

when one realizes that a single large oxalate crystal, for example, may, in passing down from the kidney, cause all the typical signs of renal colic with hematuria.

The source of the crystalloids of the urine.—These crystalloids are:

- I. Uric Acid and Urates.
- II. Oxalates.
- III. Phosphates.

The urine is essentially a solution of salts, its chemical and physical properties being those of a complex mixture. It has been shown by Nerst that two salts having the same "ion"—or less accurately the same base or acid in common—may mutually each decrease the other's solubility, whereas those salts which contain no base or acid in common may mutually increase each other's solubility.

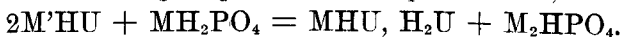
I. THE SOURCE OF THE URIC ACID AND URATES.

Uric acid, of which about .8 grams are excreted in twenty-four hours, does not exist as such in normal, freshly voided urine, hence one must explain the nature of the original solution and the cause of the subsequent separation.

Uric acid probably is excreted by the convoluted renal tubules as the bi-urate or acid urate M_2HU the most stable of the compounds of uric acid and probably the most soluble.

The urinary secretion of birds is solid and in the form of the quadri-urates, which the late Sir William Roberts considered as the only physiological type of uric acid salt, whether in the blood or in the urine, but most recent chemical physiologists disagree with this statement. Again, in the new-born infant certain uratic concretions are found in the kidney tubules which approximate to the quadri-urates, but these are explained by the fact that the liquid excretion is not yet fully established, whilst in the human adult, since the mechanism of excretion has become more perfectly suited to the elimination of liquid urine, the uric acid will therefore tend to assume the more soluble form of the bi-urate.

Uric acid, then, is probably excreted by the convoluted renal tubules as the acid salt, the bi-urate. In the presence of acid urine this bi-urate salt is precipitated as the quadri-urate,



But in the aqueous solution the quadri-urates are very unstable and decompose into uric acid and the bi-urates.

