

rounding skin, there being no fistula. Such a condition is easily mistaken for a granuloma; but if it is excised the peritoneal cavity will probably be opened. The condition should be treated by removal of the mucous membrane from the mass and ligation of its pedicle.

In fetal life the urinary bladder within the abdomen of the fœtus communicates with the allantois outside of the fœtus by a duct which passes through the umbilicus and is called the urachus. If this duct persists it will be opened by the falling away of the cord and a fistula will be exposed which discharges mucus, in case only a portion of the duct is patent, and urine if the whole duct is open as far as the bladder. Cauterization and pressure will almost invariably effect a cure in these cases, provided the urine flows freely through the natural channels. This condition may be acquired in infants or children through the existence of an obstruction in the urethra, complicated by cystitis, and afterward by the development of inflammation in the remains of the urachus. The treatment in such cases is first to establish a free passage for the urine through the urethra; second, to cure the cystitis; and, third, to dissect up the urinary fistula, suture the wound in the bladder, and close the abdominal wound.

Inflammation.—In stout people the umbilical hollow is deep. If dust and secretions of the skin are allowed to collect in it, a ball of material is formed which may chafe the skin and set up ulceration or lead to the formation of an abscess. Treatment for such conditions consists in incision and drainage.

The umbilicus may become the seat of a purulent, or biliary, or urinary, or fecal fistula, as it is the thinnest portion of the abdominal wall. The origin of the trouble may be shown by the character of the discharge; but if this is simply mucous, it may be impossible to state from what organ it comes. Diagnosis may be assisted by ingestion of food containing small solid particles—for example, huckleberries,—by irrigation of the bladder with colored fluids, etc. Treatment should, of course, be directed to the seat of the trouble.

Tumors.—The tumors which are found at the umbilicus with sufficient frequency to give practical importance to their consideration are: granuloma or fibroma, sarcoma, sebaceous and dermoid cysts, and carcinoma.

A granuloma may develop in the wound caused by the dropping off of the umbilical cord. The treatment consists in keeping the parts clean, in applying to the pedunculated mass hydrogen peroxide, carbolic acid, or some other caustic, and in carefully adjusting a gauze pad which is to be held in position by adhesive plaster. The object of these last measures is to prevent the development of umbilical hernia. A similar tumor may form in later life as a result of long-standing ulceration due to uncleanliness. Such a fibroma should be removed and the wound treated as above.

Sarcoma or fibro-sarcoma of the umbilicus is a firm tumor covered with normal skin and possessing no pedicle. It should be radically excised, and, unless the tumor is very small, it is better to open the peritoneal cavity in so doing, since the surgeon can then be more sure of cutting away all the growth.

Sebaceous cysts and dermoid cysts of the umbilicus may reach a considerable size. The proper treatment is the removal, not only of the contents, but of the cyst wall. This operation may open the peritoneal cavity.

Carcinoma, usually of the type of epithelioma, forms a shallow ulcer, with a firm base and characteristic foul-smelling secretion; or it may grow upward in a cauliflower-like mass which does not ulcerate until a later stage. The prognosis depends upon the stage at which the tumor is removed. It is rather better in sarcoma than it is in carcinoma.

Secondary carcinoma of the umbilicus occurs in some cases of cancer of the alimentary tract and female genital organs. The disease extends to the umbilicus in most cases by direct continuity. No radical treatment is possible.

Hernia.—Umbilical hernia existing at birth or devel-

oping in infancy will rarely require operation. Such a hernia is usually small, perfectly reducible, and easily controlled by a small pad held in place by adhesive plaster. A curved wooden button mould covered with gauze makes an excellent pad for this purpose. To avoid irritating the skin of the abdomen the plaster straps should be left in place several days, and each time they are changed they should be placed in a different direction: for example, first vertical, then horizontal, then oblique, etc. The new pad and strapping should be at hand before the old one is removed, and the finger of the nurse should control the hernia during the change of dressing. If this treatment is conscientiously followed, most of these herniæ will be completely cured in a few months. In older children operation is required.

Umbilical hernia in adults is a much more serious condition. It is usually complicated with adhesions, so that the hernial contents are only partly reducible. On this account the wearing of a truss is unsatisfactory and possibly dangerous. (For the operative treatment of umbilical hernia see article on *Hernia*.)

Edward Milton Foote.

UNAKA SPRINGS.—Unicoi County, Tennessee.

POST-OFFICE.—Unaka Springs Hotel.

ACCESS.—Via Southern Railroad to Johnson City, thence via Ohio River and Charleston railroad (Tennessee division), twenty-three miles to Unaka Springs.

The location is seventeen miles from Jonesboro. This resort is pleasantly located in a small cove, containing eight or ten acres, at the foot of the Unaka Mountains. The location is about 2,000 feet above the sea level, and is entirely surrounded by higher elevations. The springs are four in number and flow about 9,000 gallons per hour. No analysis has been made. The waters are said to contain iron and sulphate of magnesia. They are recommended for indigestion, chronic dysentery, and other diseases.

