

with the irrigator raised only four feet above the bowel, and it is probable that three feet is very near the limit of safety.

D'Arcy Power ("Some Points in the Anatomy, Pathology, and Surgery of Intussusception," 1898) recommends that in all cases of the common form of intussusception the routine treatment should be to irrigate the colon with salt solution at 100° F. under a pressure of not more than three feet of water, the liquid being allowed to act for at least ten minutes, while the patient is under chloroform. When this fails, the surgeon must at once proceed to open the abdomen. Similarly laparotomy is necessary, when, as sometimes happens, the invagination can be reduced by injection, but quickly returns. He does not consider that inversion of the patient renders irrigation more successful, and he is satisfied that long-continued distension under a low pressure is of more avail than rapid dilatation under a high pressure. The surgeon should keep one hand flat upon the abdomen whilst irrigation is being performed, and he must carefully avoid great variations of pressure. A sudden and uniform enlargement of the whole abdomen during irrigation raises the suspicion that rupture of the bowel has occurred, and the abdomen should in any case at once be opened. The length of the intussusception is no bar to its reduction by irrigation, and success may be obtained even when the ilio-cæcal valve is beyond the anus.

He shows further that the capacity of the colon is very variable. In a child of five months it was distended with ten ounces, while in a child two months older thirty ounces were required.

## DISEASES OF THE KIDNEYS, DIABETES, ETC.

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A good deal of work has been done during 1898 on urinary pathology and treatment. At the Edinburgh meeting of the British Medical Association an important discussion (an abstract of which is given) took place in the Pharmaceutical Section, on the treatment of chronic renal disease. The general tendency of the discussion was to deprecate efforts to cure the disease by means of drugs, but to enhance the value of general hygiene and diet in preventing the progress of the disease. Professor Ewald, of Berlin, described his method of drawing effusions from the limbs and cavities, and advocated more frequent tapping. Papers on nephritis are fairly numerous. Senator discusses the pathogenesis of chronic nephritis, while Bradford describes what he considers as a new form of Bright's disease occurring in young women. Considerable attention has been paid by the French school of physicians to the question of "renal permeability," as shown by the subcutaneous injection of aniline colours.

Pavy, in the supplementary Croonian Lecture, restates and expands his views on the pathology and treatment of diabetes. However much some physiologists may disagree with Pavy, still any statement or theory coming from one of so wide and varied an experience of diabetes, must be received with attention and interest by physicians. A considerable number of drugs have been used in diabetes by different observers, and their results are recorded. Abstracts of a number of articles on different urinary questions are given.

### I.—NEPHRITIS AND ALBUMINURIA.

#### **1. Discussion on the treatment of chronic renal disease.—Sixty-sixth annual meeting of the British Medical Association, Edinburgh, July, 1898.**

The discussion was opened by Dr. Nestor Tirard, London, who took two types of chronic renal disease—renal cirrhosis and chronic nephritis, two conditions which provided ample field for the dis-



cussion of hygiene and diet. Could we, he asked, by any hygienic change or by any dietetic measures, modify the course of these conditions? Could we by these means retard the disease, or was it possible to exert any curative effects? Or, on the other hand, were our efforts to be limited solely to the relief of prominent symptoms as they arose?

In chronic nephritis there was a tendency to the occurrence of subacute attacks with but small provocation. Hygienic treatment must be directed towards diminishing the risks and frequency of those attacks. Sudden alternations of temperature must be avoided. If the patient could not winter abroad, care should be taken that he was clad in woollen garments, and that a woollen "cholera belt" was worn. In both types of chronic renal disease the prejudicial influence of over-exertion and mental strain must be carefully avoided. A life of idleness was not called for, however, and was likely to be deleterious on account of the tendency in those cases to mental depression. As regards the question of diet, chronic nephritis probably called for greater care than renal cirrhosis, since the drain of albumin was greater, and carelessness, more particularly in regard to alcohol, was likely to favour the supervention of subacute attacks. In both forms it was possible to prejudice the well-being of the patient by undue restrictions. If the albuminous excretion in the urine was fairly constant, there was no advantage to be gained from a strictly non-albuminous diet; while, on the other hand, there might be considerable disadvantage in endeavouring to force the patient to exist on a distasteful dietary. The liability in such cases to dyspeptic troubles must always be borne in mind. With regard to the use of alcohol, the speaker thought it better not to interfere with the ordinary habits of the individual, provided those habits did not lead to the excessive consumption of stimulants. A little alcohol with meals might encourage the appetite and aid digestion; it was best taken in the form of pure spirits well diluted. Dietary, then, in chronic nephritis and renal cirrhosis, must be planned to avoid further extension of the disease, the utmost that could be hoped being arrest rather than cure.

