Although two kinds of nephritis, chronic parenchymatous nephritis and chronic interstitial nephritis, are described under the name Chronic Bright's Disease, each possesses to a great extent the same lesion, the only difference being in the exudation.

In the former there is dropsy, and post-mortem reveals the large white kidney, though the white small kidney may be found.

In the latter, cardio-vascular changes are prominent, and dropsy is usually absent.

CHRONIC PARENCHYMATOUS NEPHRITIS.

Synonyms.—Chronic Desquamative Nephritis; Chronic Tubal Nephritis; Chronic Diffuse Nephritis with Exudation.

Definition.—A chronic inflammation of the kidney, in which there is degeneration of the renal epithelium, connective tissue changes in the stroma, permanent changes in the glomeruli, and an exudation from the blood-vessels.

Etiology.—This is mostly a disease of early and middle life, though no age is exempt. Males are more often affected than females, the greater exposure, mode of life, and drink habits of the former, no doubt, accounting for the difference in the two sexes.

It may follow the acute nephritis of cold, scarlet fever, or pregnancy, or chronic congestion of the kidney, though usually it begins insidiously and seemingly independent of any acute disease.

Occurring in children, however, there is usually a history of scarlatinal nephritis.

Indulgence in alcoholic and malt beverages is no doubt responsible for the disease, the frequency with which it appears in beer-drinkers being evidence. Malaria is regarded by many authors as being a cause of chronic nephritis. Workmen exposed to cold and damp, and who live in damp, poorly ventilated apartments, are subject to Bright's disease.

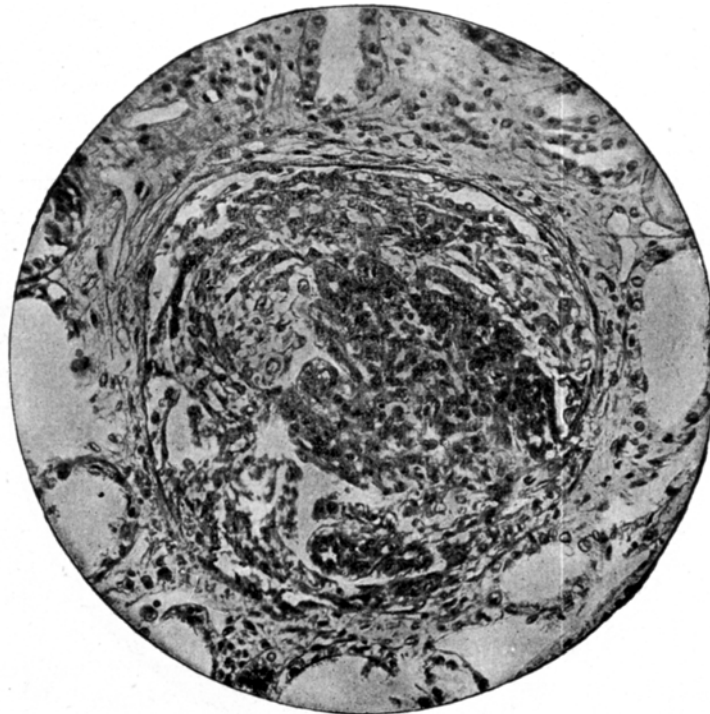


FIGURE 33. A GLOMERULUS WITH GROWTH OF CAPSULE CELLS.
SUBACUTE PRODUCTIVE NEPHRITIS.— (Delafield.)

Tuberculosis, syphilis, and suppurative diseases are also associated with

chronic nephritis. In all probability, toxins either from a perverted metabolism or introduced from without, so influence the nutrition of the kidney as to give rise to chronic diffuse nephritis.

Pathology.—Although there are several pathological types of chronic nephritis, one form may merge into another, so that the line of demarcation may be very difficult if not impossible, to detect. Three principal forms, however, are easily recognized.

(1) The *large white kidney*; (2) The *small white kidney*; (3) The *red or variegated kidney of chronic hemorrhagic nephritis*.

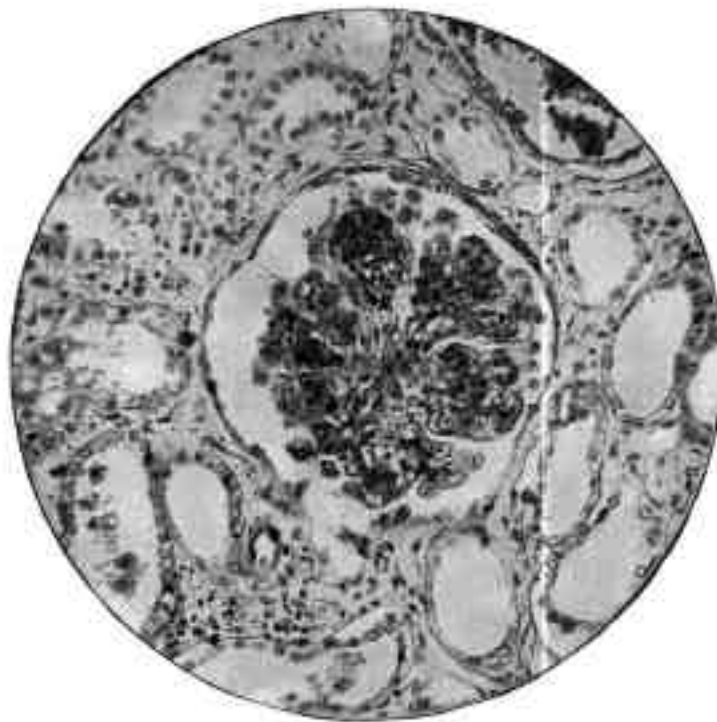


FIGURE 34. A GLOMERULUS WITH THE GROWTH OF TUFT CELLS.
CHRONIC NEPHRITIS WITH EXUDATION. (Delafield)

The large white kidney, the most common type, is usually smooth and pale, or yellowish in color, and the capsule loosely attached, so that it readily strips off. The cortex is broader than normal, owing to an extensive growth of connective tissue, and a put section reveals a yellowish-white or mottled appearance. The pyramids are highly congested and of a deep-red color. The microscope reveals the renal epithelium swollen, with fatty and granular degeneration, and the tubules of the cortex are distended with tube-casts, coagulated matter,

and blood-corpuscles. Hyaline changes are also found in the epithelial cells.

The glomeruli are enlarged, the capsule cells increasing in such numbers as to compress the tufts. The interstitial tissue is increased and shows polynuclear leukocytes, red-blood cells, and round cells throughout certain areas, and some thickening of the arterial walls.

The *small white kidney*, or secondary cirrhotic kidney, results from the gradual increase in the connective tissue, followed by a shrinkage due probably to advanced degeneration of the epithelium. Some observers believe that this variety may be independent of the first form. The capsule is thick, rough, or granular, and not so easily detached. On section, the structures are found dense and resisting, and present numerous yellowish-white foci, due to fatty degeneration of the epithelium of the glomeruli and convoluted tubes. As the interstitial tissue increases, the parenchyma atrophies.

As the interstitial changes progress, many of the glomeruli are destroyed, while the degeneration of the epithelium of the Convoluted tubes is extensive; there is also thickening of the arteries.

The chronic hemorrhagic kidney is enlarged, congested, and of a dark-red color or mottled appearance, closely resembling acute diffuse nephritis. The capsule is adherent to the roughened surface. A cut section reveals the cortex thickened in places, while contracted at other points, due to the interstitial alteration. The reddish-brown or mottled areas are due to hemorrhage in and about the tubes. The further changes are the same as found in the large white kidney.

Symptoms.—When it comes to the clinical phase of Bright's disease, we are unable to differentiate the various types just mentioned, the symptoms of one being more or less common to all. If the disease follows an acute nephritic, it will be difficult to draw the dividing line that separates the one from the other, so insidiously does the one merge into the other. In a large proportion of cases, it comes on insidiously, with but few, if any, characteristic symptoms of nephritis.

The patient notices that he is losing flesh and strength, that he tires on the slightest exertion, that his appetite is failing, and that nausea is often present. He may have a sense of weight and uneasiness in the

loins and frequent desire to micturate, though the secretion is not normal in quantity. It will now be noticed that his color is bad, he is pale, or the skin has a muddy hue, there is puffiness of the eyelids and face, soon followed by swelling of the ankles and in time by general anasarca.

The urine is characteristic, though the quantity varies at times. When the inflammation is very mild, the quantity may be nearly normal; but with the exacerbations that occur, the urine is very scanty and sometimes almost suppressed. It is dark or of a smoky color, and always contains albumin and tube-casts. On standing-, a heavy sediment is deposited containing tube-casts, hyaline, granular, epithelial, and fatty casts of various sizes and forms, together with leuk'ocytes. red blood-corpuscles, epithelium from the kidneys and pelvis, and a large deposit of albumin.

The specific gravity rang-es from 1,020 to 1,030, though in the later stages it may be as low as 1,001 to 1,005. The albumin in severe cases may amount to one-third or one-half of the urine voided.

Dyspnea may occur quite early, and during the later stages is a constant symptom, which may be due to hydrothorax, to edema of the lungs, to contraction of the arteries, or to failure of the heart's action. The dyspnea is more severe at night and early morning, and is always worse on lying down.

Uremic symptoms may occur, though convulsions are not common in chronic exudative nephritis. Headache, with nausea and vomiting and sleeplessness, followed by dullness and coma, with muscular twitchings, would be the symptoms of uremic poisoning, and would be serious. There is generally increased tension of the pulse, and hypertrophy of the heart is quite common. Nephritic retinitis, as shown by dimness of vision, occurs quite often.

Course of the Disease,—This is quite variable, and may be short or of long duration. In some cases the anemia, dropsy, and albumin are present from a very early stage, and continue without interruption till death, which occurs in one or two years.

Other patients will have attacks of dropsy and dyspnea lasting for weeks or months, followed by a seeming return to health. If the urine be

examined, however, during these intervals, albumin will be found present.

Other cases only show pallor of the skin, and urine of low specific gravity containing albumin, for years.

