

## Clinical Notes on Some Common Ailments.

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### NEPHRITIS.

We now come to some diseases of the kidneys, and though, as will be seen, not all of the wrongdoings of these organs are due to inflammation of their substance, it will yet be convenient to describe them all under the generic name of nephritis, and to point out the exceptions to this classification subsequently.

In order to understand what happens when the kidneys go wrong, we must first see how they do their work in health, and the key to this is to remember that they are essentially filters where certain waste products, which are circulating in the blood, are removed and passed out of the body in the form of urine. There, however, the resemblance ceases, for a filter in the ordinary sense of the word is a lifeless machine, while one of the most marked features of the kidneys is the way in which they are constantly altering their rate and manner of the filtration under the control of the nervous system, as will be seen subsequently.

We know that as the blood circulates through all the different parts of the body—the tissues as we call them—it not only gives up to them its fresh food, the result of digestion, but is also continuously receiving the waste matter which is the outcome of the wear and tear all over the body, just as ashes are the product of a burning fire: obviously a mechanism is necessary for removing these ashes.

Now these waste products are of many different kinds, though they all contain nitrogen, and, as the blood circulates, they reach the liver, where they are converted into a substance called urea, and the kidneys have to take this out of the blood along with waste water and some salts and a little colouring matter, which all together make up the fluid urine. In a healthy adult, the quantity of this which is passed in the twenty-four hours is about fifty ounces.

How do the kidneys do this? Omitting details, we may consider each kidney to be made up of a number of separate filtering systems, each of which consists of a tube with its attendant blood vessels. Each tube is lined with a layer of cells, and receives blood from a branch of the artery going to the kidney—the renal artery—so that the blood passes from the little artery through the substance of the cells and out again into the renal vein; in its passage through the cell water, salts, and urea are sucked out of it by the cell, and passed into the tube which ultimately joins a collecting tube called the ureter, which conveys the urine

into the bladder, where it is stored until it can be conveniently passed. Each cell has also a tiny nerve filament, whereby its action is regulated by messages from the brain and spinal cord; in practice the rate at which the kidney works is determined by the nerves which act on the blood vessels, causing them to expand (and so give the cell more blood) when a great flow of urine is required, and to contract when less work is demanded of the kidney.

Another point which we must bear in mind is that the skin is also an excretory organ, and that the kidneys work with it, so that when the skin is acting freely, as in hot weather, the kidneys are comparatively idle, and *vice versa*. If anything happens to cause the skin to stop working temporarily, such as the sudden immersion of the body in a cold bath, the kidneys have a great deal of work suddenly thrust upon them, so we can see the necessity for the nervous mechanism which regulates their action.

So much for the healthy kidneys; let us now see how and why they can go wrong. In the first place, they can either become acutely inflamed, or they can gradually lose their power of efficient filtration as the result of continual strain or ill-usage; let us take the acute inflammations first.

These occur either as the result of a chill, or from the action of the poisons produced by certain diseases, notably the acute infections such as scarlet fever, enteric fever, and the like: Other poisons, such as turpentine, often have a like effect. When the disease is due to chill, the cells lining the tubes are affected, and we have the so-called tubal nephritis, but in scarlet fever, the change is mostly between the tubes—interstitial nephritis—and the disease is usually not so intense, for in the latter case, the tubes are only pressed upon (though rendered inactive for the time) while in the former they are themselves damaged, and the mischief is more frequently permanent.

Now, the effect of the inflammation, wherever it is, is that the tubes instead of being living things with the power of selection which we have described, become inactive, so that we have a two-fold effect, in that they do not take out of the blood the things that they should, and they let unchanged blood pass through them. The circulating blood has, therefore, an excess of urea in it (and the urine contains but little urea), and also blood itself, or the serum albumen which the blood contains, is found in the urine. Beyond some degree of anæmia from loss of blood, the latter process is not as important to the patient as it is to the physician, to whom it is a valuable means of detecting the disease, but to the patient the

[previous page](#)

[next page](#)