James K. Crook.

UNDERWOOD SPRING.—Cumberland County, Maine.

POST-OFFICE.—Falmouth Foreside.

This spring is located on the shores of Casco Bay. It yields about 200,000 gallons of water per day, and is said to have been used by white men since the days of Weymouth, the English explorer. The following recent analysis was made by a chemist whose name we have been unable to secure: One United States gallon contains (solids): Sodium chloride, gr. 0.86; silica, gr. 0.50; calcium carbonate, gr. 0.48; magnesium carbonate, gr. 0.14; potassium sulphate, gr. 0.12; organic matter, none. Total, 2.10 grains.

The water is used commercially. Being lightly mineralized and entirely free from organic matter, it is well adapted for table use. It is also said to be useful in conditions due to the uric-acid diathesis, gall-stones, urinary irritation, gout, rheumatism, and dyspepsia.

James K. Crook.

UNICORN ROOT. See *Aletris*.

UPPER RED BOILING SPRINGS.*—Macon County, Tennessee.

POST-OFFICE.—Red Boiling Springs. Hotel.

ACCESS.—Via Nashville and Chattanooga Railroad to Carthage; thence twenty-five miles by stage to springs. Or via Louisville and Nashville Railroad to Gallatin, thence forty-five miles by stage. Or via Middle and East Tennessee Central Railroad to Hartsville; thence twenty-eight miles by stage.

This resort was formerly known as Whitley Springs, and for many years its waters have had a wide reputation in this section. They are located on the highland rim in the eastern part of Macon County, a region well known for its fine climate and beautiful scenery. The Red Spring throws up a large amount of gas, which gives it

*No connection with Red Boiling Springs (Vol. VI., p. 862).

the appearance of boiling. It deposits a brilliant red sediment, which covers the sides and bottom of its basin and imparts a reddish tinge to the water. The Black Spring also possesses this peculiar boiling characteristic. The Red Spring was analyzed by Messrs. J. M. Safford and J. C. Wharton in 1893, with the following results: One United States gallon contains (solids): Calcium sulphate, gr. 31.16; calcium carbonate, gr. 7.03; magnesium carbonate, gr. 5.75; sodium chloride, gr. 43.87; potassium chloride, gr. 0.44; aluminum sulphate, gr. 0.15; iron carbonate, gr. 0.10; silica, gr. 0.47; organic matter and loss, gr. 2.42. Total, 91.39 grains. Gases: Sulphureted hydrogen and carbonic acid, 9.95 cubic inches. The waters of the Red Spring are highly recommended in renal and bladder affections, especially those arising from the uric acid or lithæmic tendency. They are believed to possess a powerful solvent action on renal calculi and gravel. These waters are also said to be of great value in cases of chronic uterine inflammations, leucorrhœa, etc. The Black Spring water has an excellent reputation in the treatment of rheumatism. The waters of both springs possess tonic and appetizing qualities. A comfortable hotel, with modern conveniences and abundant bathing facilities, was built in 1890. There are also a number of private boarding-houses in the vicinity.

James K. Crook.

UPPER SODA SPRINGS.—Lisikon County, California. Hotel.

These excellent springs are situated on the line of the Shasta scenic route of the Southern Pacific Railroad, at an elevation of 2,363 feet above the sea-level. The location is in Sacramento Canyon, and is picturesquely surrounded by immense forests of pine, fir, spruce, cedar, etc. At the springs is a quiet, spacious, old-fashioned hotel with wide verandas and an air of solid, homelike comfort. The waters are of the alkaline-carbonated class and are very palatable and wholesome. They contain chlorides of sodium and potassium, carbonates and bicarbonates of sodium, magnesium, potassium, iron, calcium, sulphates of sodium and magnesium, and a large quantity of free carbonic-acid gas. The water is aperient, diuretic, tonic, and antacid. It is highly recommended in the treatment of the uric-acid diathesis, gravel, and calculi, and irritative states of bladder and kidneys. The water is also of value in acid dyspepsia and flatulence.

James K. Crook.

URÆMIA. See *Auto-Intoxications*, and *Kidneys, Diseases of*.

URÆMIA, TREATMENT OF.—Regarded from the standpoint of treatment, the term "uræmia" should cover all derangements due primarily to blood poisoning on account of deficient elimination by the kidneys. The term then would include a number of functional disorders causing more or less prolonged invalidism, as well as the more serious conditions to which it is commonly applied. To limit the term to a more definite series of changes or symptoms is not practicable, because of the great variety and diverse nature of the poisons operative in different cases. How entirely dissimilar such poisons may be is illustrated by the fact that the symptoms which follow upon acute obstructive suppression of the urine are very different from those which occur in ordinary uræmia. Death follows in such patients with scarcely one of the clinical features of the latter state. In a case of the kind which I saw in consultation, the patient had his left kidney destroyed by a calculus becoming impacted in its ureter thirteen years before. At the time of my visit he had not passed any urine whatever for eight days; a condition of affairs which warranted the belief that a calculus had become similarly impacted in his right ureter. I stated that if not relieved by operation he would die, as similar cases do, without any symptoms of ordinary uræmia; and so he did, as the operation was refused. He retained his consciousness up to the end, and did not experience convulsions, coma, dyspnoea, vomiting, or in-

testinal symptoms, and there were no evidences of pulmonary congestion or of œdema in any part of the body. His death was apparently due to asthenia pure and simple.