Diagnosis.—The diagnosis of Bright's disease is readily made by a chemical and microscopic examination of the urine, though it may be very difficult, if not impossible, to determine the stage and type of the disease. In the large white kidney, there is generally less urine passed, and it has a higher specific gravity than in the other forms, and there is more dropsy present, while the history of alcoholism and the presence of blood-casts and red blood-corpuscles in the urine would suggest the hemorrhagic kidney.

Prognosis.—Albuminuria or Bright's disease is one of the gravest of diseases, and the prognosis is generally unfavorable. Life may be prolonged for years by judicious treatment, though the disease may terminate fatally in three months.

In children, chronic nephritis following scarlet fever may terminate in recovery. If the disease has continued one year, it is nearly always unfavorable. Death is usually the result of uremia, dropsy, cardiac dilatation, or other complications.

Treatment.—This will be along the same lines as indicated in acute Bright's disease. We are not to forget, however, that in chronic nephritis we have a vice of nutrition as well as an inflammation, and that remedies that improve the condition of the digestive apparatus and make a better blood-supply are equally important with agents to correct renal wrongs.

The patient should wear flannels to protect the body from chilling, and, where possible, he should remove to a warm and equable climate. Alcoholic and malt stimulants must be restricted. The diet should consist largely of milk in some form, sweet milk, buttermilk, whey, or malted milk, as the patient may prefer. Rich broths and fruits are to be used as the patient may desire. Pure water may be taken freely, and helps nature flush the uriniferous tubules of their inflammatory products. An infusion of the vegetable diuretics mentioned in acute nephritis will be found useful.

To improve the condition of the skin, jaborandi and pilocarpin will be successfully used. To relieve the dropsical effusion and at the same time improve the tone of the heart, apocynum and digitalis will be among our best agents.

Constipation must be overcome by the use of seidlitz salts, antibilious physic, elaterium, apocynum, and like agents.

Fowler's solution, strychnia, quinine, and iron may be useful as tonics when such agents are required. The old compound tonic mixture, the triple phosphate of iron, quinine, and strychnia, will be found an efficient combination. Howe's acid solution of iron in drop doses will also be found useful where a ferruginous preparation is indicated.

Counter-irritation, though unpleasant, will often prove beneficial, and the old compound tar-plaster, or the more modern thapsia plaster worn over the loins, will be attended with good results.

Berberis aquifolium is a good remedy in controlling inflammation, and also as a tissue-builder, and should not be overlooked. Oversexual indulgence must be strictly enjoined, as it not only aggravates the disease but is regarded by some as an exciting cause.

CHRONIC INTERSTITIAL NEPHRITIS.

Synonyms.—Contracted Kidney; Cirrhosis of the Kidney; Granular Kidney; Gouty Kidney; Renal Sclerosis; Chronic Productive Nephritis without Exudation, etc.

Definition.—A chronic inflammation of the kidney, in which there is a growth of new connective tissue in the stroma, degeneration of the parenchyma attended by atrophy, and more or less cardio-vascular changes.

Etiology.—This is a disease of advanced life, and is most often seen after the age of fifty. Males are more subject than females, owing to greater exposure and dissipations. The causes that give rise to this form of nephritis are not always readily determined. Heredity seems to have some influence, the disease occurring in some families to the fourth

generation.

Arterial degeneration also favors cirrhosis of the kidneys. Alcoholism and syphilis, undoubtedly, are forces that must be considered as etiological factors. Acute articular rheumatism is sometimes followed by interstitial nephritis, while malaria precedes chronic nephritis often enough to be regarded as figuring in the etiology.

Chronic lead-poisoning and gout may also cause it. Overeating and drinking, especially of meats and rich foods, causes increased work to be thrown upon the kidneys in their effort to get rid of the products of imperfect metabolism, and that irritation may give rise to sclerotic changes. Mental worry and overwork are not to be overlooked as predisposing causes.

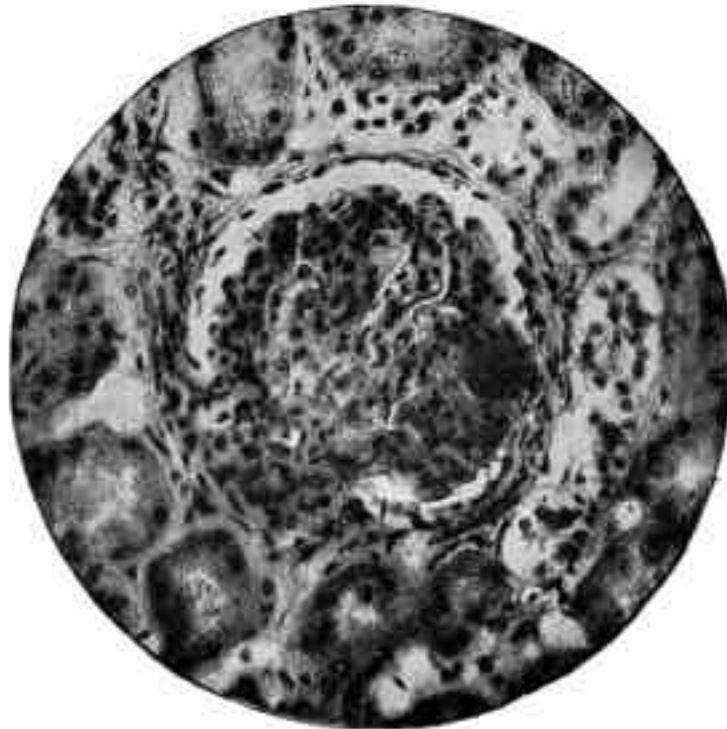


FIGURE 35. AN ATROPHIED GLOMERULUS. CHRONIC NEPHRITIS WITHOUT EXUDATION. (Delafield)

Pathology.—The kidneys vary in size from those slightly reduced from the normal, to an ounce each. They are firmly imbedded in adipose tissue. The capsule is thick, and so firmly adherent, that, in stripping it from the kidney, portions of the latter come with it. The kidney is firm and resisting on section, and reveals a cortex very much thinned and

atrophied and of a red or gray color. The pyramids are also of a dark-red color and reduced in size. The outer surface of the kidney is rough or granular, and frequently corroded with small cysts.

The microscopic changes as given by Delafield are as follows: "There is a growth of new connective tissue in the cortex, and also in the pyramids, which becomes more and more extensive as the disease progresses. In the cortex, the new tissue follows the distribution of the normal subcapsular areas of connective tissue, and is in the form of irregular masses, or is distributed diffusely between the tubes. In the pyramids the growth of new connective tissue is diffuse.

"The tubes, both in the cortex and in the pyramids, undergo marked changes. Those included in the masses of connective tissue are more or less dilated; their epithelium is flattened, some contain cast matter, while many are obliterated. The tubes between the masses of new connective tissue are more or less dilated; their epithelium is flattened, cuboidal, swollen, degenerated, or fatty. The dilatation of the tubes may reach such a point as to form cysts of some size, which contain fluid or coagulated matter. These cysts follow the lines of the arteries or tubes, or are situated near the capsules.

"Of the glomeruli a certain number remain of normal size, but with the tuft-cells swollen or multiplied. Many others are found in all stages of atrophy and of change into connective tissue. The atrophy seems to depend partly upon the growth of tuft-cells and intracapillary cells, partly on the thickening of the capsules, and partly on the occlusion of the arteries. If the chronic nephritis follows chronic congestion of the kidneys, the glomeruli remain large, with an increased growth of tuft-cells, or they become atrophied, but with the dilatation of the [capillaries still evident. The capillaries of the glomeruli may be the seat of waxy degeneration. The arteries exhibit the same changes as are found in exudative nephritis."

Symptoms.—Unless some complication sets in, like pneumonia, pleuritis, or pericarditis, and causes a rapid degeneration of the kidney, the renal symptoms may be latent for years, and only become manifest late in life, notwithstanding the fact that degeneration has been going on for years. The symptoms are so varied and complex, affecting so many organs, that it is better to describe them under the following heads:

Urinary.—The urine is increased in quantity, often amounting to two quarts, is of a light-yellow color, and may have a specific gravity of 1,005 or 1,010. Frequently the patient is compelled to void water several times during the night, and diabetes may be suspected. There is but little albumin present, especially in that voided in the early morning, and there are but few casts, and those are of a hyaline or granular form, while leukocytes and blood-corpuscles are rarely found.

During acute exacerbations, and later in the disease when there are marked cardiac changes, the albumin and casts are found more abundantly. The quantity is also diminished at this time. The amount of urea eliminated is diminished. In rare cases there may be hemorrhage from the kidneys. In rare cases the specific gravity, as well as quantity of urine voided, will be normal.

Cerebral.—Headache is nearly always a prominent symptom, and often quite difficult to relieve. Insomnia is not uncommon, especially where the patient is subject to neuralgia of various parts. Headache, with muscular twitching or drowsiness, is the forerunner of uremia or convulsions, and should always put the physician on his guard. The patient may become dull and drowsy, passing into coma, or there may be delirium more or less severe.

Cerebral hemorrhage, followed by coma or hemiplegia, is not uncommon, and is due to changes in the cerebral vessels. The hemiplegia and coma may continue till death, or may disappear in a few days, to be followed by a second or third attack.

Circulatory System.—There may be few symptoms present suggesting cardiac derangement, but a physical examination will determine the true condition. Inspection reveals the apex-beat displaced downward and to the left. Palpation confirms inspection, while percussion gives the dullness beyond the nipple line, confirming the diagnosis of hypertrophied heart.

Auscultation shows accentuation of the second aortic sound, and, where there is relative insufficiency, a mitral systolic murmur.

The pulse is hard, firm, and shows increased arterial tension. The hard, thickened, and tortuous vessels that are palpable show arterio-sclerosis.

When compensation fails, the cardiac asthma is a frequent distressing symptom.

Respiratory.—Dyspnea is one of the distressing symptoms of the advanced stage of the disease, though it may be one of the first symptoms to direct attention to the kidney. It may come on spasmodically, and is aggravated by exertion, or on lying down. The dyspnea may be due to several causes, such as contracted condition of the arteries with dilatation of the heart, to uremia, anemia, pneumonia, pleurisy, pericarditis, bronchitis, hydrothorax, and edema of the larynx and lung. Towards the end, the Cheyne-Stokes breathing may occur.