With regard to medicinal treatment, there was little to be hoped from the treatment of the disease as an entity; symptoms must be treated as they arose. Apart from uræmia, three conditions had to be coped with: diminution in the urinary secretion, albuminuria, and dropsy. The first and last, being closely associated, could be treated simultaneously. If the condition was due to a subacute attack, it must be treated like an acute nephritis. When there was no active engorgement diuretics, such as digitalis and

strophanthus, might be of great service—preferably digitalis. Of all diuretics, water was the best, and could be given freely, unless it was found that the dropsy increased while the elimination of urine showed no change. With regard to loss of albumin, the drugs most in use to reduce the albumin excretion belonged to the class of astringents. The salts of iron perhaps gave the best results, but all the drugs in use had the disadvantage of favouring indigestion. It was more desirable to watch the general condition of the patient than to fix the attention on the albuminuria. The treatment of dropsy was carried out by diaphoretics, diuretics, and hydragogue purgatives, and in extreme cases by surgical means. The skin should be encouraged by wet packs, hot water or hot air baths, combined with copious draughts of water. Pilocarpine, if used at all, must be used with great care on account of its toxic effects. Of diuretics which favour the removal of dropsy, the salts of sodium, potassium and lithium, seemed to give the best results. With cirrhosis of the kidney, treatment must be purely symptomatic. One of the most prominent symptoms is persistent headache. For the relief of this, nitroglycerine, trinitrine, or nitrite of sodium should be employed, or erythrol tetranitrate, which had a more permanent power in lowering the arterial tension. Sleeplessness was sometimes a prominent feature, and for its relief the use of hypnotic drugs demanded considerable caution. Much difference of opinion prevailed with regard to the use of opium. The speaker himself was averse from its employment for the relief of insomnia due to renal cirrhosis. Much benefit might be derived from hyoscine in very small doses. Sulphonal and paraldehyde also gave good results, and in the case of sulphonal, the dose could be reduced after the habit of sleeplessness had been overcome. Passing next to the consideration of uræmia, the speaker discussed first the treatment of gastric and intestinal symptoms, and then passed on to the consideration of acute uræmia. In the acute attack, nitrite of amyl and the nitrites had not been found of much value. Chloroform had been used, but required considerable caution on account of the weakened cardiac action. The treatment by purgatives and diaphoretics was more hopeful, and of those remedies croton oil was the most useful.

Professor Dr. C. A. Ewald, Berlin, discussed the question of the removal of transudates by mechanical means, by scarification, puncture, etc., and considered that none of the usual methods were carried out energetically enough, and too many inconveniences were attached to them. Puncture for ascites and pleural effusion was done too seldom. Several weeks were allowed to elapse



between the punctures, the fluid collected again, there was danger to the patient, and reabsorption of the fluid was rendered extremely difficult by pressure exerted upon the blood- and lymph-vessels of the pleura and peritoneum by the presence of the fluid. The endothelium of the serous membranes suffered in its nutrition, and the organs contained in the cavities were compressed and their functions disturbed. Under these circumstances puncture should be carried out as often as there was enough fluid present to make it possible; in this way, combined with proper treatment of the œdema, the "cure" of nephritis could be brought about in a number of cases. The drainage of the œdema could be effected by inserting long needles into the subcutaneous tissues as far as possible parallel to the skin, the part that projected being covered with salicylic wool and iodoform collodion. To the end of the cannula a rubber tube should be attached, which could hang down alongside the bed into a vessel to receive the fluid. By means of a safety-pin the rubber tube should be attached to the mattress to avoid pulling upon the needle. Into each leg one or more needles were inserted, and thus 3 to 5 litres could be drawn off in a day from the legs, abdominal wall, and scrotum. Antiseptic precautions must, of course, be observed. In only one case had the speaker seen any serious accident occur. Erythematous conditions sometimes set in, but disappeared promptly under an alcoholic bandage. In this way enormous amounts of fluid could be drawn off, and the drain of albumin was but insignificant. Discussing uræmia and uræmic convulsions, the speaker thought that the use of venesection was too much neglected.