A careful study of the great variety of symptoms of uræmia itself in different patients suggests the inference that there must be a corresponding variety of distinct poisons present in them, some of which it may be possible to recognize by their own special properties, in the same manner as we would recognize any of our drug poisons by their special properties. We might expect this to be so *a priori*, because modern chemistry has demonstrated that different poisons may arise in the decomposition of even the same tissues; and that the poisons of uræmia originate in the disintegration of the tissues of the body, scarcely admits of a doubt. Thus, two distinct poisons have been isolated from nervous tissue, viz., cholin and neurin, and their presence has been detected in the cerebro-spinal fluid drawn off during life in patients with some form of disease of the nervous system of a degenerative nature. Of these two poisons, neurin is much the more virulent, and it presents properties quite different from those of cholin.

So in uræmia I believe that we have among others one special poison—viz., urea—which is commonly present and which has an important bearing upon the course of renal diseases. The presence of this poison can be distinguished by its own specific effects, and, what is more for our present purpose, it can be combated by appropriate treatment.

In all cases of acute nephritis, from the onset of the first symptoms, a remarkable change occurs in all the arteries of the body, for they shrink in size, and the pulse accordingly rises in tension. The most striking fact about this change is its subsequent persistence, for it continues as long as the nephritis continues, and should that become chronic the high tension becomes likewise established for months or years. This has led many erroneously to attribute the high-tension pulse of chronic renal disease to endarteritis, supposedly caused by the poisoned blood circulating in the vessels. But while it is true that changes in the coats of the blood-vessels, especially when they proceed to the extent of obliterating the lumen of the arterioles, will mechanically cause high-tension pulse, yet this latter symptom appears long before such changes occur, and, as we will show, it is the strain of high tension, rather than the toxic condition of the blood, which causes the endarteritis.

That the high tension is due, not to kidney disease as such, but to the presence in the blood of some special poison, is rendered probable by the opposite condition of low-tension pulse in some patients with marked accompaniments of renal derangement, such as albuminuria and œdema. In these, however, cardio-vascular changes are significantly absent, the arteries being everywhere soft and permeable and the heart unaffected.

In the other class, on the contrary, the pulse is hard and wiry and the artery, though smaller than natural, is yet easily palpable to the touch from being overfull, while in the early stages, before changes have taken place in its coats, it may feel (or be) quite smooth. Ere long the heart gives signs of overwork, from the ischæmia caused by the universal contraction of the arteries, and it becomes hypertrophied. Acute dilatation of the heart, however, may occur at this stage and be associated with very serious symptoms, although not a sign of thickening or of atheromatous change can be detected yet in the arteries accessible to examination.

We have at our command, it so happens, an agent which, when it is experimentally injected into the circulation, produces in the arteries exactly the same condition as that which we have just described. Suprarenal extract, or its active principle, adrenalin, acts as a very powerful and universal vaso-constrictor, and thus greatly raises the general arterial pressure, so that its effects are indistinguishable from those of the supposed blood poison which we find operative in nephritis. If this be a fact it is not necessary to postulate that the daily amount of

poison generated must be great to account for the high-tension pulse that persists in kidney disease for months together, because Schaffer and Oliver have shown that nothing is so extraordinary about adrenalin as the minuteness of the dose which will act on the whole vascular system, gr. $\frac{1}{100}$ being sufficient to affect the pulse of a healthy man. If the supposed kidney poison possesses properties at all similar to those of suprarenal extract, its effect would be the same as a continued overdosing with this drug. Under its influence both arteries and arterioles throughout the body would so contract that the heart would labor against a universal obstruction, until, after first enlarging, it might suddenly dilate and fail.

Schaffer, moreover, reports, as one of the striking results of the intravenous injection of suprarenal extract, a most extraordinary shrinkage of the kidney itself, a condition which could not fail seriously to impair its excretion of urea.

It follows as a matter of course that the administration of vaso-dilators is indicated in all such conditions as we have just described, both to relieve the heart from its extra labor caused by arterial obstruction, and to restore the normal conditions in the circulation of the kidneys themselves. For this purpose the nitrites have long been employed, and with good results. The nitrites, however, in every form, even in that of the tetranitrate of erythrol, have the disadvantage of being very evanescent in their action, and the dose often requires to be much increased in order to keep up the effect. In my opinion the ideal vaso-dilator is aconite, and its administration in doses of five drops of the tincture, three or four times a day, is followed in time by the most unmistakable beneficial effect, not alone as regards the general systemic symptoms, but also in respect to the kidneys, which show a marked restoration of functional power. In this case the uncertainty which so commonly characterizes therapeutic inferences, cannot justly be imputed to the action of aconite, for under the steady administration of this remedy the daily excretion of urea increases to from twice to four times the average daily amount excreted before its administration.