Gastro-Intestinal.—Nausea and vomiting are generally present at some stage of the disease, and suggestive of uremia. Attacks of gastritis or spasmodic vomiting may sometimes threaten the life of the patient. The breath is sometimes foul and urinous. Diarrhea is not uncommon, and may prove very exhausting.

Skin.—There is generally but little edema, and that in the ankles and extremities, though where there is cardiac dilatation or where compensation fails, dropsy may occur.

The skin is usually dry, pallid in color save in great cardiac complications, when it may become cyanotic. Pruritus is an occasional distressing symptom.

Special Senses.—An ophthalmoscopic examination may reveal the first evidence of Bright's disease, nephritic retinitis, flame-shaped hemorrhages being characteristic. Sudden blindness, uremic amaurosis, may be temporary or permanent. Ringing in the ears, more or less dizziness and deafness, sometimes occur.

Diagnosis.—This is not often made in the early stage of the disease. When the patient is passing large quantities of pale urine with low specific gravity, repeated examinations should be made of the urine voided, both night and morning. The presence of albumin and casts would suggest renal sclerosis. If, in addition, there is increased tension of the pulse, and the radial and temporal arteries are hard and sclerosed, and the apex-beat is displaced downwards and to the left, and there is accentuation of the second aortic sound, the diagnosis is quite certain. If to all these we have persistent headache, nausea and

vomiting, dimness of vision, dyspnea, and coma, the diagnosis is positive.

Prognosis.—This disease is incurable, and the prognosis therefore unfavorable for a cure, though the patient's life may be prolonged for years with comfort to himself and the enjoyment of a fairly active life, provided that no complication or intercurrent affection prove fatal.

Where the diagnosis is made comparatively early, and the patient instructed how to live, what habits to avoid, and what methods to pursue, life may be prolonged for years. On the other hand, where there is cardiac dilatation and failing compensation, the outlook is bad. Uremic convulsions, coma, and paralysis also portend a fatal termination.

Treatment.—But little can be expected from medicines in the way of curing interstitial nephritis, and our attention will be directed to preventing or retarding further retrograde tendencies, and meet the complications, as far as possible, as they arise.

The hygienic treatment is of great importance. The patient should observe regular habits, avoid severe mental or physical work, take exercise in the open air, dress warmly, and, as far as possible, avoid mental worry. Where possible, a removal to a warm and equable climate, where the patient can live a great deal in the open air, will be of marked benefit in prolonging life.

The diet should be nourishing, but easily digested. Meat may be eaten once a day. Vegetables (not much potatoes) and fruits may be eaten freely, and in some cases the cereals. Milk should be taken freely, and cocoa and coffee may be allowed occasionally, though, as a rule, they should be avoided. Alcoholic drinks, beer, and wines should be positively forbidden.

When there is gastric disturbance, only the blandest articles should be allowed, sherry or pepsin whey being generally acceptable to the most sensitive stomach. Pure water may be taken in moderation. The bowels should be kept soluble and the skin moist. A slightly increased arterial tension is not objectionable, and needs no special treatment; but where greatly increased, the strain upon the heart may cause rupture of the blood-vessels. For this, nitro-glycerin is highly recommended. Low tension is usually evidence of cardiac dilatation, there is edema, and the

urine is scanty and albuminous. A decoction of apocynum, where the stomach will tolerate it, has a good effect, not only in relieving the edema, but in adding tone to the heart. An infusion of digitalis will also act kindly with these same conditions. For the uremic conditions the treatment will be the same as recommended under the head of uremia and acute Bright's disease.

Convulsions will be controlled by the hypodermic injection of morphia and pilocarpin. Any complication like pneumonia, pleuritis, pericarditis, bronchitis, etc., will be treated according to the conditions present. In fact, in treating interstitial nephritis, we treat our patient symptomatically, meeting the conditions as they arise.

AMYLOID KIDNEY.

Synonym.—Lardaceous or Waxy Degeneration of the Kidney.

Definition.—A degeneration in which a peculiar proteid substance, lardacein, is deposited in the walls of the capillaries and connective tissue-cells of the kidney.

Etiology.—This form of kidney is always associated with amyloid degeneration of some other part, such as spleen, liver, etc., and, although it is frequently associated with Bright's disease, should not be regarded as a variety of chronic nephritis, as it may occur independently of it. While the cause is obscure, it is most likely due in some measure to retrograde changes in the blood plasma, whereby the blood is unable to manufacture normal tissue. It is secondary to chronic suppurative diseases, especially those of the bones, and is often tubercular. Ulceration of the bowels, tuberculosis, anal fistula, the ulcerative stage of syphilitic deposits in the bone, and, in fact, any chronic suppurative process whereby there has been a long-continued drain on the albumin—gout, cancer, malaria, leukemia, and chronic valvular diseases—have been associated with the amyloid kidney; but just how much, if any, these diseases are responsible for the degeneration is not known.

Pathology.—The kidney presents a characteristic appearance. It is large, smooth, and of a grayish-white or yellow color. On section the cortex presents a peculiar glistening appearance or resembles bacon. It

is tough and increased in width. The malpighian bodies stand out prominently, and may sometimes be distinguished with the naked eye. The pyramids are of a dark-red or mottled appearance. On applying Lugal's iodine solution, the degenerated tissue turns a brownish-red or a dark-mahogany or nut-brown color, which, on the addition of dilute sulphuric acid, usually changes to blue.

Microscopically the changes as given by Strumpell are as follows: "We find first the amyloid degeneration, which, in varying extent and combination, affects most frequently the glomeruli and also the capillaries of the cortex, the vasa recta, and sometimes the membranae propriae of the uriniferous tubules. In pure amyloid kidney the rest of the renal tissue is normal, but in many cases we find changes in the epithelium,—fatty degeneration, desquamation, and disintegration, and also, not infrequently, interstitial cellular infiltration."

Symptoms.—The symptoms many times are quite obscure, and only discoverable post-mortem. Preceded as it is by some chronic suppurative or wasting disease, the symptoms are masked or overlooked. The urine varies as to quantity, and may be slightly diminished, normal, or increased, usually the latter. Frequently the patient is required to arise several times during the night to void water, the total amount reaching one hundred ounces. It is generally very pale or straw-colored, of low specific gravity, 1,005 to 1,015, has but little sediment, and varies as to the quantity of albumin present. There may be only traces present, though it is usually quite free, and in rare cases there is none present. Where casts are present, they are of the hyaline, fatty, or granular type.

Dropsy is not a marked feature, though usually present in the ankles and legs, sometimes becoming general. Dyspeptic symptoms are quite common, with furred tongue, unpleasant breath, and occasional vomiting. The liver and spleen are generally enlarged, the sharp outlines of these organs being of diagnostic value.

Diarrhea is quite common, especially late in the disease, and is often due to degeneration of the same character taking place in the intestines or tubercular ulcers. A waxy complexion is common. There is usually no cardiac disturbance.

Diagnosis.—The history of some chronic affection, such as suppurative bone disease, syphilis, tuberculosis, chronic malaria, fistula, and other

wasting diseases associated with enlargement of the liver and spleen, and the passing of a large quantity of pale, albuminous urine of low specific gravity, and hyaline or granular casts, make the diagnosis almost sure.

Prognosis.—This is usually grave. The disease comes on so insidiously that degeneration is well established when recognized.

Treatment.—This will consist in an effort to raise the quality of the blood-supply. With a blood rich in red blood-corpuscles, degeneration is at an end. Hence our attention will be turned to correcting the associated ulceration or suppurative lesion.

The bitter tonics, the chlorates, sulphites, mineral acids, echinacea, etc., will be found useful. A nutritious but easily digested diet, exercise in the open air, the avoidance of colds, and a line of treatment suitable to chronic Bright's disease will give the best results.

PYELITIS.

Synonyms.—Consecutive Nephritis ; Pyelonephritis; Pyonephrosis.

Definition.—Primarily, an inflammation of the pelvis of the kidney, though the contiguous renal tissue soon becomes involved, with varied results.

Etiology.—The most frequent cause is the irritation arising from foreign bodies, especially from renal calculi, whose roughened surfaces may destroy the mucous membrane. The finer calculi, gravel, or even uric acid sand, may be sufficiently irritating to produce the disease.

The decomposition of retained urine in the pelvis, due to obstruction of the ureter, either from growths or foreign bodies. The extension upwards from urethritis or cystitis, especially where there is gonorrhoeal infection.

Cancer and tuberculosis of the kidney, and more rarely parasites, as the echinococcus, distoma, etc.; also irritating diuretics, as cubebs, cantharides, turpentine, copaiba, oil of sandal-wood, and mustard. The infectious fevers may also give rise to pyelitis, especially diphtheria,

scarlet fever, small-pox, typhoid and typhus fever.

Enlarged prostatic tumors, stricture, and phimosis may also be responsible for this disease.

Pathology.—In the early stage and in the mildest forms of pyelitis, the catarrhal, the mucous membrane is swollen, of a dark-red color or ecchymotic, and covered with a viscid mucus or muco-pus. A turbid urine, which contains pus and epithelial cells, is found in the pelvis of the kidney.

In the most severe forms, the mucous membrane is of a brownish-red, increased in thickness, the veins being enlarged and tortuous, and is covered with a thick, purulent secretion. The submucous tissue, and sometimes the entire wall of the pelvis, becomes infiltrated with serum, and a purulent inflammation and ulceration occur, with an extension into the kidney structure—pyelonephritis. Renal abscesses are thus distributed throughout the organ, or there may be but one abscess. Following the more severe infectious fevers there may be a diphtheritic inflammation, with the formation of a false membrane and sloughing of the pelvis, and sometimes severe hemorrhages occur. Where the pelvis of the kidney or the ureter is obstructed for a long time, distention of the pelvis, and sometimes the calyces of the entire kidney, takes place, resulting in atrophy of the tissue and converting the organ into a sac filled with serous or purulent material—*hydronephrosis* and *pyonephrosis*.

Following severe cystitis, there may be acute suppurative inflammation of the kidney, the so-called surgical kidney. This is usually bilateral pyelitis, and unilateral when the result of a calculus.