Dr. Barr, Liverpool, gave it as his opinion that the albumin and urea excreted were not to be regarded as of importance. It was not what was excreted, but what was retained which was to be considered. It was of importance to give the kidneys rest. The question was mainly one of dietetics, and was best answered by a carbohydrate diet pure and simple. Referring to the use of pilocarpine, he regarded it as a very dangerous drug. The amount of water eliminated from the system might prove decidedly harmful, and in cases where the patient was unconscious and could not get rid of the poison, so great was the increase of the various secretions that the patient was practically drowned in them. The necessity of improving the vascular condition of the patient should be insisted upon.

Professor Saundby, Birmingham, agreed with Professor Ewald as to the need of early tapping in the case of dropsy in renal disease. He had found much benefit from careful elevation of the limb, massage, and the application of a bandage, in ridding the

part of chronic œdema. Though he did not reject venesection in the treatment of uræmia, he seldom employed it. The injection of water into the rectum produced beneficial results in diminishing the intoxication. With regard to alcohol he advocated abstinence.

Dr. Ewart, London, in discussing the treatment of dropsy advocated the gravitation of the fluid by raising the head of the patient's bed 6 to 8 inches. Deep incisions should then be made near the ankle with due antiseptic precautions, and the drainage kept up as long as possible with the help of a liberal supply of beverage. An exclusively milk diet should be adopted at first, but this could soon be exchanged for a liberal and varied dietary, under which the albuminous character of the serum was gradually restored, and the patient's strength improved. As long as free drainage was kept up the feeding might be maintained without any risk, and the urinary flow was increased.

## 2. The pathogenesis of chronic nephritis.

Senator (*Berlin. klin. Wochenschr.*, 1897, No. 38), discussing the pathogenesis of chronic nephritis, concludes that chronic nephritis results as a rule from an error in the constitution of the blood, which error depends upon different causes and varies in nature. Chronic inflammation can result from an acute nephritis and have a similar origin. Acute nephritis, however, improves as the cause subsides, while the chronic progresses from the beginning, more or less gently passing from the acute to the subacute, subchronic and chronic. The causes of the acute and the chronic may be identical save that their action in the chronic variety is less powerful, slower, and more insidious. The commencement of the acute and subacute inflammation is either in the parenchyma alone, on the subsidence of which a secondary interstitial inflammation with increased fibrous formation manifests itself, or else parenchyma and interstitial tissue are from the first affected together. In either case the condition ends in the so-called granular contracted kidney. In chronic interstitial nephritis or genuine primary contracted kidney, it is possible that the inflammatory process begins first in the interstitial tissue, and that the parenchyma is affected secondarily. A very common form of chronic nephritis leading to induration and shrinking, formerly looked upon as a primary kidney cirrhosis, depends upon a primary arterio-sclerosis from which the inflammatory changes in the tissues result, or else there is an arterio-sclerosis, with at the same time a parenchymatous change. This arterio-sclerotic form of contracted kidney depends not so much upon an error in the composition of the blood as upon a deficiency in



the blood supply. This is the type of the senile kidney, and should not be classed with the pure hæmatogenous chronic nephritis.

