1:10 to 1:5120. After shaking the test tubes for 3 minutes, they were placed in a water bath at 37°C for one hour. At the end of that time the tubes were shaken again and placed in the refrigerator over night.

Readings were made in the morning. After gentle agitation of the test tubes, presence of cell aggregates was determined first grossly under proper lighting conditions. A negative reaction was seen as a diffuse cloudiness. Agglutination varied in intensity depending on the original titer of the antiserum and the dilution. A strong reaction consisted in the presence of large clumps. As the agglutinin titer of the antiserum decreased, the cell aggregates became smaller and fewer.

Microscopic readings were made by pipetting a drop of the leukocyte-antiserum mixture onto a slide and examining it with a 16 mm objective. Clumping of the leukocytes with loss of identity of the individual cell constituted a positive reaction. Partial or complete disintegration of the cell architecture could be seen in the stronger reactions. In many instances the "prozone" phenomenon was encountered.

The technic of the test is not overly simple. The natural tendency of leukocytes, especially from normal people, to clump tends to produce false agglutination. After some experience, such reactions can be recognized grossly. In most instances of false agglutination, the leukocytes can be observed under the microscope to be held together loosely by strands of fibrin.

Summary. A method of testing and titrating antileukocytic sera by agglutination is presented. The procedure offers a relatively simple method of studying the immunochemical differences between normal and leukemic leukocytes and between lymphocytes and polymorphonuclear leukocytes.

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The Static Intrapelvic Pressure of the Hydronephrotic Kidney.

HARRY A. WILMER. (Introduced by B. J. Clawson.)

From the Department of Pathology, University of Minnesota, Minneapolis.

Following complete ureteral obstruction the hydronephrotic kidney continues to secrete urine. The exact quantity of the glomerular filtrate elaborated and the mode of reabsorption is not known with certainty. The reabsorption of urine by pyelovenous refluxes or pyelotubular backflow is a possibility.[1,2,3] Ahlström[4] points out that with an increased intrapelvic pressure, rupture of the pelvis with an outpouring of its contents into the venous system is not, in itself, remarkable. Only when this reflux can be shown to occur at pressures which are maintained *in vitro* by urine secretion with obstruction to outflow can it be of pathogenic importance.[4] Despite the crucial importance of intrapelvic pressures, accurate determinations by physiologic methods have not been found in the literature, by the writer.

Experimental. By the use of the Null Point Manometer which is on occasion employed in various physiological laboratories we have determined the static intrapelvic pressure in 8 rabbits with unilateral hydronephrosis of varying intervals from 3 to 63 days. The left ureter of the rabbits was doubly tied and severed; intravenous sodium pentothal anesthesia, and aseptic surgical precautions were employed. The needle attached to the left arm of the Null Point Manometer System is inserted into the hydronephrotic sac through the thin wing of parenchyma near the edge

