

immediately sucked up into the tube; then the upper end is closed again by the finger, so that the contents of the tube cannot escape, and this is withdrawn from the fluid. It is then held over a perfectly clean glass slide, and a little of the sediment is permitted to escape from the tube on to the glass, is covered by a small circle of very thin glass, and is then ready to be placed under the microscope. Any sediment of the urine can be easily examined in this manner, and thus facts can be learned which are often most instructive. For example, there may be found under the microscope what are called "casts." These are really moulds of the tubules of the kidney. They are formed by the fibrine of the blood coagulating in the tubes, and finally being washed away by the urine. Sometimes blood is found entangled in the tube-casts, and, as a rule, in patients who are suffering from acute disease of the kidney substance. The deposit may consist of crystals of uric acid; or of oxalate of lime, which have characteristic appearances resembling those of a closed envelope or of a dumb-bell. Some crystals of urate of soda look like a hedgehog, and those of the triple phosphates have a feathery, or a transparent prism-like, shape.

It is a useful precaution that urine which has to be examined microscopically should be withdrawn from the bladder by a perfectly clean catheter, and should immediately be placed in an absolutely clean conical glass, and covered over by a glass slide so as to prevent foreign bodies from the air contaminating it. There are four principal forms of "casts," and these are significant of different kidney diseases—the transparent or waxy casts are usually found in chronic diseases of the kidney; the cellular casts which show that the disease is of recent date are usually found in acute Bright's disease; granular casts are found in those cases of contracted kidney which are so frequent amongst gouty patients; and, finally, the fatty casts are significant of the disease known as fatty kidney.

A chief part of the work of the kidneys is to excrete the poison known as UREA, a substance mostly composed of nitrogen, and the form in which the greater part of the waste nitrogen from the body is thrown off; just as the lungs remove from the system the greater part of the carbon which is derived from the waste of the tissues. In twenty-four hours, there

should be eliminated by means of the kidneys about an ounce and a quarter of urea; and if anything prevents this excretion the patient will probably sooner or later suffer from the signs of poisoning known as Uræmia. It is an interesting fact that an ounce and a quarter of urea contains nearly the whole of the three hundred grains of nitrogen which, as it was pointed out in the Lecture upon Digestion, are necessary to make up for the waste of this substance from the body. If, then, a larger quantity of nitrogenous food is taken, an equal amount of urea and its compounds must be excreted, or the system will soon suffer from the effects of their retention. For example, uric acid will be deposited in various tissues of the body, especially around the joints, and this probably is the reason why our forefathers suffered so greatly from gout. They ate large quantities of meat, drank large quantities of malt liquor, and took very little exercise, and thus prevented the nitrogen from being properly excreted; and so the uric acid accumulated in their tissues until some chill or slight blow brought about an attack of joint inflammation. Then they were placed on low diet, and medicines were given which had the effect of clearing away much of the uric acid; and so it was a common saying that their condition was the better after a "good healthy attack of gout." Nowadays, when people eat less meat, and more vegetables and fish, take more outdoor exercise, and drink considerably less than formerly, gout is much less frequent than it used to be.

When a patient is suffering from any form of kidney disease, and especially if the amount of the urine becomes much less than normal, it is of the greatest importance to discover whether the proper quantity of *Urea* is being thrown off; if not, measures are usually taken by means of medicines and, if necessary, of hot fomentations across the loins, to stimulate the kidneys to increased activity, and, at the same time, to make the skin take on increased action also, and thus to some extent to relieve the kidneys of their work. One of the most effective methods to obtain this is the administration of a hot-air bath; the patient practically being placed—in bed and between the blankets with the heated air surrounding him—as though he were in a Turkish Bath, and thus free perspiration is excited.

(To be continued.)

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