Clark of twenty-four autopsies on calculus cases, thirteen of whom have had no pain.

The size of the stone has no definite relation to the character or amount of pain. Large calculi occupying the pelvis of the kidney may give little or no pain. On the other hand small rough stones that make their way into the ureter may cause the most agonizing pain.

3. Hematuria. The amount of blood in the urine may vary from a few corpuscles, found by microscopic examination of the centrifuged specimen obtained during or after an attack, to large and even fatal hemorrhages.

Hematuria, especially occurring in microscopic amounts during or after an attack of renal colic, is a finding of considerable importance in establishing a diagnosis.

4. Other urine findings, such as renal sand, crystals, small calculi, fragments of calculi, renal or ureteral epithelium, leucocytes often seen in clumps, macroscopic pus, are findings of importance. Cunningham found pus 39 times in 48 cases reported.

5. Vesical tenesmus or rectal tenesmus is frequently felt when a stone is moving in the lower portion of the ureter, cystitis frequently accompanies the pyelitis and ureteritis set up by a stone in the pelvis of the kidney or in the ureter, and gives rise to frequency of micturition. Occasionally, a stone in the lower portion of the ureter can be palpated per rectum, or per vaginam in the female.

Next to the gross clinical picture must be considered: (*a*) Cystoscopy and ureteral catheterization. Cystoscopy may be of great value in calculus cases. A stone impacted in the ureteral orifice may be seen protruding or causing prolapse, widening, or edema of the ureteral orifice, and a ureteral bougie passed into the ureter may give definite evidence of obstruction.

Examination of the ureteral orifice will often show from which side the blood or pus is coming, and catheterization of the ureters enables one to obtain the separated urines and examine them for blood, pus, bacteria, epithelium, etc., as well as to determine the functional capacity of the two kidneys.

(*b*) Functional tests. The following should be mentioned: The indigocarmine test made by injecting 5 to 10 c.c. of sterile indigocarmine solution into the gluteal muscles, introducing the cystoscope twenty minutes after the injection, and observing the rhythmical puffs of deep blue colored urine as it escapes from the ureter. By some observers the time required for the blue color to appear in the urine and the intensity of the color are regarded as being of value in determining functional capacity.

The phloridzin test, described by Casper and Richter, depends