

hypothesis than that it is connected with the hardness of the water, for the food, clothing, habits of life, climate, etc., do not differ from the people around them. Dr. Roberts points out that a certain district, a suburb of Manchester, has furnished a considerably smaller number of cases of stone since the use of softer water supplied by water-works has taken the place of hard well water, and he gives no other explanation of the falling off in the number of cases.

Professor Gamgee draws attention to the fact that sheep pastured in limestone districts are particularly prone to become the victims of calculus, whilst under other conditions it is a rare affection amongst them.

In Finland, stone is an almost unknown disease, and the water coming mainly from granite mountains is remarkably pure. The Finlanders however are not addicted to excesses of any kind, live active lives and subsist on plain diet into which milk enters to a considerable extent. Estlander believes that the hot vapour baths common amongst them has a marked influence in securing that immunity which is so remarkable.

It would appear that the negro race are rarely affected with calculous disease, American statistics showing a proportion of not more than one to six of the white population. So far as my investigations have gone, I believe a similar immunity is enjoyed by the American Indian. It would appear that in these races the diathesis is less strongly marked, and that they are less exposed to those influences which tend to cause renal deposits, such as drinking strong or malt liquors, indigestion and sedentary habits.

There are renal stones which may be classed as purely accidental, such as those commonly occurring in Egypt, where the nucleus is found to consist of the ova of the *Diastoma hæmatobium*, also those instances in which blood clot, etc., forms the nucleus. In these cases the formation of stone is secondary, the nucleus being really a foreign body and consequently they ought to be classed separately from those arising idiopathically.

It is a rather remarkable rule, to which there are many exceptions, that only one kidney is affected by calculous deposit in the same patient. The explanation of this peculiarity which I would offer is, that inflammatory or catarrhal attacks probably affect only one kidney at one time as is usual in

other double organs such as the lungs, and that even a mild catarrhal attack produces a colloid material in persons predisposed to calculous disease. Rainey has shown by experiment that the presence of colloid matter causes the precipitation in spheroidal masses of crystalline salts, and this is the form in which uric acid nuclei are found. If only one kidney be attacked by the catarrhal inflammation or by congestion, that alone will be the seat of calculus; if both be attacked then stone formation may take place in both kidneys simultaneously. It might be objected to this theory that many victims of renal calculus have never had symptoms of catarrh of the kidney. My reply is that kidney catarrh usually presents no marked symptoms, and might very easily be overlooked, that in fact catarrh of the kidney is an exceedingly common occurrence. It may be caused by a glass or two of beer, by the chilling of the skin in a cold bath, even by purely mental causes as most people have had more or less demonstration of in their own persons. To epitomize, then, I believe that these three factors are necessary for the production of renal calculus. First a special diathesis, secondly certain exciting causes incident to the ingesta and surroundings of the person, and thirdly a catarrhal or inflammatory attack which acts as the direct cause of the deposit.

With reference to the treatment of an attack of renal colic, I may say that the advice commonly given, viz.: to administer belladonna, opium, diluents, etc., and to place the patient in a warm bath, with the application of wet cups or perhaps venesection, is utterly inadequate to relieve the frightful agony experienced during the passage of renal calculus along the ureter. I speak of what I know, having been myself a victim of the trouble in question, when I advise the administration of an anæsthetic in every case where the pain is severe. Authors generally say that occasionally an anæsthetic may be given. I would be rather inclined to say that one always must be given. Of course in addition, the treatment already mentioned may be employed with the exception of the blood letting which, to say the least, is entirely unnecessary.

As regards treatment to prevent the deposit of renal stone, what I have been in the habit of recommending is careful regulation of the diet and relief as far as possible of dyspeptic symptoms, the drinking of considerable quantities of water which