Symptoms.—The symptoms of a primary lesion may so obscure the disease that there will be no characteristic symptoms to suggest pyelitis. In simple catarrhal cases, there will be pain and tenderness over the affected kidney, slight fever, frequent desire to micturate, though the urine is scanty and more or less turbid, acid in reaction, and contains a few pus cells, some mucus, more rarely red blood-corpuscles, and if pus is abundant there will be albumin.

In chronic pyelitis and pyelonephritis, scanty secretion of urine is rare, and not infrequently it is increased to three or four times the normal

quantity, due, as suggested by Senator, to the diminished absorption of water from the urine in the medullary substance and to compensatory hypertrophy of the sound portions of the affected kidney and of the well kidney, as well as to cardiac hypertrophy.

In the more severe cases, the pain is often severe, extending down the ureters. Deep pressure reveals marked soreness. The urine is dark in color, owing to the presence of red blood-corpuscles. Pus cells and mucus are abundant, and transitional epithelial cells are found, though this may be from the bladder or sound kidney. If there be obstruction of the ureter, either from a calculus, clotted blood, or a plug of mucus, the urine becomes clear from the sound kidney, to become again turbid with pus-cells when the obstruction gives way.

In suppurative pyelitis, there will be rigors, followed by fever, the chills occurring with such regularity that the case is often mistaken for malaria; later the fever may assume the hectic type, and the rigors disappear. At times the fever assumes a typhoid type, though diarrhea and tympanites are not a marked symptom.

As the disease progresses, the symptoms are those of pyemia, the patient losing flesh and strength.

In the chronic form, especially where there is extensive inflammation, the kidneys may become enormously distended, and distinct fluctuation may be observed.

Diagnosis.—A careful history of the case is important in determining causes that lead to this lesion. The character of the urine, which should be examined frequently, is also an important diagnostic feature. Tubercular pyelitis will be recognized by finding tubercular bacilli in the urine and the presence of tubercular foci in the other parts. Calculous pyelitis is sometimes quite difficult to recognize, though a history of renal calculi is quite suggestive, and if crystals of uric acid or oxalate of lime be more or less continuously present, the diagnosis is quite certain.

It is sometimes quite difficult, if not impossible, to differentiate suppurative pyelitis from cystitis; the chief points to be remembered are, that in pyelitis the urine is acid and the pain in the lumbar region, while in cystitis the urine is ammoniacal and the pain is in the bladder. In the female, by catheterization of the ureters, we determine not only

the source of the pus but the kidney affected.

The presence of a fluctuating tumor in the region of the kidney would signify pus, though it may be extremely difficult to decide between perinephric abscess and pyelitis, although the edema about the loins and but little if any pus in the urine would suggest the former.

Prognosis.—This depends largely upon the form of the disease. Where tubercular, it is unfavorable, though the pus may become encysted, caseate, and finally calcify, the patient recovering.

In those cases that come on during fevers, or in the catarrhal case, the patient usually recovers. The calculus variety, tending as it does to chronicity and eventually to suppuration, is very apt to terminate fatally from exhaustion.

Treatment.—This will necessarily depend largely upon the producing cause and the type of the disease. Thus when due to cystitis, our attention must be directed to the bladder; if urethral irritation or prostatic troubles are responsible, these must be corrected; if due to a calculus, the treatment will, in the main, be that for nephrolithiasis. When the infectious fevers have preceded the disease, there is usually more or less sepsis to combat, and antiseptics will be indicated. The treatment, therefore, is symptomatic, meeting- the conditions as they arise.

Pure water should be taken freely, and infusions of the milder diuretics, such as marshmallow, polytrichum, trilicum repens, etc. Apis, gelsemium, rhus tox., and eryngium will be called for according to well-known indications.

Where there is suppurative conditions, echinacea, baptisia, potassium chlorate, and the mineral acids will be used. Where the tongue is broad and thick, with fullness of tissue and puffiness under the eyes, the acetate or citrate of potassium will give good results. Where the pain is intense, despite the use of hot fomentations, hot-water bottles, cupping, etc., morphia will be used hypodermically. Should there be active fever, aconite, vera-trum, jaborandi, and like remedies will be indicated. Should there be fluctuation in the lumbar region, with accompanying symptoms of pus, surgical intervention will be necessary.

The diet will consist of sweet milk, malted milk, buttermilk, whey, and plenty of pure water.

HYDRONEPHROSIS.

Definition.—A dilatation of the pelvis and calyces of the kidney from an accumulation of urine, due to obstruction in some part of the ureters, bladder, or urethra.

Etiology.—Hydronephrosis may be congenital or acquired. When congenital, the constriction is usually due to malformation or defective development. Sometimes the ureter is attached at an acute angle, or the insertion may be quite high. Again, alterations in the lining mucous membrane may form a valvelike obstruction, or there may be a twisting of the ureter upon its axis. The dilatation has been found so great in some cases in the fetus as to form mechanical obstruction during labor. In the adult, the constriction of the ureter may be due to a tuberculous mass, or to malignant growths, or to pressure from tumors.

There may be stricture from ulceration of the ureter, or it may be due to a calculus. Cicatricial bands, the result of inflammatory adhesions, may be responsible for it; also thickening of the bladder walls from cystitis, enlarged prostate, and urethral stricture. In movable kidney, a twisting or flexion of the ureter may give rise to it. Pressure from a pregnant or displaced uterus as well as ovarian tumors may also produce the disease.

The enlargement may be so small as to escape detection during life, or it may be so enormous as to be mistaken for ascites.

Pathology.—While hydronephrosis may be unilateral or bilateral, it is usually confined to one kidney, its fellow member generally becoming hypertrophied. As the pelvis of the kidney dilates, the renal tissue, from pressure, atrophies, the papillae become flattened, the uriniferous tubules and glomeruli become smaller and finally disappear, or show as remnants in the walls of the cyst. The mucous membrane lining the pelvis and calyces becomes very much thickened by the growth of connective tissue forming the walls of the hydronephrotic sac, the size of which varies, sometimes becoming so large as to contain two or three gallons of fluid. The fluid contained in the sac in the early stage is urine; but as the disease progresses and the renal tissue atrophies, the

secretion becomes more and more of the character of mucous membrane secretion. It is usually thin and colorless or yellowish in color, of low specific gravity, alkaline in reaction, and contains traces of urea, uric acid, various solids, and albumin. Where pus, epithelial and blood corpuscles, are present, the fluid becomes quite turbid. Hypertrophy of the left heart is a frequent complication.

Symptoms.—In the early stages, the symptoms are so obscured by the primary lesion as to be negative, and when due to pressure from tumors or cancer may never be recognized during life. When bilateral and congenital, hydronephrosis usually proves fatal in a few weeks, and has no characteristic symptoms.

After continuing for some time, the tumor enlarges, and the appearance of a visible or palpating tumor in the region of the affected kidney is the first definite knowledge we have of the presence of the disease. With the further progress of the disease, there is distention of the hypochondriac region, which, when very large, may extend to the median line. The tumor shows considerable resistance, and at times distinct fluctuation. If on the left side, the tumor remains stationary on respiration; but if located on the right side, a deep inspiration gives the tumor a downward motion. Percussion gives a dull sound, though the tympanitic note of the colon is confusing unless we remember the characteristic sound.

The tumor may be mistaken for an ovarian cyst, or, in exaggerated cases, for ascites. Ovarian tumors, however, do not crowd the lumbar region so prominently, as a rule. Aspiration, however, in some cases, is the only means of determining the true character of the disease, and even this may not be positive, for in advanced cases of hydronephrosis the urinary salts may disappear, the fluid being sero-mucus in character.

In some cases the hydronephrosis is intermittent in character, the tumor mass suddenly disappearing with the discharging of a large quantity of fluids, this being followed by a gradually increasing tumor mass, with some gastric disturbance, intestinal derangement, constipation, or obstinate diarrhea. With the disappearance of the tumor, the general systemic symptoms also disappear, and the patient is comfortable for a time; but with each reappearance of the tumor, there is marked systemic derangement. Suppuration is announced by chills, irregular fever,

sweats, small rapid pulse, nausea, and vomiting.

The cyst may rupture into the abdominal cavity, or, perforating the diaphragm, open into the lung.

Diagnosis.—The diagnosis of hydronephrosis is difficult, if not impossible, where the accumulation of fluid is small. With the appearance, in either lumbar region, of a tumor mass, with a gradual decline in the amount of urine voided, the disease would be suggested.

We have to differentiate between it and ovarian cysts, ascites, and splenic and hepatic tumors. To distinguish from solid tumors, the aspirating needle will be used. Aspiration may also aid in distinguishing an ovarian cyst, though, as already suggested, the fluid in advanced hydronephrosis may have changed to sero-mucus, in which case aspiration would not enlighten us. Ascites would be recognized by the uniform enlargement, the fluid filling both lumbar regions.

In pyonephrosis, there will be fever, night-sweats, and marked emaciation, which are generally absent in hydronephrosis.

Prognosis.—The prognosis is usually unfavorable, though where the disease is confined to one kidney and the accumulation remains small, the patient's life is rarely endangered. In the intermittent form, the disease may disappear after having existed for years. Where the sound kidney becomes involved from any cause, and ceases to perform its function, uremia is apt to follow, with fatal results. When the hydronephrosis is bilateral, the prognosis is always grave.

Treatment.—The treatment for hydronephrosis, save for the relief afforded to pain, or gastric and intestinal disturbances, will be almost entirely surgical. Massage has been highly recommended, and cases have been recorded where a cure has been effected by removing the obstruction. If practiced, however, it should be done by an experienced masseur, as there is danger of rupturing the ureter. When there is a large quantity of fluid in the sac, it may be removed by aspiration, and this repeated as often as it may accumulate; or an incision may be made down to the kidney and drainage obtained, and, if a calculus be present, the foreign body removed. Where badly diseased, the kidney may be removed, though this should only be done as a last resort, as the history of successful extirpation of the kidney is not such as to hope for great

success. Where the hydronephrosis is intermittent, a well-applied pad and bandage may prove useful.

NEPHROLITHIASIS.

Synonyms.—Renal Calculus; Renal Gravel.

Definition.—The presence in the kidney or in its pelvis of concretions formed by the precipitation of certain of the urinary solids, and varying in size from small sandy particles up to the capacity of the pelvis.