I have now the records of observations made on ten patients, four in private and six in hospital practice, in whom the daily excretion of urea was first estimated for from three to six days previous to taking aconite, and then afterward for as long a time as the remedy was administered—i.e., for periods varying from three weeks to nine months. In two of these patients the urea rose from 8 to 32 gm. daily; in one, from 10 to 40 gm. In one case, which I have published, the excretion rose from a daily average of 8 gm., noted for two months, to 32 gm. daily after five drops of the tincture had been given every three hours for one week. The aconite was continued for six months, and then twice diminished to half the dose. The output of urea soon fell to 14 gm., but returned to 30 on resuming the full dose. After six months the aconite was discontinued and the nitrites (tetranitrate of erythrol) were substituted. The urea again fell to 10 gm., when, the aconite being again resumed, the quantity rose to 32 gm.

The same results, so far as the excretion of urea is concerned, followed in the other nine cases. Three of those were hospital patients, and in two of them, after a month's use of aconite, the effect of omitting it altogether for three weeks was carefully noted. With each patient a week passed before the elimination of urea fell off, but then the diminution became decided. The third patient, who came into the hospital with anasarca and albuminuria, severe cerebral symptoms, and extensive cardio-vascular changes, improved so much that he refused to stay long enough for us to observe the effects of withdrawing the remedy.

Next to the improvement in the kidneys, including the disappearance of albumin and casts, the most marked effect of aconite is in relieving the cardiac oppression. In the case above alluded to, acute dilatation of the heart was the first condition which her physician found, and for two months she could not have her head raised, or

even be turned in bed, without threatening symptoms of syncope. As soon as the aconite was given, it seemed to act on the heart as a restorative instead of a sedative, doubtless from the relief which the heart experienced from the removal of the general arterial obstruction.

On the other hand, I hold that the administration of such a vaso-dilator will be of the highest service in preventing the development of endarteritis, besides checking the progress of changes in the kidneys themselves; for it is well recognized that atheroma develops in the arteries at the seat of the most long-continued strain, and that is just what high tension is sure to induce.

We cannot expect much from aconite, nor from any functional vaso-dilators for that matter, in conditions in which widespread chronic endarteritis has already caused extensive obliteration of the smaller arteries. In such conditions the pulse tension, as already remarked, is due to permanent closure of a great number of peripheral vessels, and neither aconite nor any similar agent can dilate vessels which have practically ceased to exist. In cases of senile hearts, therefore, aconite should be given with discrimination. Even in them, however, should the pulse be not only of high tension, but also rapid, aconite may be advantageously given till the pulse falls to normal frequency, and then it should be intermitted; for I have seen it do much good in old people who, from their quickened pulse, appeared to have some acute exacerbation of chronic renal trouble.

In puerperal eclampsia we have a remarkable illustration of such a poison being rapidly formed and giving rise to extreme high tension. But, in addition to this high tension, we have the most dangerous addition of another element, viz., the rapid and powerful action of the heart itself. Schaffer's experiments with intravenous injection of suprarenal extract supply a striking parallelism to this condition, for he found that if, after the suprarenal extract had been injected, the vagi were paralyzed with atropine, the heart then acted very violently and forced such an increased amount of blood into the contracted arteries that an enormous rise in blood pressure followed. Under these circumstances the excessive intracranial vascular tension is likely to give rise to a fatal status epilepticus unless the pressure be promptly relieved. It would seem, therefore, that in puerperal eclampsia an analogous paralysis of the vagus occurs, either by overstimulation, by an excessive generation of the vaso-constrictor poison, or else by the conjoint action of this and some other poison resembling atropine. This surmise cannot be considered improbable, if the varied nature of the poisons of uræmia are considered.

Clinically, the best and speediest vaso-dilator which we can use to relieve such a condition is free venesection; but, if that be objected to, then veratrum viride should be given in very large doses, administered according to the effect which it produces on the tension of the pulse, but without reference to any other consideration. Aconite is much too slow for such an emergency, and, besides, aconite does not have the specific effect of veratrum on the great splanchnic blood-vessels. Our object is to quiet the heart and relax the arteries by bleeding the patient, as has been expressed, into her own abdominal veins, which when fully relaxed can hold all the blood of the body.

Precisely the same kind of convulsions as those which take place in puerperal eclampsia occur in acute alcoholism in men, and they have to be treated in the same way, either by full venesection or by doses of twenty drops of the tincture of veratrum viride administered every twenty minutes till the tension of the pulse is counteracted. I have given two drachms of this tincture in four hours and a half in a case of that kind, and as a result of these heroic doses the convulsions ceased and the patient recovered.