1 Hinman, F., and Lee-Brown, R. K., *J. Am. Med. Assn.*, 1924, **82**, 607.

2 Hinman, F., and Vecki, M., *J. Urol.*, 1926, **15**, 267.

3 Hinman, F., *Surg., Gynec. and Obstet.*, 1934, **58**, 356.

4 Ahlström, C. G., *Acta chir. Scandinav.*, 1934, **75**, 162.

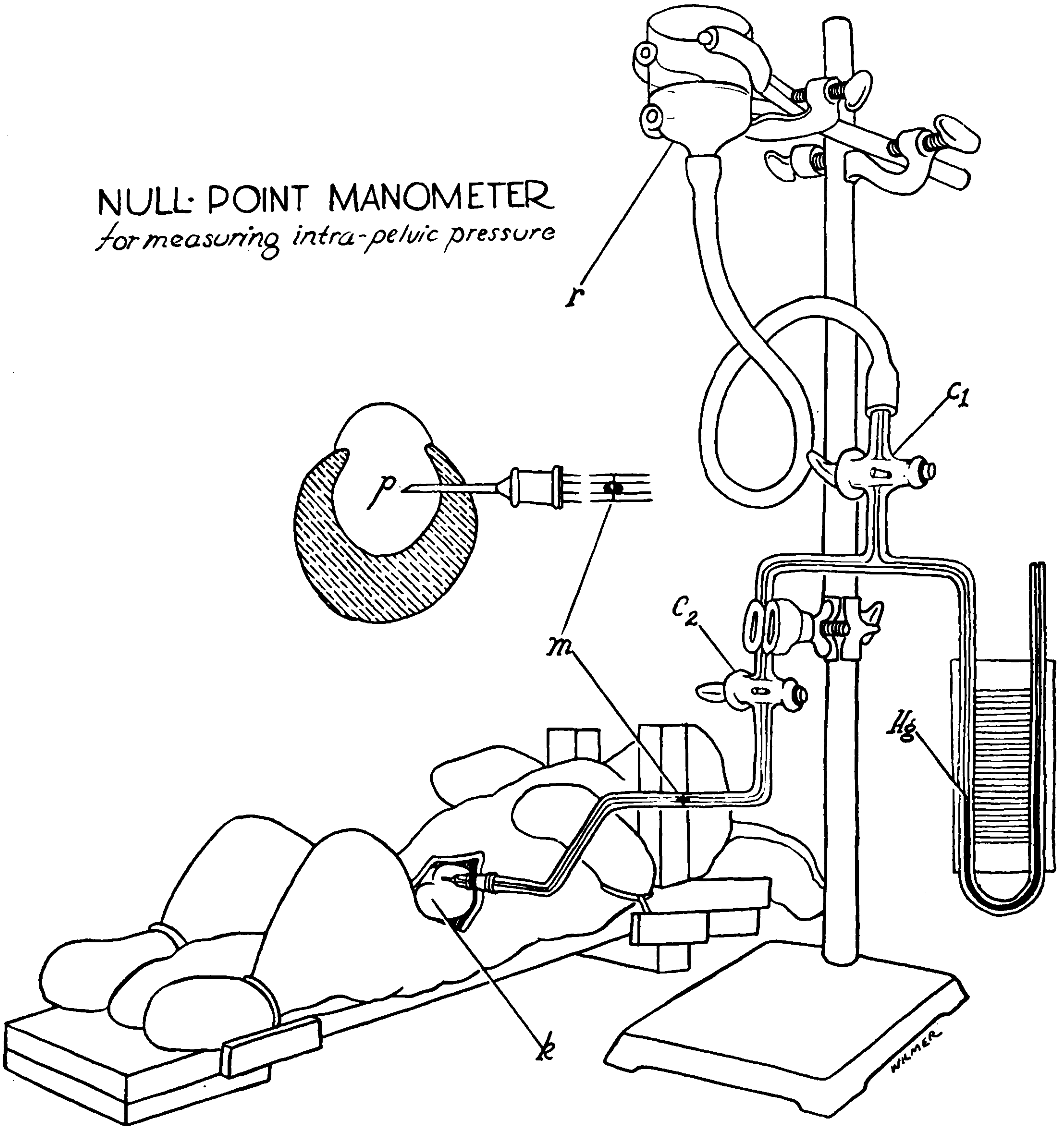

FIG. 1.
Null Point Manometer. This apparatus consists of a capillary tube bent into a deep "U" forming a mercury manometer in one arm, while the other arm is so bent that a 20-gauge needle adapted to it can be inserted into the renal pelvis as indicated in the insert. The entire capillary system is filled with normal saline with the exception of the mercury manometer and a single drop of mercury in the horizontal portion of the opposite arm. A reservoir above the system permits the pressure to be changed. Stop-cocks permit varying the pressure without sudden changes in the pelvis. When a pressure is found which exactly equals that in the hydronephrotic sac the mercury drop stands precisely still at the scratch mark on the glass where it stood at the beginning of the experiment.

of the distended fibromuscular pelvis. One estimates the pressure to be measured and then establishes this pressure in the manometer system. Repeated readings are made until the pressure in the system equals that in the pelvis. The accuracy of the method is due to the fact that the fluid content of the hydronephrotic sac is the same at the end of the experiment as at the start. The measuring system (Fig. 1) is employed in the sense of a balance.

The urine from the hydronephrotic sac and from the bladder was examined in each animal and contained no blood, and with 2 exceptions

TABLE I.
Static Intrapelvic Pressures and Specific Gravity.

Rabbit Exp. No.	Duration hydronephrosis days	Intrapelvic pressure, mm Hg.	Specific gravity Right (unoperated)	Specific gravity Left (hydronephrotic)
R-1	3	7.5	qns	1.024
R-2	6	27.5	qns	qns
R-3	11	22.5	1.029	1.013
R-4	16	23.5	1.029	1.010
R-5	23	unsat.	1.018*	1.017*
R-6	28	17.5	1.020	1.007
R-7	37	20.0	1.029	1.008
R-8	63	16.0	1.021	1.002

* Unfiltered.

was perfectly clear. In one rabbit the fluid content of the sac was too viscid to interplay freely with the saline in the measuring system (Rabbit 5). The specific gravity of the urine was determined with the Gay-Lussac picnometer after passing through a sinter filter. Corrections were made for temperature, and an analytical balance used for determinations. The specific gravity readings show that the hydronephrotic kidney rapidly loses its ability to concentrate urine, and with the exception of a single reading of 1.002 the results are in agreement with previous work.

Discussion. The static intrapelvic pressure is quite different from the secretory pressure. While the static pressure is maintained physiologically *in vivo* the secretory pressure is the pressure of a column of urine or mercury against which the kidney can secrete. Surprisingly, this secretory pressure may reach 125 mm Hg.[5] The static intrapelvic pressure was found to be 7.5 mm Hg. at 3 days, to rise to between 22.5 and 27.5 mm Hg, in the interval of 6 to 16 days and to fall slightly thereafter to 16 mm Hg, at 63 days. (Table I). These pressures are below the effective glomerular filtration pressure, and therefore serve only to suppress and not stop urine formation. Why only small quantities of urine reach the pelvis following release of this back pressure[6] is not known. Under these circumstances the factors causing a pyelovenous reflux are no longer existent. Yet, it is many weeks before the urine volume becomes appreciable.[6] Histologically the glomeruli are normal, but there is tubular disturbance. This suggests that there might be considerable back diffusion through the convoluted tubules. Our experiments do not confirm or deny the pyelovenous reflux, but are compatible with it, if such refluxes occur at the pressures we have recorded. The function of the hydronephrotic kidney cannot be resolved into hydrostatic pressures without making assumptions based upon theories without conclusive experimental evidence.

Summary. The static intrapelvic pressure of the hydronephrotic kidney varies from 7.5 mm to 27.5 mm Hg. at various intervals from 3 to 63 days. Because of the technical accuracy of the Null Point Manometer employed in this study the readings reported here are considered exact for anesthetized rabbits at the moment of hydronephrosis at which they were determined.

5 McDonald, J. R., Mann, F. C., and Priestly, J. T., *J. Urol.*, 1937, **37**, 326.

6 Johnson, R. A., *J. Exp. Med.*, 1918, **28**, 193.