Varieties.—Renal concretions have been classified,—1. According to their size; thus, renal sand consists of fine pulverized crystals, renal gravel, a coarser deposit, which may contain particles as large as a pea; renal stones, or calculus, where the deposits exceed in size gravel or pea-sized concretions. 2. According to their chemical composition.

1. *Uric-acid calculi* occur most frequently. They vary in size, and are usually smooth, round, or oval in shape, and may have facets where they come into contact with each other. In color, they may be red, brown, black, or yellow. The breakage is crystalline, revealing a laminated formation of uric acid and ammonium urate. In children the calculus may be entirely uratic.

2. *Calcium-oxalate* concretions are not so common as the former. They are known as the “mulberry calculi,” owing to their resemblance to the fruit of the mulberry, they being dark-brown, or black, oblong in shape, and covered with small nodules and points. They are extremely hard, and a broken surface reveals a radiate arrangement of deposits around a uric-acid nucleus. The smaller stones may be smooth.

3. *Phosphatic calculi*, while frequently found in the bladder, are but seldom found in the kidney. They are a combination of phosphate of lime, ammonia magnesium phosphate, and calcic carbonate. These always form in neutral or alkaline (ammoniacal) urine, and originate chiefly in the bladder. They are generally white or grayish in color, and are soft and easily broken. They may be either smooth or rough.

4. *Renal calculi*, composed of cystin, xanthin, indigo, carbonate of lime, urostealith, and urate of soda, are rare.

Cystin Calculi.—These are of a pale yellowish color and quite soft, generally rough, and in form are oval or cylindrical. While more common in the bladder, they may form in the kidney.

Xanthin.—These are the rarest of all the urinary calculi, and may consist entirely of xanthin, or there may be a mixture of uric acid and the urates. They may vary in color from white to pale yellow or brown, and vary in size from that of a pea to that of a hen's egg. They usually occur in children.

Indigo.—These are very rare. “Ord has reported a case in which an indigo calculus was found in the pelvis of the right kidney of a woman whose left kidney was destroyed by sarcoma. The stone weighed forty grams. Forbes has also reported a case of indigo calculus found in the pelvis and a calyx of one kidney. The stone weighed one hundred and forty-seven grams, was of a dark-brown color, and when drawn across paper left a blue mark.” (Ogden.)

Urostealith, or fatty concretions, are very rare, and when fresh are quite soft, but become hard and brittle on drying. They are of a yellowish or brown color.

Urate of Soda.—These are light in color, not very hard, and rarely exceed the size of an average marble.

Carbonate of Lime.—While not uncommon in the herbivora, they are very rare in man. They are of a grayish color, small in size, spherical in form, and very hard.

Etiology.—There are certain predisposing causes, such as age, sex, geographical location, sedentary habits, and heredity.

Age.—Renal calculi are quite common in children and in advanced life, and have been observed in the new-born.

Sex.—Men are more subject to nephrolithiasis than women, the shortness and dilatibility of the urethra in the latter, no doubt, having its influence, as the bladder is the more readily flushed of irritating substances.

Geographical Location.—Renal calculi occur far more frequently in some countries and regions than in others, though the cause has never been made quite clear. Thus England and Holland are known as favorable to the formation of the calculi, and the character of the soil, drinking water, meteorological conditions, and habits of living may all enter as factors in the production of these various deposits.

Sedentary Habits.—Calculi are found more frequently in persons that lead an inactive life. It is very rare among soldiers, sailors, and those devoted to athletics.

Heredity.—There appears to be a tendency to calculi in some families, which would indicate heredity as an important factor.

The diet probably plays some part as a predisposing cause, and an excessive meat diet, the use of sour wine and alcohol, and water containing lime, favor their formation.

As to the precise causes that give rise to renal calculi, we have as yet no positive knowledge. “The precipitation of concretions from the urine is theoretically possible under two conditions; namely, either if the urine contains so much of any material that it can not retain all of it in solution, or if the reaction of the urine becomes so altered that certain substances are thrown out of solution. The simple precipitation from the urine of substances capable of forming calculi by no means, however, alone gives rise to the formation of renal calculi; for microscopic, and particularly microchemic, examination of renal calculi has shown that the calculus-forming substances have not simply crystallized together, but that they are bound together by an organic framework. This latter, probably, is scarcely other than the product of a catarrhal state of the mucous membrane of the renal pelvis, so that some clinicians have referred directly to a calculus-generating catarrh. Since, however, bacteria may play a causative role in the development of such a catarrh, one is forced to the conclusion that, as in the development of gall-stones, so also in the formation of renal calculi, bacteria are of great importance. In the case of calculus formation in decomposed urine, *bacteria* are again concerned, and they must be looked upon as the cause of the alkaline decomposition. In this way is explained the great influence that all conditions of urinary stasis exert upon the formation of renal calculi; for, whenever urinary stasis exists, excessive development of bacteria in the urine is possible.” (Eichhorst.)

It will be seen that an important primary cause of calculus is the presence in the urine of some substance that acts as a nucleus about which the layers of crystals adhere. This substance may be mucus, blood-clots, epithelial particles, parasitic ova, tube-casts, or bacteria.

Pathology.—The changes that take place in the tissues depend upon the size, shape, and length of time present. Pyelitis very early follows, the character of the inflammation depending upon the mechanical irritation of the stone or stones. If the calculus be small and smooth, a simple or catarrhal inflammation of the mucous membrane is the result; but with a greater irritation there is likely to be a pyelonephritis or even pyonephrosis. There may be only a slight or a severe hemorrhage attending these processes. Ulcerative process may follow, revealing one or more calculi. Should the ureter become blocked, hydronephrosis is the common result. The calculus may occupy the entire pelvis, and project into the kidney. In rare cases, the calculus, by ulcerative processes, may perforate the ureter, the peritoneal cavity, the intestines, or the lung.

Cystitis, enlargement of the prostate gland, and urethral lesion are not uncommon.

Symptoms.—The symptoms embrace a wide range of phenomena, and depend upon the character and size of the calculi and their location, and may be divided into three classes: First, the passage of the calculus from the pelvis to the bladder; second, the retention of the calculus in the ureter; and, third, its retention in the pelvis of the kidney.

1. Passage of the Calculus from the Pelvis to the Bladder.— If the concretions be very small and smooth, the only symptom may be a long-time taken to void water, with an occasional sudden stoppage of flow, which is resumed again as a calculus pops out of the urethra. One patient, an old gentleman under my care, passed sixty concretions about the size of No. 9 bird-shot at a single micturition. They were smooth, and the only annoyance was the length of time consumed in voiding water. At other times, when the stones are large or rough, the pain is most agonizing, of a cutting or tearing sensation, beginning in the affected kidney, passing down along the ureter to the inner side of the thigh, and causing, in the male, a retraction of the testicle, due to the reflex action of the cremaster muscle. The pain is paroxysmal in character,

though more or less continuous till it reaches the bladder. During its passage the patient writhes with the intense suffering, and in children a convulsion may ensue. The pulse is small and quick, a cold perspiration bathes the face, the patient is extremely anxious, and sometimes an attack terminates in syncope. In some cases there are chilly sensations, and the temperature may rise to 102° or 103°. Nausea and vomiting are quite common during an attack. There is an almost constant desire to micturate, attended by a burning sensation. The urine is generally scanty and often bloody in character. Occasionally the urine is copious, especially if the fellow kidney is in a normal condition. There may be but one stone present, or they may pass intermittently for years. An attack varies from a few hours to two or more days.

After a severe attack, there is often soreness in the loins and testicles for a day or two.

2. Retention of the Calculus Within the Ureter.—The attack begins as a renal colic; but after a time the excruciating pain subsides as the ureter becomes accustomed to the presence of the calculus, or a dull ache or soreness follows, which in time may entirely disappear. If the impaction does not completely occlude the ureter, or, if so, does it gradually, hydronephrosis will follow with its attendant symptoms; but if the obstruction be sudden and complete, the secretion of urine will cease as soon as the pent-up urine equals the blood pressure in the renal artery. Atrophy of the kidney follows, degenerating into a cyst containing serum, pus, and calculous concretions.

If the fellow kidney be in good condition and able to do its work, no symptoms may develop to tell of the atrophy; but should the second kidney be unable to do its work, anuria with uremia follows, terminating in death.

3. Where the calculi remains in the pelvis of the kidney, a pyelitis occurs, varying from the simple to the suppurative form, depending largely upon the size of the concretions. In the milder forms the pain is of a dull, aching character, with tenderness over the affected organ. The urine is highly acid, of a dark, smoky color, and contains pus, blood, epithelial cells, and uric acid or lime salts.

Severe exertion may result in an attack of renal colic.

In the more severe form of pyelitis, the patient may be seized with a chill or rigor, high fever following, the patient rapidly becoming emaciated. Hectic fever and night-sweats follow, with all the evidence of pronounced sepsis. The urine is scanty, high-colored, and contains pus and blood. If both kidneys are involved, the patient dies of uremia. The general health of many of these patients is but little disturbed.

Diagnosis.—The characteristic pain extending downwards along the ureters and inner thigh, with retraction of the testicles in the male, and pain in the labium in the female, the small, frequent pulse, the cold perspiration, the almost constant desire to micturate, the pain in voiding water, and the scanty, bloody urine, are symptoms that can hardly be mistaken for any other lesion. Where these symptoms are not so pronounced as when the calculus is retained in the pelvis of the kidney, an examination by the X-ray will reveal the presence of the stone.

Prognosis.—Where the calculi are small enough to pass into the bladder, the prognosis is favorable, though the disease has a tendency to recur. Where the calculi remain in the pelvis of the kidney the prognosis is always unfavorable, atrophy of the kidney or pyelitis in various forms resulting. Also where the calculus remains fixed in the ureter, the prognosis is unfavorable.

Treatment.—The first object is to give relief to the agonizing pain, which may be accomplished by the hot bath or the use of hot packs or poultices. A hypodermic injection of morphia, one-quarter grain, at the beginning of an attack, assisted by the inhalation of chloroform till the patient becomes easy, will be the means for bringing the quickest relief.