It is too commonly the case that practitioners are content in their examinations of the urine to search for only what ought not to be there, such as blood, albumin, casts, pus, sugar, etc. Their examinations, however,

should extend also to determining whether the urine contains its normal ingredients in proper proportion and amount. Often the urine may not contain any foreign elements, and the kidneys be free from any organic disease, and yet the patient remain seriously out of health from deficient elimination of urea and other solids. Nothing could be more puzzling than the narration, which patients often make, of symptoms which, particularly as regards nervous manifestations, seem to be inconsistent with any known disease. This feature of itself should lead us to suspect a general toxæmia of some kind, and most likely either of renal or of intestinal origin. Headaches, mental depression, severe neuralgias constantly shifting from one part of the body to the other, all kinds of paræsthesiæ, somnolence alternating with insomnia, and a sense of general prostration, especially in the morning, and also in some instances morning polyuria, are among the many symptoms of which such patients are likely to complain. The diagnosis of the condition is at once made clear when a proper examination of a specimen of the collected urine for twenty-four hours is made, and the output of urea is found to be only one-fifth, one-third, or one-half of what it ought to be for persons of their age or weight. The elimination of urea ought to range, for a woman in good health, between 18 and 20 gm., but it is singular how long some women will live eliminating only 10 gm., or 5 gm., or even only 4 gm., daily for months together. Hysteria is the commonest verdict pronounced upon them, owing to their ever-changing nervous symptoms. But I have had, among men, a number of patients who manifested just such symptoms, both in kind and in number, and in them I have found the urea output to amount to from 11 to 15 gm., when it should range from 22 to 30 gm. Neurasthenia is the favorite term applied to cases of this nature.

In all such patients the pulse tension is low, and there can be little doubt that the underlying disorder, whatever it may be, differs materially, both etiologically and pathologically, from that which is present when the elimination of urea is low but the pulse tension high. In true hysteria I have not found the elimination of urea specially deficient. As to the other solids of the urine the records vary remarkably. Some urines with a low percentage of urea have a great excess of other solids, while in the case of others the total solids may be diminished. The chief factor, therefore, is deficiency of urea. My own view of the etiology of these disorders is that they are of gastro-intestinal origin. In health there is a significant association between the intake of food and the elimination of urea by the kidneys. Within the first hour after a full meal the elimination of urea is from twice to three times what it will be in the fourth hour after the meal. That fact seems to explain why attacks of apoplexy so commonly follow Christmas or Thanksgiving dinners in those who have already damaged kidneys. The serious effects, in kidney diseases, of errors of diet are a further evidence of the close relation of the gastro-intestinal tract to the renal functions. It seems to me, therefore, quite conceivable that certain disordered states in the alimentary canal may exert an inhibitory effect, so to speak, upon the elimination of an adequate amount of urea by the kidneys. At any rate, instead of aconite or vaso-dilators being of any service, I have found the restoration of the normal output of urea best secured by a persevering and systematic use of intestinal antiseptics. A weekly, or bi-weekly, dose of blue pill is very efficacious. On rising in the morning the patient should take a drachm and a half of sodium sulphate, or of sodium phosphate with ten grains of sodium salicylate, dissolved in a tumbler of water as hot as he can sip. The benzoates are also of much service. Ten grains of either the sodium or the ammonium benzoate may be mentioned as the proper dose. Three such doses, either with or without an equal amount of sodium salicylate, are commonly taken (the benzoate and the salicylate in two separate capsules) in the course of the day—one about an hour after each of the first two meals, and the third just

before retiring for the night. Some physicians prescribe, in preference to the above, a mixture of castor oil (℥ xv.) and salol (gr. v.), to be taken half an hour after each meal and again at bedtime. Each dose is enclosed in one of Starr's shellac-covered capsules. Red meats should be avoided, especially at night, and among vegetables asparagus and beets.

The treatment of uræmia occurring in organic derangements of the kidneys is treated fully elsewhere (Vol. V., p. 343), and, therefore, I will only allude to some particular conditions. In acute scarlatinal nephritis, the first danger signal from the kidneys is not the appearance of albumin or of blood corpuscles under the microscope, but a diminution in the quantity of urine excreted and a fall in the specific gravity. When a discovery of this kind is made, treatment should be begun at once. One of the most effective measures that can be employed under these circumstances is the rectal douche, with normal saline solution at 115°-120° F.

Action of the bowels always causes a flow of urine in health, owing to the nervous association between these two adjacent viscera; and this association stands us in excellent stead whenever the kidneys are, from any cause, failing to secrete. I would place more reliance upon this one than upon any other single measure in scarlatinal suppression of urine. At least two gallons of the hot saline solution should be allowed to run in and out at a time, the best instrument for which purpose that I know of being Kemp's rectal irrigator. (See article on *Enteroclysis* in Vol. III.) I have seen also most excellent results from hypodermoclysis in these cases and in the hemorrhagic nephritis of diphtheria. In such cases it is well to inject, beneath the skin of the flank, from two to four ounces of normal saline solution. (See article on *Hypodermoclysis* in Vol. IV.) We need hardly despair of even the most seemingly desperate case of scarlatinal suppression; and if deep coma supervenes, I have found effectual a procedure recommended by Brown-Séguard; it consists in dipping a tablespoon in hot water and holding it in contact with the skin over the kidneys until the surface shows signs of being scalded.