### 3. On a form of Bright's disease occurring in young women.

Bradford (*The Practitioner*, April, 1898, p. 359) discusses what he considers an anomalous form of Bright's disease, of which a series of cases have come under his notice during five years of hospital work. The kidneys in these cases were small, usually averaging some 3 oz. apiece, occasionally less. The capsule was considerably thickened, but stripped off readily without tearing the kidney substance, offering in this respect a marked contrast to what is seen in the granular kidney. The surface of the kidney was, however, extremely irregular, the granulations being approximately  $\frac{1}{16}$  in. in diameter. The cortex was greatly diminished, and the distinction between the cortex and medulla was frequently lost. The surface of the kidney and the section of the cortex both presented a mottled appearance. The medulla was congested. An account of six cases is given. In all the six cases the patient at first sought advice for comparatively trivial symptoms, but death ensued very rapidly from various forms of acute uræmia. In all but one albuminuric retinitis was present. In all dropsy was absent during the last illness, and in only one of the six was there any history of dropsy. In five of the cases the onset of the disease was so gradual that the patient could not date it. The characters of the urine were peculiar. A quantity equal to, or even considerably greater than, the normal was passed, containing a high percentage of albumin. The specific gravity was low, and the quantities of urea excreted were moderate, considering the vomiting, diarrhœa, etc. The author considers that the fact that the abundant dilute urine contained a large quantity of albumin separates these cases from granular kidney, inasmuch as their history lent no support to the view that they were cases of renal cirrhosis complicated by an intercurrent attack of acute nephritis; and further, the *post-mortem* characteristics of the kidney were quite different from those of the granular kidney. The *post-mortem* characteristics of the kidney and the characters of the urine secreted during life justify the cases being placed in a distinct class of Bright's disease—a chronic and insidious malady rather than the sequel of an acute nephritis that has not been recognised. All the cases had well-marked albuminuric retinitis. All the cases terminated with acute uræmia, and in only one was there any considerable suppression of urine. The author thinks that they form a distinct clinical variety, which can be recognised

and separated from the granular kidney on the one hand and the so-called chronic Bright's disease (either large white or small white kidney) on the other.

### 4. The elimination of urinary potash in nephritis.

Charrier (*Comptes Rendus Hebdomadaires de la Soc. de Biolog.*, 1897, vol. iv., p. 972) gives an account of an interesting research carried out in the laboratory of Professor Guyon, on the elimination of potash salts in nephritis. The analyses were done on the urine of twenty-four hours, over a period of eight days. Ten patients were under observation. In three cases there was marked retention of potash. In one of the three, where the elimination was markedly diminished, a notable proportion of potash salts was found in the vomited matter. In three cases there was an increased elimination; one, indeed, eliminated during three days 6 grm. of potash. Some time afterwards the amount of potash eliminated by this patient fell below the normal. In this case the period of increased elimination coincided with an amelioration in the symptoms, and was possibly due to a rigid milk diet. An interesting observation was made on the comparative elimination by a healthy kidney and by a kidney affected with pyonephritis. The diseased kidney eliminated two and a half times less potash than the sound one.

The author concludes that in most cases of nephritis there is a slow and progressive poisoning of the organism by potash salts. Potash seems to play an important part in the complications of nephritis. Discharge of the potash seems to take place under the influence of milk diet. The ordinary dietary of a case of nephritis bears out the view that potash has a deleterious effect. Those articles of food containing little potash and having a diuretic action, such as milk, are allowed. The articles forbidden by experience are found to contain a large proportion of potash. Observations on the potash elimination in health are given.

### 5. Chronic nephritis and albuminuria in infants.

Heubner (*Gazette Hebdomadaire*, No. 70, 1897) finds that, as an ætiological factor in chronic nephritis in children, the infectious diseases play an important part. Out of thirty-eight cases, twenty-five followed scarlatina; the others diphtheria, influenza, measles, and other forms of infection. The symptoms of chronic nephritis in children are little accentuated. It is rare to find headache, insomnia, or vomiting. The sufferer shows general malnutrition and anæmia. In no case was there œdema, or retinitis, or manifest hypertrophy of the heart, with increased vascular tension. The diagnosis must be made by examining the urine. The quantity of urine remains about normal, the specific gravity is diminished,



the reaction is always acid. The quantity of albumin does not usually exceed 1 part per 1,000. Casts are present, hyaline and a few waxy, never granular nor epithelial. The albuminuria is sometimes cyclic, sometimes intermittent in character. The course of the disease is essentially chronic. **Auffrecht** has published a case where the nephritis acquired when nine years of age was verified by *post-mortem* examination nineteen years subsequently. **Mann** had a case, scarlatinal in origin, acquired at fourteen years of age; death resulted from uræmia at forty-two. Recovery is possible; in one case it occurred after the albuminuria had persisted for seven years. The treatment, **Heubner** considers, should consist simply in attention to general hygienic considerations and the avoidance of cold. It is inadvisable to change the diet and the life of the child. Drugs, he considers, have no influence on the nephritis.