In the intervals between the attacks, the treatment will be directed to keeping the urine abundant, and, if excessively acid, to render it alkaline. The free use of aralia, epigea, chimaphila, eupatorium, and althea will yield good results. These agents will respond more promptly, however, as infusions than when given as specific tinctures. The patient is instructed to drink freely of the infusion, which not only increases the flow of urine, but diminishes its acidity. The tincture of eryngium, gelsemium, and apis, when specifically indicated, will not disappoint any one in their action. The free use of plain distilled water, or water rendered alkaline by adding the salts of potassium, the acetate, citrate, or bicarbonate, is to be commended, also lithiated waters.

Piperazin in five-grain doses, three or four times a day, has proved beneficial in some cases, and deserves a place in the treatment of renal calculi, though the exaggerated claims made as to its power as a solvent to uric-acid stones should not be taken too seriously.

Van Noorden and Straus recommend ten to fifteen grains of calcium carbonate, three times a day, as a uric-acid solvent. A number of favorable reports has attended this treatment.

The diet should consist largely of fruits and vegetables; but little meat should be eaten, avoiding especially red meats, liver, and sweet-breads. Starchy food and sweets should be taken in very limited quantities. The patient should live much in the open air, and take regular and systematic exercise. Where the calculus obstructs the ureters, or sets up destructive changes in the pelvis, with septic poisoning, the patient should be turned over to the hands of the surgeon, operative measures giving the only promise of relief.

TUMORS OF THE KIDNEY.

The simplest division of tumors of the kidney is into benign and J-nalignant. The benign are again, divided into fibroma, lipoma, lymphadenoma, angionoma, and adenoma. These grow in the cortex of the kidney, forming small nodular masses, and unless they become very large, an exception, they do not produce any definite symptoms. They may be congenital or develop later in life.

The malignant tumors are sarcoma and carcinoma, and may be primary or secondary. While sarcoma may occur in the adult, it is more frequently found in young children, often being congenital. The most common form is the small-celled variety, while a rare form, and one generally congenital, is a mixture of sarcoma and striped muscular fiber, the *rhabdomyoma*.

Sarcomas develop very rapidly, are vascular, and may attain large size, almost filling the abdomen.

Carcinoma is not so common as sarcoma, and generally is found in the adult, though it may occur in children. It is usually soft, encephaloid, and may reach an enormous development. Primary cancer rarely occurs

in early life, and is more common in males than in females. Heredity is a strong predisposing cause.

Secondary carcinoma is found in connection with cancer of the testicle, rectum, uterus, stomach, or liver.

Symptoms.—The characteristic symptoms are pain, hema-turia, cancerous cachexia, and the presence of the tumor mass.

Pain is not always present, and therefore more or less uncertain as a diagnostic aid. When present, it is located in the affected flank, and extends down the ureter and along the inner side of the thigh. It may be more or less constant, of a dragging character, or occur at intervals, and be sharp and lancinating. Hemorrhage occurs in about half the cases, and though it is usually but small in quantity, it may be severe and exhausting. At times it will be in clots, there will be casts of the pelvis of the kidney and ureter, and when thus passed are characteristic of a malignant tumor; often, however, they are mixed with the urine and perfectly soluble.

Where the hemorrhage is large, anemia rapidly develops. As long as the tumor retains the position and outline of the kidney it is an important symptom; but as it leaves the flank and encroaches upon the abdomen, and adhesions form, it may be impossible to distinguish it from other tumors of the abdomen, though the cancerous cachexia would help in the differential diagnosis. As the disease advances, the appetite fails, nausea and vomiting are frequently present, and the emaciation becomes marked.

Diagnosis.—The diagnosis will be made by the symptoms already given,—*pain, hemorrhage, cachexia, and the presence of a tumor mass, being the most pronounced.*

Prognosis.—The prognosis is almost always unfavorable, the rare cases of recovery being where an early and successful nephrectomy has been performed. The duration of the disease is from a few weeks in congenital cases, to a few years in the adult.

Treatment.—While we have no specifics for malignant growths, there are two remedies that should be given persistently, with the hope of at least staying somewhat the destructive character of the disease. They

are echinacea and hydrastis. When severe, the pain will be controlled by morphia. Extirpation may prolong life if resorted to early, though the diagnosis is usually only made after the system has become so thoroughly infected with the malignant poison, that successful nephrectomies are very rare.

CYSTIC DISEASE OF THE KIDNEY.

Cysts of the kidney are more interesting from a surgical standpoint than from that of medicine, since they are but little influenced by medication. They may be congenital or acquired, unilateral or bilateral, and vary in size from that of a pea to that of one which fills the abdominal cavity. There may be but one, or there may be many. The smaller ones are found associated with chronic nephritis. The cysts contain a clear or turbid fluid, varying in color from amber to a brownish black, and containing albumin, blood crystals, cholesterin, uric-acid crystals, and the triple phosphates.

Symptoms.—There are no characteristic symptoms to suggest the nature of the disease, but they are rather those of chronic nephritis, and later those of uremia.

Diagnosis.—Where large, a careful physical examination may reveal their nature.

Prognosis.—When unilateral the patient may be but little affected, and when of large size, surgical interference may be followed by favorable results. When the disease is bilateral, it can only terminate in one way, death.

Treatment.—This is entirely surgical, and consists in removing the cyst and capsule, and suturing the kidney. If degeneration has taken place, nephrectomy is the only resort.

PERINEPHRIC ABSCESS.

Synonym.—Perinephritis.

Definition.—A suppurative inflammation of the perinephritic tissues.

Etiology.—Perinephritis may be primary or secondary. The secondary, which is far more common, is due to an extension of a suppurative inflammation from neighboring parts. It may be from caries of the spine, from suppurative appendicitis, abscess of the liver or bowel, pelvic cellulitis, or an extension from the pelvis of the kidney, or of the entire kidney, or from the ureter; also from tubercular or cancerous deposits in the kidney. It may also be secondary to the more septic of the infectious fevers, such as typhoid, small-pox, diphtheria, pyemia, and kidney affections.

The primary cause is due to sudden exposure and to blows and contusion of the loins.

Pathology.—The suppurative process usually begins in the loose tissue behind the kidney. There may be multiple purulent foci in the early stage, though usually they merge into one large abscess. The abscess wall is soft, shreddy, and ragged where the suppurative process has been rapid, and thick, smooth, and fibrous when more chronic in character.

As the pus accumulates, there is bulging in the region of the kidney, and when very large the liver is crowded on the right side, or the spleen on the left. Burrowing downward along the psoas muscle, it points in the groin, or works its way into the perineum, scrotum, or vagina. It may perforate the peritoneum, the colon, or the bladder. Extending upwards, the diaphragm may be penetrated, and the pus discharged into the pleura or lungs.

The pus is usually very offensive; sometimes fecal in character, owing to its close relation to the bowel, of an urinous odor, the result of infiltration of urine.

Where the disease is of long standing, the fatty capsule may become firmly adherent to the true capsule of the kidney by bands of fibrous tissue.

Symptoms.—The first pronounced symptom is usually pain and tenderness on the affected side between the ribs and the crest of the ilium. At other times rigors, followed by fever of an intermittent character, are the first symptoms announcing the presence of an

abscess. As the suppurative process advances, the skin over the affected side becomes red, edematous, and painful, the patient lying on the back, with the legs flexed to a void tension.

Where large nerves are pressed, the pain is severe, extending down the thigh and into the testicle or labium. Fluctuation can usually be elicited on palpation. There is loss of appetite, nausea and vomiting, and all the symptoms of septic poisoning.

Should the abscess rupture into the peritoneal cavity, symptoms of acute peritonitis suddenly develop. If it empties into the lung, it is expectorated from the bronchi, while k is passed w[^]ith the feces and urine when it opens into the colon or bladder.

Diagnosis.—There are certain characteristic symptoms that will make the diagnosis comparatively easy. The bulging over the affected kidney, the skin being red, edematous, and sensitive to pressure, the urine free from blood, pus, and casts, unless the kidney be involved, and finally the use of the exploring needle, render the diagnosis positive. In pyelitis, the urine contains pus, blood, and casts, while in hydronephrosis the pain and tenderness are absent, and the exploring-needle reveals water instead of pus.

Prognosis.—This depends somewhat upon the vigor of the patient and the point at which the abscess is directed. If externally, and the abscess is freely drained, the outlook is quite favorable, but if it empties into the peritoneum or the lung, the prospect is unfavorable, and when into the bladder or bowel it is also quite grave.

Treatment.—In the early stage, rest in bed, with the proper sedative and echinacea, the sulphites, chlorates, or mineral acids as the antiseptics, will be the proper internal medication. As soon as the abscess is discovered, free drainage is at once instituted. The longer the delay in making a free incision, the greater becomes the septic poisoning, and the less hope there is for the patient.

II. DISEASES OF THE BLADDER.

ACUTE CYSTITIS.

Definition.—An acute inflammation of the mucous membrane of the bladder.

Etiology.—The causes producing cystitis are numerous, and may be mentioned in the following order:

Catarrhal.—All mucous membranes are exceedingly sensitive to impressions, and that lining the bladder is no exception; thus we find that atmospheric changes, whereby a wide range of temperature occurs within a few hours, or sudden cooling after severe exertion, often gives rise to a catarrhal inflammation of the lining of the bladder. Extreme distention of the bladder may give rise to cystitis, even though there be no change in the quality of the secretion; and where decomposition has taken place from long retention, the irritation is greatly increased. The teasing effect of an enlarged prostate gland, a cystocele or urethral stricture, may be the exciting cause.

Septic.—Under this head will come the irritating action of septic matter introduced by unclean catheters, sounds, irrigators, etc.. The cystitis found in puerperal women and gonorrhoeal patients are of this class, as well as those suffering from stricture and enlarged prostates, who are compelled to resort to the catheter.

The cystitis that occasionally accompanies the infectious fevers is also to be included in the septic class. Especially, diphtheria, typhoid fever, scarlet fever, and tuberculosis.

Drugs.—The ingestion of certain drugs, by their toxic effect, not infrequently causes cystitis. The most common are cantharides, turpentine, copaiba, cubebs, mustard, and methylene blue. Workers in dye-houses are subject to cystitis, the result of the irritating dyestuffs used.