With reference to some points connected with the treatment of chronic interstitial nephritis, I may state that it is not uncommon for a person to be suddenly taken with uræmic convulsions as the first announcement to anybody that he has Bright's disease. Post mortem we find that such persons have long been carrying diseased kidneys with them, with only moderate accompanying symptoms, which they had accredited to biliousness, etc. Others, on the contrary, have long been known to have kidney disease, but they have got along fairly well for many months, or they have even attended to business, and then suddenly serious symptoms have developed and the disease has soon carried them off.

I believe that in the great majority of such patients there has entered into the case a new element, the recognition of which we owe to recent advances in pathology; I refer to a septic invasion of the kidneys by bacteria, of which the commonest form is the colon bacillus. Dr. Flexner has been one of the foremost investigators who have demonstrated the rôle which terminal infections play in the final issue by death of many chronic diseases, particularly diseases of the heart and of the kidneys.

In chronic interstitial nephritis the process seems to be this: A patient with cirrhotic kidneys, who has had polyuria for months, begins to pass much less urine, or perhaps very little. He is then beginning with virtually the same conditions as those which are present in a case of commencing scarlatinal nephritis. Soon afterward he has a convulsion, and becomes comatose, or he has, during the night, an attack of uræmic asthma with œdema of the lungs and pleural effusion, or an attack of vomiting and diarrhoea. Often thereafter the kidneys stop secreting altogether and death follows. At the autopsy the kidneys are found to be acutely inflamed, stuffed with micro-organisms of various kinds, but most frequently with the colon bacillus.

There is nothing so much to be dreaded as an attack of so-called cholera morbus in an elderly person. In such a case we should at once turn our attention to the kidneys, to find out what their condition is. Something also of this kind undoubtedly occurs in those cases which heretofore have been regarded as simply an acute exacerbation of the original chronic malady. I think that I have repeatedly, in patients whose kidneys were in a cirrhotic condition, warded off the worst results after threatening symptoms, such as fever, mental clouding, Cheyne-Stokes breathing, vomiting, and the like, had manifested themselves, by the prompt administration of mercurial cathartics, followed every two or three hours by ten grains of urotropin combined with ten grains of sodium benzoate. In my experience urotropin does not cause untoward symptoms if sodium benzoate is given along with it. Of course, hot saline rectal irrigation also should be used, as in a case of scarlatinal suppression. Against the presence of the colon bacillus in the kidneys urotropin is at least as much of a specific as it is against the bacillus typhosus.

In all cases of chronic interstitial nephritis our prognosis must always be uncertain, because we can never be sure how much working kidney substance these patients may still have. Not uncommonly the most unlooked-for improvement in the action of the kidneys will occur, and then continue until it is suddenly cut short by some error of diet, such as a too hearty meal of meat, particularly if taken at night. With reference to this point we may remark that there is an apparent difference in the activity of proteid metabolism between the day and the night hours. We have a whole series of affections, marked chiefly by nervous disturbances, which are evidently due to various toxæmias, and which are all characterized by being worse in the early morning hours. Many cases of melancholia and of migraine, and all cases of Graves' disease show this peculiarity. In Graves' disease the twenty-eight symptoms, aside from the goitre and exophthalmos, which I have found to be characteristic of this singular malady, are, without exception, worse in the morning. In my notes I have records of no less than eight who could not write or sew in the morning, but could do so in the evening. In all such cases of melancholia, migraine, or Graves' disease, I enjoin entire abstinence from red meats, especially beef, and most of all at night. Then again the first attacks of gout and of peptic asthma always occur after midnight. I have repeatedly noticed that many patients can take beef at breakfast or at lunch, but if they take it at evening dinner it is sure to cause a very troubled sleep. All these particulars should be borne in mind when we aim to regulate the life of a man who comes to us with a high-tension pulse and rigid arteries.

The chemistry of these night-generated poisons is yet to be worked out, but there can be no doubt that they have much to do with changes which take place in the alimentary canal, changes connected with the nitrogenous elements of food, particularly the red meats; and every person with cirrhotic kidneys should be enjoined, like an asthmatic, not to eat heartily after midday.

For the rest, I may say that the greatest remedy for auto-infection and the best prophylactic against the manifold dangers of chronic interstitial nephritis is life in the open air. Such a case needs a milder climate in winter, just as much as any bronchitic or phthisical patient does. Intestinal antiseptics are of the greatest value; and, as to special medicinal remedies, I have great faith in the employment of gr. $\frac{1}{4}$ of bichloride of mercury, t.i.d. for one week out of three weeks, and of small doses (not more than five grains) of sodium iodide t.i.d., to be taken for prolonged periods.