#### 6. Methylen blue in nephritis.

**Kramer** (*St. Petersburger med. Wochenschr.*, No. 20, 1898) quotes some cases of hæmorrhagic nephritis, and strongly advocates the use of methylen blue. In his hands it proved very efficacious, the blood and albumin rapidly disappearing from the urine.

[The drug has previously been employed by French physicians ("Year-Book, 1896," p. 110). Its action is principally of a diuretic nature. It may be prescribed in capsules, 5 grains in each, given thrice daily. No unpleasant effects have been noted from its use.]

#### 7. Diet in cyclical albuminuria.

**Von Keller** (*Jahrb. für Kinderheilk.*, 1897), investigating the value of diet in cases of cyclical albuminuria, discusses the value of a purely milk regimen, and the influence of diet on the albumin excretion. Five patients were under observation. They were kept for a period on a purely milk diet, and then for a second period on a mixed diet, the general conditions being identical during the two periods. The quantity of the urine, its specific gravity, and the amount of albumin excreted in the 24 hours were noted. It was found that milk diet had no marked influence either on the albumin excretion or on the amount of urine. The author concludes that in cyclical albuminuria a mixed diet is to be advised.

[The present tendency is to regard cases of cyclical albuminuria as in reality a nephritis of a mild character, in which a cure may be hoped for. To place such cases on a purely milk diet is to demand an unnecessary sacrifice from the patient, and may have a deleterious effect upon general nutrition,

and thus be hurtful rather than beneficial to the kidney condition. Even in cases where a more grave inflammation is present in the kidney, a strict milk diet is by no means always advisable, for, as **Hale White** has shown (*Med.-Chirurg. Trans.*, vol. lxxvi.), in many cases a liberal diet is beneficial and does not increase the liability to uræmia, if the diet be kept within reasonable bounds.]

#### 8. Nucleo-albuminuria.

**Haushalter** and **Guérin** (*Comptes Rendus de la Soc. de Biologie*, 1898, No. 20) recount an interesting case of nucleo-albuminuria. The patient, a child four years of age, was brought to the clinic on account of a cough. Some consolidation of the right apex was discovered. The urine was abundant, clear, at times pale, at times highly-coloured. No tube casts or formed elements could be found. Boiling gave no precipitate. On the addition of a little acetic acid in the cold a distinct cloud was produced, which was not increased by heat. The cautious addition of hydrochloric acid produced a slight cloud, which rapidly disappeared on the slightest excess of the acid. The addition of trichloroacetic acid and picric acid produced a distinct precipitate. During the course of observation the amount of nucleo-albumin reached 3 grammes per litre. When the child improved under suitable hygiene and rest the proteid disappeared rapidly. The authors consider that the presence of transitory nucleo-albuminuria points to the existence of tuberculosis.

#### 9. Albumosuria.

**Bradshaw** (Royal Medical and Chirurgical Society, April, 1898) recounts a peculiar case of albumosuria in which the albumose was spontaneously precipitated. The patient, a man 70 years of age, had a good personal history. For nearly a year he had passed, two or three times a week, turbid urine of a milky appearance, which deposited a copious amorphous sediment, giving the reactions of a proteid body. At other times the clear urine contained a proteid of the nature of an albumose, which appeared to be the same body as was precipitated in the turbid specimens. The spontaneous precipitation was coincident with an increase in the acidity of the urine. The albumose seemed to coincide with the body described first by **Bence Jones**, and since described in some five cases. The patient, as in other cases described, showed signs of bone disease.

**Rosin** (*Berlin. klin. Wochenschr.*, No. 48, 1897) records an interesting case of albumosuria. The patient was admitted for cough, pain in the back, and general weakness. On examining the urine an albuminous body was found, which, on further investigation, proved to be albumose. The urine contained numerous casts



and epithelial cells from the kidney. On *post-mortem* examination changes were found in the kidney which appeared to be more of a degenerative than of an inflammatory nature. The condition in the thorax was of interest. In several of the ribs a new growth was found, which proved to be of a myeloid sarcomatous nature. Was the sarcoma of the thorax to be looked upon as the cause of the albumosuria? The author thinks so, and finds confirmation in the record of similar cases in the literature of the subject. He concludes that the presence of albumose in the urine may prove a sign of diagnostic value in cases where sarcoma of the thoracic bones is suspected.