Traumatic.—The traumatism induced by the rough or un-skillful use of instruments used in breaking up a stricture or sounding the bladder, may give rise to cystitis; also the presence of a calculus or foreign body in the bladder, or the pressure of the fetal head during a prolonged and

difficult labor, or a mass of impacted or hardened fecal matter may be sufficient to produce like results.

Extension from Neighboring Parts.—We have already seen. that the bladder is frequently involved in nephritis, ureteritis, or urethritis. The same results may follow disease of the ovaries and tubes, or of the vagina and rectum. Tumors and abscesses of the pelvic tissue are apt to be attended by cystitis.

Pathology.—The anatomical changes are similar to those of any other mucous surface; viz., intense hyperemia, the membrane being smooth, red, and edematous, and covered with a mucopurulent secretion. There will be patches where the epithelium is denuded, the edges being shaggy from the hanging shreds of epithelium. Where the inflammation is intense, the submucous tissues become involved, and not infrequently ulcerated patches are to be seen. Hemorrhagic effusions may occur about the denuded patches.

As a result of the more malignant forms of scarlet fever, diphtheria and kindred infectious diseases, a diphtheritic ulceration occurs, with necrosis of the entire, bladder wall. The urine may be acid in reaction, though usually alkaline, and contains pus, blood, and epithelial cells, all of which decompose rapidly.

Symptoms.— “Acute cystitis commences with pain in the hypogastric region, of a subacute character, with soreness on pressure. There is a frequent desire to urinate, and these calls are attended with an aggravation of the suffering. From the sympathy existing between the bladder and the kidneys, the urinary secretion becomes scanty and high-colored, and its increased acidity gives rise to a painful burning and scalding sensation when it is passed. When the disease has attained its greatest intensity, there is an almost constant desire to micturate, with an intense tenesmus, so that the patient is sometimes obliged to take hold of something with his hands when passing water, and will frequently bite his lips to keep from crying out with the severe suffering.

“With the commencement of the pain the patient is usually-seized with a chill or well-marked rigor, which is followed by febrile action, generally of a remittent character, and not very severe. The disease runs a course of from six to twelve days, and terminates in resolution, or in the chronic form; or, in some rare cases, extending to the peritoneum

and adjacent fascia, gives rise to the formation of a pelvic abscess.”

Diagnosis.— “Acute cystitis is readily determined by the seat of the pain, and by its aggravation during micturition; the change in the character of the urine and its difficult passage, with tenesmus, is additional evidence.” In nephritis there are tube-casts, and the quantity of albumin is much larger.

Prognosis.—Simple, uncomplicated cystitis terminates favorably in from five to ten days without any structural change. Where the inflammation extends to the kidney, the outlook is more grave, and should septic processes be set up, with ulceration of the membrane, diphtheritic in character, the disease may prove fatal.

Treatment.—Gelsemium in full doses, combined with the appropriate sedative, gives good results, and may be the only agents required. We add thirty to sixty drops to a half glass of water, and give a teaspoonful every hour. Where there is smarting and burning in voiding urine, apis and rhus tox. will replace the gelsemium, thus:

Apis	20 drops.
Rhus Tox	10 drops.
Water	4 ounces. M.

Sig. Teaspoonful every hour.

Where there is great tenesmus, cantharides, five to ten drops in a half glass of water, given every hour, will often bring prompt relief. Eryngium is a useful agent where the desire to urinate is almost constant and the water is highly colored or bloody. When these specifics fail to give the desired results, we will usually get relief from an infusion of triticum repens given freely, or an infusion of marshmallows, epigea repens, polytrichum, or eupatorium.

In this day of small doses and pleasant medication, we have failed to make use of the infusions many times at: the expense of pain and much suffering to our patients. Their efficacy may be increased by adding to the infusion small doses of the acetate or citrate of potassium or the benzoate of sodium.

When there is evidence of sepsis, echinacea, baptisia, the sulphites,

chlorates, or mineral acids will be the better remedies. In the way of local treatment, the hot sitz-bath will be found to give better results than hot packs. The use of opium suppositories acts kindly, and, should other means fail, should be used. Where the suffering is intense and the tenesmus almost constant, a hypodermic of morphia, should be used.

CHRONIC CYSTITIS.

Definition.—Chronic inflammation of the mucous membrane of the bladder, attended by more or less structural changes in its walls.

Etiology.—Chronic cystitis may be the result of oft-repeated acute attacks, or it may come on insidiously, following an acute attack which has been neglected. The exciting cause may be a calculus in the bladder, or pressure from the outside, as from a tumor or displaced uterus. It may also arise from a urethral stricture or enlarged prostate, the bladder not being completely emptied, and the urine thus contained becoming acid. Tubercular deposits and neoplasms are among the rarer causes.

Pathology.—In long-standing cases, the mucous membrane becomes very much thickened, affecting its capacity for retaining urine. The surface is not red and velvety, but assumes a purplish or slate color. Its surface is covered with a muco-pus, with here and there an ulcerated patch. There is enlargement of the follicles, and there may be so much obstruction of the ureteral orifices as to cause dilatation of the ureter and pelvis of the kidney, followed by hydronephrosis.

The urine is alkaline, and contains more pus and albumin than in the acute form.

Symptoms.—“Persons suffering from chronic cystitis usually complain of a sense of weight in the hypogastrium and peritoneum, with a dull, dragging pain. There is also tenderness on deep pressure over the hypogastrium. More or less difficulty is experienced in passing urine, sometimes on account of the increased mucous secretion, and at others, from the seeming acridity of the urine. The patient frequently complains of pain in the neck of the bladder, extending the entire length of the urethra, and sometimes of a sensation of scalding or burning referred to the region of the bladder. In severer cases, when complicated with disease of the prostate, or when ulceration has occurred, the pain and

heat in the bladder is very severe, the call to urinate urgent and attended by violent tenesmus and straining.

“The general health becomes markedly affected when the disease is severe; the bowels are constipated; the appetite impaired; the skin dry, harsh, and sallow; and there is considerable loss of flesh and strength. The urine varies greatly; in the milder cases it seems nearly natural, but in the more severe cases it contains mucus, pus, and the phosphates. Sometimes it is so thick with the presence of these materials that it is voided with difficulty.”

Diagnosis.— “Chronic cystitis is determined by the location of the pain and tenderness, and its association with difficulty in passing water, and alteration in the urine dependent upon the changed secretions of the bladder. Mucus in the urine may be determined by its action on litmus paper, by its particles coagulating into a thin, semi-opaque membrane, on the addition of nitric acid, and by its soon undergoing putrefactive decomposition, becoming ammoniacal.

“Pus, in urine, generally falls to the bottom when allowed to stand: acetic acid has no effect on it, but if agitated with liquor potasse it forms a dense, translucent, gelatinous mass. If the urine contains phosphatic deposits, it is often very fetid, sometimes pale, at others greenish, and viscid from the abundance of mucus. On placing some of the mucus beneath the microscope, abundant crystals of the triple phosphate are found entangled in it. Dr. Bird remarks that, “One point must be borne in mind in forming a prognosis from the state of the urine; viz., not to regard it as ammoniacal because the odor is offensive, and not to consider the deposit as purulent because it looks so. A piece of litmus paper will often show it to be neutral, and even sometimes acid, while microscopic inspection often proves the puriform appearance of the urine to be an admixture of the phosphates with mucus. For want of these precautions, I have seen some cases regarded as almost hopeless which afterward yielded to judicious treatment. It is quite certain that the mucous membrane of the bladder may, under the influence of chronic inflammation, secrete so much of the earthy phosphates and unhealthy mucus as to render the urine puriform and offensive without having necessarily undergone any structural change.”

Prognosis.— “Though persistent in its character, the disease is almost always amenable to treatment. Cases in which there is enlarged

prostate with ulceration of the bladder, are the most intractable, and sometimes prove fatal. When associated with chronic disease of the kidneys, it is almost always fatal.”

Treatment.—The treatment will include internal medication, counter-irritants, and local treatment to the bladder walls. In the milder forms of somewhat acute character, the remedies recommended in acute cystitis will prove beneficial; viz., apis, gelsemium, cantharides, eryngium, etc. In the more chronic forms, and where the urine contains large quantities of mucus, phosphates, etc., we will get better results by the use of additional remedies.

Agrimony.—Where there are large quantities of mucus, or mucus pus, and blood, agrimony will be found to give good results. Agrimony one or two drams, to water four ounces, a teaspoonful every three or four hours.

Colorless Hydrastis and cubeb are also good agents when the same conditions prevail.

Eryngium will be found useful where there is continual uneasiness and the water is scanty and high-colored.

Hydrangia.—Where there is constant backache and the bladder is irritable, hydrangia will give good results.

Elaterium.—This is the remedy so highly praised by Dr. John King, and where the inflammation is at the neck of the bladder, with constant pain, the urine passing spasmodically and leaving unpleasant sensations, the remedy is a good one.

Rhus aromatica will be a good remedy where there is some hemorrhage.

Santonin will prove a good agent where the urine is scanty and passed with difficulty.

Salol.—Where the urine is excessively alkaline, salol in five-grain doses every three or four hours will not prove disappointing.

Injections.—We can not secure the best results, and many times not effect a cure, unless we can secure a clean bladder, and wash out the

irritating and decomposing urine. The double catheter may be used, allowing the fluid to escape as rapidly as it flows in; or a soft rubber catheter may be attached to a glass funnel, and the bladder filled, then, by depressing the tube, the water allowed to flow out. Where the deposits are abundant, the bladder should be *thoroughly* irrigated, one, two, or three times a day. We use plain sterilized water or a normal saline solution, boracic acid solution, or weak solution of potassium chlorate.

Following this treatment, much benefit may be derived by introducing into the bladder a solution of colorless hydrastis and sulphate of zinc; say hydrastis, one dram; zinc sulphate, four grains; water, one ounce. Should this be followed by much pain, it may be washed out with tepid sterile water.

Where there is great pain, morphia may be added to the solution introduced, using one-third or one-half grain to the ounce; or one grain of opium may be used as a rectal suppository.

The older Eclectics obtained good results from counter-irritation over the bladder, and, though rather unpleasant treatment, it will be found to give good results in the more stubborn cases. The old compound tar-plaster may be used to suppuration, or the more modern thapsia plaster.