There can scarcely be a stronger contrast than that which exists between the clinical features of a typical case of chronic interstitial nephritis and those of an equally typical case of chronic parenchymatous nephritis. The first is most commonly a disease of middle or of past middle life, and is associated with the changes of advancing years. Parenchymatous nephritis, on the

other hand, attacks the young oftener than the aged, and is not infrequent among children. In kidney cirrhosis albuminuria is usually insignificant in amount, repeatedly is absent, and at no time is of much import as such. In parenchymatous nephritis albuminuria is steadily present and abundant. But, above all, in interstitial nephritis the patient is never waterlogged, unless from consecutive heart disease. In parenchymatous nephritis there is from the beginning a tendency to a general leakage of water into the tissues, so that it often appears first in the face instead of the feet, and the mechanism of this dropsy remains, up to the present time, wholly unexplained. Along with these conditions, anæmia occurs early and is persistent, so that in view of all these differences there can be little doubt that the systemic poisoning in the one disease is quite different in kind from that in the other.

The anatomical changes in the kidneys in these two forms of nephritis are equally contrasting. The capsule of the tough cirrhotic kidney is found to have become almost an integral part of the shrunken organ. It so dips into and adheres to the kidney substance that we have to tear away bits of this if we wish to strip off the membrane. The capsule of the large white kidney is stripped off the soft organ as readily as the rind is from an orange. It is true that these changes are not uniformly restricted to diseased kidneys of either kind, and interstitial changes may be found in parenchymatous nephritis; furthermore, kidneys which are white but not large are not uncommon. But the clinical differences still remain as marked as ever; and, moreover, in the white kidney we find conditions which readily explain why those patients are so difficult to relieve or cure. The glomeruli are pressed upon by masses of the round cells, which fairly stuff Bowman's capsules, and the tubules are choked with every kind of debris.

Now it would seem that if we only had in the kidney the double circulation of the lung, all this ruinous accumulation might be got rid of. We have interstitial pneumonia, if the lung exudates are not removed, just as we have interstitial nephritis also in the kidney if it remains clogged with inflammatory exudates; but interstitial pneumonia is rare, because in the lungs we have the double currents of the pulmonary artery and of the bronchial arteries, and between them the immense exudates of a croupous pneumonia are got rid of, usually before the stuffed air cells are damaged. In the kidneys, on the other hand, we have the one renal artery, which answers to the pulmonary artery in the lungs, and nothing more. To expect that the kidney capsule will allow enough blood-vessels to enter through it to help absorption would be even less warranted than to expect help from the blood-vessels of the pleura to assist in the removal of the inflammatory exudates in the air cells.

We seem, in this condition, to have an obstacle which wears the aspect of a mechanical obstruction quite insuperable to our ordinary medical remedial measures. The attempt to increase the outflow of watery urine by prescribing diuretics for the relief of the dropsy oftener fails than succeeds. We may temporarily succeed by trying one diuretic after another, but the cause of the dropsy remains and the œdema returns just the same as ever. All we can do, then, is to throw upon the skin and bowels the task of working vicariously for the kidneys; but in the majority of instances we make no real headway. Some patients with chronic kidney disease, with dropsy and persistent albuminuria, recover; but whether they do so on account of our therapeutics, or whether they recover spontaneously, we cannot tell.

Such conditions would suggest the advisability of having recourse to surgical measures of relief for the embarrassed renal circulation, and this subject has of late been prominently brought to the attention of the profession by Dr. George M. Edebohls, of New York. In a communication published by him in the *New York Medical Record*, March 28th, 1903, he gives reports of 51 patients, 29 females and 22 males, in whom he had performed decapsulation of the kidneys for chronic nephritis of the inter-

stitial, diffuse, and parenchymatous forms. Of these, 39 cases were more or less benefited, including 19 completely cured, none being considered cured unless they had been for six months free from any signs in the urine of diseased kidneys. For further particulars the reader should consult his paper; but there can be no doubt that this procedure was successful in a sufficient number of patients with serious renal changes to merit its extended trial by other operators.

That the beneficial result followed upon a freer circulation within the kidneys, upon the removal of the constricting capsule, there can be no doubt; but whether an additional factor exists in the development of a new supply of blood-vessels formed in the perirenal tissue after the capsule has been removed, is doubted by Dr. Harold A. Johnson, of San Francisco,¹ who decapsulated the kidneys of ten dogs and examined the kidneys at various dates after the operation. He states that a new capsule is formed about the kidneys without the development of any considerable anastomosis between the renal and the perirenal vessels. The objection to this observation is that the results of such an operation upon healthy kidneys in dogs scarcely prove that a new capsule will be formed in human subjects with kidneys so embarrassed in their circulation that new channels can be taken advantage of whenever possible, as commonly happens in hepatic cirrhosis.

In the management of a case of general renal dropsy, with abundant albuminuria, I may add that I have repeatedly observed that the kidneys start up, as it were, and carry off the water when milk and a fluid diet are given up, and solid food, including meat, given instead, with a restriction of liquids. The effects of such a change in regimen, however, should be watched carefully.

As to diaphoresis, the subcutaneous infiltration makes the skin tense and glossy, and thus closes the sweat ducts whose opening on the surface is at an angle. A thorough oiling of the skin, therefore, before using our diaphoretic measures, makes the action of the sweat glands much more effective.