#### 10. A new method for the demonstration of albumose in the urine.

Bang (*Deutsche med. Wochenschr.*, 1898, No. 2) recommends the following procedure for the recognition of albumose in the urine: Take 10 c.cm. of urine, mix in glass with 8 gm. ammonium sulphate, and heat till all the salt is dissolved. Centrifuge. The precipitate thus obtained contains albumin, albumose, urobilin, some uric acid and urinary salts. Wash with alcohol, to remove the urobilin. Dissolve the remaining precipitate as far as possible in a little water, filter, and the filtrate contains the albumose, which can be demonstrated by the biuret reaction. The author claims that in this way albumose can be demonstrated when present in a quantity as small as 1 in 4,000 to 1 in 5,000.

[There is nothing new in the procedure, save the adaptation of the centrifuge to the ordinary procedure for separating albumoses by saturation with ammonium sulphate and heat.]

#### 11. Renal permeability.

Considerable attention has been devoted during 1898 to renal permeability in different diseases. Bard (*Lyon Médical*, No. 1, 1898), using the subcutaneous injection of methylen blue and iodide of potash, finds that in healthy individuals the drugs appear in the urine in about half an hour, and the excretion continues for thirty-six to forty-eight hours. In cases where there is disease of the renal epithelium with secondary interstitial changes the excretion begins earlier, and does not last so long. In primary interstitial nephritis, the excretion is delayed and is irregular. Iodide of potash can only be injected in small quantities, for iodism is easily set up.

Lépine (*Lyon Médical*, No. 8, 1898) advises the use of rosaniline trisulphonate of soda, an intense red pigment, in hypodermic doses of 0.01 gm. In cases of Bright's disease there is not only delayed excretion, but also deficient excretion of the colouring matter. He considers that the results obtained by Bard in

parenchymatous nephritis, where the excretion of methylen blue was rapid and of short duration, are not due to increased permeability of the kidneys, but to diminished elective power of the cells, that is to say, that the cells of the convoluted tubes are no more able to reabsorb non-excremental products from the fluid coming from the glomerulus. In the healthy condition, part of the colouring matter is reabsorbed by the tubular epithelium. In support of this is the fact that all the colouring matter injected cannot, in a healthy individual, be recovered from the urine.

Dreyfus (*Lyon Médical*, No. 19, 1898) advocates the use of rosaniline as possessing many advantages over methylen blue for subcutaneous injection.

Fränkel (*Presse Médicale*, May, 1898) gives observations on forty-two cases of cataract, and finds there is considerable variation in the renal permeability, even when there is no apparent kidney lesion.

Castaigne (*Gazette des Hôpitaux*, No. 66, 1898) goes fully into the literature and technique of the procedure, and gives extensive observations in different morbid conditions. Intermittent elimination was never found in patients suffering from nephritis, but was present when there were signs of "hepatic insufficiency." Prolonged elimination (five to six days), with passage of the blue during the first hour, points to a partial alteration of the kidneys, part, however, retaining a normal permeability. Delayed appearance of the colour points to a deficient power of elimination on the part of the kidneys. It is a physiological proof that the kidneys are no longer carrying out their normal excretory functions efficiently.

#### 12. Renal tuberculosis.

King (*Medical News*, II., 1897) reports an interesting case of genito-urinary tuberculosis. The patient, a girl thirteen years of age, had been treated by several medical men for emaciation, pain in the abdomen, and incontinence of urine. When seen, a large, round, soft and fluctuating tumour was found filling the right side of the abdomen. The external genitals were swollen and exquisitely sensitive, and eroded patches were present on the walls of the vagina, and about the meatus. The urine contained pus, epithelial and granular casts, and large numbers of tubercle bacilli. The patient rapidly sank and died. *Post-mortem*, no tuberculous foci were discovered in the thoracic organs. The mesenteric glands were enlarged and tuberculous. On the right side, the tumour which occupied almost the entire cavity of the abdomen, displacing other organs, proved to be the distorted remnant of the right kidney. All trace of kidney structure proper was lost,



and the mass was simply a fibrous pus-secreting capsule, about six inches long by four inches wide, filled with pus, communicating with the bladder by a thickened ureter. The pus contained tubercle bacilli, bacilli coli communis, and streptococci. The left kidney presented evidences of subacute parenchymatous nephritis, but not of tuberculosis. The bladder wall was thickened, the mucous membrane eroded, at several points showing ulcers with raised and overhanging edges. The author considers that the case shows (1) that renal tuberculosis may be idiopathic; (2) that it may be confined to the kidney; (3) that the golden opportunity for cure is lost in the failure to recognise the disease in its early stages before the bladder is involved, and when a nephrectomy would promise the best results.