The bowels should be kept in a soluble condition. Of course, if there be stricture of the urethra or enlarged prostate gland, our attention must be directed to overcoming these difficulties before we can expect much, if any, relief to the cystitis. Where the irritation is persistent and the deposits large, and the treatment has failed to give relief, as a last resort drainage by way of the vagina in the female and the perineum in the male, is to be advised.

VESICAL HEMORRHAGE.

Synonym.—Vesical Hemorrhoids.

Definition.—A hemorrhage from the walls of the bladder.

Etiology.—Quite a variety of causes may give rise to hemorrhage from the bladder, and, though usually symptomatic, the use of the endoscope

in recent years has revealed a hemorrhoidal condition of the veins of the bladder that is responsible for hemorrhages that were heretofore inexplicable. Malignant diseases of the bladder that in their ravages destroy arterial vessels, are attended by hemorrhages, and malarial hematuria is not uncommon. Leukemia may also be a causal factor. As a mechanical cause, the irritation from renal and vesical calculi is not to be overlooked. Rarely, hemorrhage from the bladder occurs in the latter months of pregnancy.

Symptoms.—Aside from the presence of blood in the urine, there will be a sense of fullness in the bladder, and the pain is of a dull, aching character, with a sense of weight and oppression when due to hemorrhoidal veins.

Diagnosis.—A positive diagnosis can only be made by a cysto-scopic examination of the bladder, though the absence of the usually well-defined symptoms that accompany renal hemorrhage would suggest hemorrhage from the bladder.

Prognosis.—This is generally favorable, though fatal cases have been reported.

Treatment.—Hemorrhage from the bladder will be treated on the same principle as bleeding from any other part. If active in character, gallic acid in five to ten grain doses will give good results; or equal parts of oil of erigeron and oil of cinnamon, five to ten drops per dose, will be useful, while some will prefer ergot in from ten to sixty drop doses.

When the bleeding is due to a hemorrhoidal condition of the veins, such remedies as assculus, collinsonia, and hamamelis will give better results. Hamamelis may be used in irrigating the bladder, as may a weak solution of tannic acid, boracic acid, or alum.

NEUROSES OF THE BLADDER.

IRRITABILITY OF THE BLADDER.

We quite often meet with patients, especially with women of nervous temperaments, in whom there is a hyperesthetic condition of the bladder, usually about the urethral or ureteral orifices (vesical trigone),

that is independent of structural disease of the organ or mechanical irritation from a calculus.

Etiology.—This unpleasant, and often exceedingly painful condition, generally occurs among patients of a neurotic temperament, hysterically inclined. As a result, we find the patient excited or melancholy, the appetite capricious, and, being usually poorly nourished, cross, peevish, and making life a burden to herself and those around her.

Often there is dyspepsia, with the many symptoms attendant on that lesion, or there is menstrual derangement, dysmenorrhea, menorrhagia, or amenorrhea. At other times it is the result of severe mental or physical work, overindulgence in venery, or sexual intercourse, or the many dissipations of fashionable life; such as late hours, indigestible food at unreasonable times, etc. Other cases are purely reflex and due to uterine derangements, rectal diseases, and wrongs of the vagina or urethra. There is also an irritability of the bladder developed in some cases of chronic malaria.

Pathology.—With the exception of a hyperemic condition of the bladder, there are no pathological changes.

Symptoms.—Pain, frequent calls to micturate, and rectal or vesical tenesmus are the four characteristics of an irritable bladder. The pain and tenesmus may be relieved by micturation, or may be increased, the latter being especially true where there is a spasmodic condition of the muscular walls of the bladder, the hyperemic and exquisitely sensitive mucosa being so greatly irritated as to cause excruciating pain, which persists during the intervals of micturation. This spasmodic action may be so marked as to cause retention of the urine, while at other times the urine is passed suddenly and spasmodically. Some cases will complain of a constant, dull, aching pain in the bladder. The pain extends along the urethra, and often the patient cries out in his distress.

Diagnosis.—This is readily made by the four characteristic symptoms,—*pain, frequent micturition, rectal and vesical tenesmus.*

Prognosis.—This is often a stubborn and chronic lesion, sometimes continuing for weeks or months, though life is never endangered.

Treatment.—These cases are frequently quite stubborn and require

much care in the treatment. The patient must refrain from severe mental or physical work, be regular in her habits, and avoid dissipations of all kinds. Any wrongs of the uterus and its appendages must be corrected and the rectum should be examined for hemorrhoids, pockets, papillae, fissures, ulcers, etc., and if there be urethral troubles, these must be corrected.

In the way of remedies, we have a number that will give good results. *Triticum repens* drunk freely as an infusion is one of the best. The tincture of red onion, one or two drams to half a glass of water, and given in teaspoonful doses every hour, is also very good. *Rhus aromatica* one dram, to four ounces water, and a teaspoonful every hour, will relieve a large per cent of the cases. Where there is a burning and stinging sensation, *apis* is the remedy. For tenderness, *eryngium* is useful, and where there are spasmodic conditions present, *gelsemium* is among the best agents. Where the pain is severe and continues during the interval of micturition, an opium suppository will afford relief.

Most patients, being of a neurotic temperament, will need, in addition to the above remedies, agents to improve the general health. *Nux vomica*, *hydrastis*, *strychnia*, the hypophosphites, or acid solution of iron, as may be indicated, together with outdoor exercise and a nourishing diet, will greatly assist in effecting a cure.

INCONTINENCE OF URINE.

Synonym.—Enuresis.

Definition.—A partial or complete inability to control the sphincter of the bladder, thus permitting the urine to escape.

Etiology.—Incontinence of urine, whether occurring in children who habitually wet the bed, or in patients of more mature years whose control of the sphincter is only partial, permitting accidents to occur, or whether it be the constant dribble occasionally seen in elderly people, constitutes one of the most disagreeable, distressing', and stubborn lesions that the physician meets.

Among the many causes may be mentioned the following: Spinal lesions, whereby the sphincteric center is involved, is known as paralytic

incontinence. This form is attended by a constant dribbling of urine, and when any sudden muscular contraction occurs, as in sneezing, coughing, laughing, etc., there is a spurt of urine. The lax and weakened condition of the sphincter muscles may be due to general bodily weakness following-prolonged febrile diseases.

In children it is usually due to atony of the muscular fibers closing the neck of the bladder, or to irritation of the nervous fibrillae distributed to the mucous membrane of the bladder, preventing a normal distention of the organ.

A temporary paralysis of the walls of the bladder may result from overdistention and also from prolonged pressure of the urethra in tedious cases of labor, when the fetal head has pressed upon it for hours.

The presence of a vesical calculus may so irritate the bladder as to give rise to incontinence. Irritation from an elongated prepuce, a contracted meatus, an adherent clitoris, or from the presence of ascarides, is not to be overlooked as an exciting cause. When due to this kind of irritation, it generally gives rise to nocturnal enuresis; or bed-wetting. A persistent and incurable form, save by surgical measures, is due to congenital misplacement of the ureter, the opening being into the urethra or vagina.

Symptoms.— “The symptoms of this affection vary in different cases; some being able to partially retain the urine, while others have no control over it at all. In the worst cases it continually dribbles away as it is passed into the bladder, the patient being unable to retain it. As the result of this state of affairs, we find that the person is rendered filthy, and is debarred society on account of the disgusting urinary odor that he can not get rid of. There is also more or less irritation of the genital organs, and of the adjacent integument, sometimes very severe, resulting in deep, foul-looking ulcers. In other cases, it is retained to the amount of a few drams, and then commences to dribble away, unless the patient has an opportunity to void it. Again, the bladder being irritable, it is forcibly expelled after having accumulated to a certain extent, the patient having no power to resist its expulsion. Incontinence of urine at night is a troublesome affection among children, and the physician is frequently consulted about it; but, unlike the other, it usually arises from an irritability of the bladder, which, assuming

control when the will is in abeyance during sleep, causes the discharge.”

Diagnosis.— “There is little difficulty in determining the existence of enuresis, but care should be taken to ascertain definitely the cause. In females, a careful examination should be made to determine that the constant dribbling of urine is not consequent upon vesico-vaginal fistula.”

Treatment.—Before prescribing any internal medication, a thorough examination should be made of the penis, vagina, and rectum; for it is a humiliating experience to find, after several weeks of unsuccessful medication, the incontinence to be due to an elongated prepuce, contracted urethra, or adherent clitoris, or a diseased rectum, the correction of which effects a cure.

The selection of the proper remedy will depend, as in all diseases, upon the condition present, as no one remedy will fit all cases. Where there is atony of the sphincter and abdominal walls, there is usually general debility, and the patient will need tonics, good food, outdoor exercise, and have regular habits.

Belladonna has been regarded by many as a specific, and where there is a feeble capillary circulation, it will give good results. Combined with nux vomica, it is especially effective. The small dose should be used:

Belladonna.	
Nux Vomica	10 drops each.
Water	4 ounces. M.

Sig. Teaspoonful every three or four hours.

Thuja.—Professor Howe used to regard thuja as a specific for bed-wetters, and where there is atony, it is a splendid remedy either in nocturnal incontinence or the dribbling found in elderly patients.

Thuja	1 dram.
Water	4 ounces. M.

Sig. Teaspoonful every three or four hours.

Nux vomica, ergot, strychnia, and like remedies, would also be

suggested in cases needing tonic and stimulating treatment. Electricity is also of special benefit in these cases—the Faradic current being used—the negative pole being attached to a urethral electrode, while the positive pole will be applied over the pubes. A three-minute application should be made two, three, or four times a week.

Brisk friction along the spine with salt water is also beneficial. Where the incontinence is due to irritation, the treatment will be sedative in character.

Rhus Aromatica.—This remedy has earned a reputation for curing incontinence, and should be used in fifteen or twenty drop doses. Agrimony, hydrangia, gelsemium, bromide of potassium, and santonin will be found useful in cases due to irritability.

Whatever remedy is used, however, must be fortified by an intelligent assistance on the part of the patient. But little fluids should be taken during the after part of the day, the bladder evacuated before it is greatly distended, and at the last moment before retiring.