William H. Thomson.

URAL; URALUM.—This drug is also known as *chloral-urethane*, and, as its name implies, it is a compound of urethane and chloral. It occurs as a white crystalline body, readily soluble in alcohol, but almost insoluble in water. It is decomposed by hot water.

Ural was introduced by Dr. Poppi, of Bologna, in 1889, as a better hypnotic for neurotic patients and the insane than are most of the drugs employed for this purpose. He considered it to be more active than urethane and more safe than chloral, and better borne by the stomach. In the hands of others it has not furnished such favorable results, and has not secured any position as a hypnotic remedy.

Beaumont Small.

URANIUM ACETATE AND NITRATE, UO₂C₂H₃O₂·2H₂O and UO₂(HNO₂)₂·6H₂O, are yellow crystalline salts which are soluble in water, and have been employed to some extent in diabetes in dose of 0.01–0.02 gm. (gr. $\frac{1}{8}$ – $\frac{1}{4}$). It is claimed that they stimulate the sugar-consuming cells of the body. The acetate has also been used as a catarrh snuff or in solution as a nasal douche. They are powerful drugs, and there is very little clinical evidence in favor of their employment at all.

W. A. Bastedo.

URESIN is a double citrate of lithium and urotropine, which, according to Kudintseff and Soanki, has the power of diminishing the excretion of uric acid and of dissolving gravel. The dose is 1 gm. (gr. xv.).

W. A. Bastedo.

URETERS, PATHOLOGY OF.—**MALFORMATIONS OF THE URETERS.**—The ureters take their embryonic origin from the lower part of the Wolffian duct. Malforma-

tions of the ureters are, on the whole, not very rare. If the kidney of one side is absent the ureter of the same side is generally absent also. Sometimes, however, in this case the ureter may exist, and then usually as a small duct. Absence of one kidney and ureter has been observed without any other malformation of the urogenital tract but kryptorchismus. Usually, however, in such cases other malformations are present, and uterus unicornis, absence of the vas deferens and a seminal vesicle, or a malformation of one side of the prostate, have been found.

Both kidneys and both ureters may be missing; in one case of this kind the fetus lived ten minutes after birth. In cases in which the kidney was but incompletely developed, the ureter also showed incomplete development. In one such case the ureter did not reach the bladder; in another it had an abnormally small lumen.

A partial duplication of the ureter is not rare, especially in its upper part. Double ureters usually unite before they enter the bladder. A perfect duplication of the ureters is rare; in such cases the points of entrance into the bladder are generally near each other. They may, however, end as much as 1.5 cm. removed from each other. Double ureter is sometimes combined with a horseshoe kidney; in such a case three or even four ureters may apparently originate from one kidney. Sometimes two ureters end in two separate parts of one kidney on the same side. In this case the ventral ureter connects with the lower and ventral kidney, the dorsal ureter with the dorsal kidney, situated nearer the diaphragm. The first ureter enters the bladder at a higher level than the second ureter. This arrangement is similar to the one found in a doubling of the Wolffian duct. In the case of doubling of the ureter the pelvis of the kidney may also be double, or may be single; the latter occurrence is, however, much less frequent. Double ureters may be found on both sides or on one side only.

Of clinical importance are congenital valvular projections of the mucous membrane of the ureter, which are sometimes met with. These may be found in all parts of its course, especially, however, at the place of its entrance into the bladder and pelvis. If the concavity of such projections is directed toward the kidney they may obstruct the flow of urine and cause hydronephrosis. Such valves may become fixed by external adhesions. Congenital torsion of the ureter may have a similar significance.

Besides a valvular obstruction a congenital stenosis or atresia has been found, especially in the lower part of the ureter. It may be followed by a great dilatation of the upper part of the ureter and by a forward bulging of its lower part either outside or inside the bladder. In the latter case such a diverticulum may cover the internal meatus of the urethra. Such diverticula of the ureter have, however, also been found in cases in which the ureter was patent.

The ureters may enter the pelvis of the kidney in its centre instead of at its lowest point. Under these conditions the collection of urine in the lower part of the pelvis may entirely occlude the opening of the ureter. A similar result may be produced if the insertion of the ureter into the pelvis is an oblique one. A projecting part of the ureter may become pressed against the opposite side of the wall of the ureter by the collection of urine. Instead of running straight down to the bladder the ureter may be bent in its further course so that it forms an angle.

The ureter may enter the bladder higher up than is normal, or it may end in the urethra (colliculus seminalis), in the vesiculæ seminales (in the male), or below the external meatus of the urethra and in the uterus or vagina (female). A double ureter may have one normal and one abnormal ending.

INFLAMMATION OF THE URETERS.—Inflammation of the ureters rarely starts in the ureters themselves. This may, however, be the case if a calculus becomes impacted in a ureter, or if during labor the ureters become compressed and injured. The mechanical lesion may be

¹ *Annals of Surgery*, April, 1903.