## II.—DIABETES.

### 13. Pathology and treatment of diabetes.

Pavy, in a Supplementary Croonian Lecture (*British Medical Journal*, II., 1897, p. 1494), reiterates and expands his views on points in connection with the pathology and treatment of diabetes. The questions first presented for solution are: How does carbohydrate normally become disposed of in the system? What is it that gives rise to its unnatural escape in the urine?

It has hitherto been believed that the carbohydrates undergo oxidation in a direct manner in the system; that the liver was endowed with a glycogenic function, which provided a supply of sugar to be conveyed to the tissues for oxidation when carbohydrate matter is lacking in the food. The systemic blood conveying the sugar must pass through the kidneys in part, and it was believed that the capacity for tolerating a certain amount of sugar in the blood existed, but if the sugar rose above a certain proportion it was excreted in the urine. No such toleration can be admitted to exist; if sugar is present in the blood it will be eliminated by the kidneys. For freedom from diabetes, carbohydrate matter must be prevented from reaching the general circulation as sugar. Conversion of the carbohydrate matter must take place between the alimentary canal and the point where the portal blood-stream obtains entrance into the general circulation. Most physiologists believe that the alimentary sugar is converted by the liver into glycogen. The author cannot agree with this view. He considers that the first influence exerted on the ingested carbohydrate is by the ferments of the alimentary canal, which hydrolise and convert the insoluble into a soluble form, and thus prepare for absorption. On being absorbed, the carbohydrate is brought within the sphere of influence of living matter. In the

villi, which constitute the seat of absorption, there are active cells with which the absorbed carbohydrate falls into close relation, and subsequently it permeates the cellular structure of the liver, which thus, as it were, stands in a position to exert a supplementary action, and to complete, before the general circulation is reached, whatever may have escaped completion in the villi. If the disposal of carbohydrate by the exercise of protoplasmic power should not be properly effected—if, in other words, the circumstances be such as lead to the faulty accomplishment of protoplasmic action; or, if even with a natural state existing, as far as the system is concerned, it should happen that the system is unduly taxed by the ingestion of an exceptionally large amount of carbohydrate in a readily absorbable form, especially at a period of fasting, sugar will be permitted to reach the general circulation, and in proportion as this occurs, sugar will be found in the urine. Carbohydrate which escapes being transformed into fat or synthesised into proteid by the villi of the intestine is carried to the liver, there to be transformed into glycogen, and stored up to be gradually transformed into fat or synthesised into proteid. That it should be retransformed into sugar, to be discharged into the general circulation and conveyed, as such, to the tissues for oxidation is, Pavy considers, incompatible with the condition of the urine in health. The conversion of carbohydrate into fat is illustrated in the rabbit, after a full meal of oats, when the lacteals can be seen to be engorged with milky chyle, the fat in the oats being quite insufficient to account for the phenomena, the carbohydrate, according to the author, having been converted into fat by the villi of the intestine. The villi of the intestine are thus of great importance in relation to the assimilation of food. Within the villi an extensive building-up of proteid goes on, through the instrumentality of protoplasmic action, and a synthesis of carbohydrate into proteid matter, and the proteid-carbohydrate matter is then placed in a position to be susceptible of transport through the body. In the graver form of human diabetes, as well as in experimental pancreatic and phloridzin diabetes, sugar is drawn from a source other than the food, from the locked-up store of carbohydrate which exists, ready to be set free when the requisite agent for effecting the purpose is present. After every meal it has been shown that there is an increased amount of sugar in the portal vein. If no further provision for conversion of this sugar existed, glycosuria must be produced. The liver, however, intervenes, and a supplementary action checks the flow of sugar into the general circulation. If the supplementary action is incomplete, the blood and urine are