

culosis of the kidney and calculus, the differential diagnosis is a matter of much importance. The more profuse hæmaturia is especially characteristic of tumor and interstitial nephritis, and at times of ruptured varicose veins.

Most of the standard works in urinary diagnosis describe various means by which the source of the blood may be determined. While separately or together these methods are often of value, in many cases they are entirely inadequate and some of them in my experience are quite useless. In Watson and Cunningham's recent work, in this connection, reference is made to the diagnostic significance of the color of the urine, the distribution of the blood in the two or three glass test, the quantity of the blood, whether continually or intermittently present, the shape and arrangement of the corpuscles (*rouleaux*), the association of the blood with other elements as casts, crystals, pus, particles of tumor, special type of epithelium; the reaction of the urine; specific gravity and amount of albumin. In many difficult cases of symptomless hæmaturia all of these tests may be applied with most painstaking care, and yet it is impossible to draw safe inferences from them.

The color for instance will depend upon the quantity of the blood, the length of time it has been retained before voiding and the reaction of the urine. The inference that in *renal* hæmaturia the blood is more evenly distributed in all portions in the three glass test is often correct, though I have seen cases of *renal* hæmaturia in which the first glass contained the most blood.

As to the quantity, it is usually most profuse in cases of tumor, though in a given case it may be equally profuse in interstitial nephritis. Whether it is intermittently or continually present is of little help, as in most of the difficult cases that come under one's observation it is intermittent. As to the size, shape and arrangement of the red cells, this depends more on the reaction of the urine and the length of time that it has been retained than on the etiological factor producing the bleeding. The association of the blood with other elements is equally unreliable. In the first place the amount of blood obscures the microscopic field in many cases. Much reliance is usually placed on the presence of casts as pointing to the renal origin of the hæmorrhage but in view of recent experiences this cannot be considered a safe guide in all cases. Epithelial and blood casts have most significance, but hyaline and granular casts are so frequently found in renal tumors, pyelitis, ureteral calculus and vesical conditions, with ascending infections, back pressure or other causes of vascular disturbance of the kidneys, that they cannot be