uric acid is eliminated by glomerular filtration and about 94% by some other process—presumably tubular secretion.

It is interesting to compare these experiments on the reptile with similar ones on the bird, where other evidence is available for the secretion of uric acid. In Table II are given results on chickens anesthetized with urethane. Phlorizin was given in about the same dosage as for the reptile, urine was collected from cannulae in the ureters, and blood was drawn at the mid-period of urine collection.

TABLE II.
Uric Acid and Glucose in Chicken.

Wt. Kg.	Urine Flow cc. per hr.	Plasma, mg. % glucose	Plasma, mg. % uric	Urine, mg. % glucose	Urine, mg. % uric	U/P Ratio glucose	U/P Ratio uric
2.5	7.0	381	3.8	6600	604	17.3	159
	8.8	409	4.4	4370	676	10.7	154
1.6	12.0	304	2.9	3700	365	12.2	126
	8.0	302	3.1	4350	572	14.4	185
3.0	14.8	289	7.2	1355	418	4.7	58

The average of the glucose ratio is 12.0 and of the uric acid, 136.4. This means that about 9% of the uric acid is filtered and about 91% secreted, a situation quite similar to that observed in the reptile. The concentration ratio for glucose is much higher in the bird than in the reptile, which can be interpreted as greater reabsorption of water by the tubule (beginning loop of Henle in the bird). In line with this, it may be stated that in neither fish nor amphibian is the glucose ratio greater than that of the reptile, but in the mammal (with complete development of the loop of Henle) the glucose ratio can attain very much higher values than in the bird.

6175

Studies in Renal Denervation (IV).

RUDOLPH HECHT. (Introduced by W. F. Petersen.)

From the Department of Pathology and Bacteriology, University of Illinois College of Medicine.

I. *Distribution of Intra-arterially Injected Oleokoniol.* Rabbits were anesthetized with ether, a lumbar incision made, the viscera pushed to one side, and the aorta isolated and elevated proximal to the renal arteries. The aorta distal to the renal arteries was also isolated and a ligature applied. A hypodermic needle was inserted

in the proximal portion of the aorta and Oleokoniol was slowly injected. The needle was left in place several minutes thereafter to allow for the distribution of the material, and then the proximal portion of the aorta was clamped and the animal killed. The kidneys were removed, sectioned, and stained with Sudan III and hematoxylin. Microscopic examination revealed that the oil was distributed equally on both sides. This procedure was repeated on animals denervated according to the technique of Milles, Müller and Petersen.[1] The left kidney was denervated and the right kidney kept intact for control. The animals were allowed to recover for 2 to 3 weeks before injections were undertaken. Microscopic examination revealed that the denervated kidneys contained more oil than normal kidneys.. This agrees with the findings of Milles, Müller and Petersen,[2] who described the dilatation of the vascular bed in denervated kidneys.

II. *Bacterial Embolism in the Normal and Denervated Kidney.* After having experimented with bacterial suspensions in denervated kidneys,[3] and having determined that the control kidney contained more emboli than the denervated kidney, the effect of chilling and of injection of epinephrine, followed by the intravenous injection of an attenuated *Staphylococcus* suspension was tried.

Rabbits in whom the left kidney had been denervated were used. A 2-week as well as a 2-month recovery period was allowed. The animals were chilled in a bucket of crushed ice and water, until a severe chill had developed. They were then removed from the ice water, and 5 cc. of a concentrated suspension of an attenuated culture of *Staphylococcus aureus* in physiological salt solution was injected into the marginal ear vein of each rabbit. In another group of rabbits, instead of the ice bath, ½ cc. of a solution of epinephrine hydrochloride 1:1000, was injected subcutaneously, and one minute thereafter 5 cc. of the bacterial suspension was injected intravenously. The animals were killed on the fourth day after inoculation, the kidneys removed, hardened in formalin, sectioned and stained. Microscopic examination again revealed more emboli on the normal than on the denervated side in most cases.

In animals allowed a 2-week recovery period following operation, one "chill" animal and one "adrenalin" animal had approxi-

[1] Milles, G., Müller, E. F., and Petersen, W. F., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 351.

[2] Milles, G., Müller, E. F., and Petersen, W. F., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 354, and 1931, **28**, 561.

[3] Hecht, R., PROC. SOC. EXP. BIOL. AND MED., 1931, **29**, 212.

mately the same number of emboli in both kidneys. It might be suggested that the shortness of the recovery period may be a factor in this apparent discrepancy. Another explanation is that possibly due to an unavoidable error in surgical technique these kidneys were not completely denervated, and that both sides received the same number of emboli.

The theoretical considerations as to why the normal differs from the denervated kidney in regard to the number of emboli which lodge there has already been discussed.[8]

III. *Microscopic Fat Droplets in the Tubules of the Normal Dog Kidneys.* In our studies of the histology of normal and denervated kidneys, it was noted that dog kidneys always showed fat when stained with Sudan III. It was suggested that fat was possibly only found in the kidneys of old dogs. To prove that microscopic intracellular fat accumulation is or is not a normal constituent of dog's kidneys, the following experiments were undertaken: Several young, normal dogs were bled to death in as short a time as possible. The kidneys were removed, sectioned, and stained with Sudan III. Microscopic examination revealed much fat in the tubular epithelium. The bleeding method of killing the dogs was used to avoid the toxic effect of lethal agents on the kidney epithelium.

To further establish the fact that the fat so demonstrable in the epithelium of the dog's kidney, occurs in dogs with normal renal function, several young, normal, female dogs were taken, day and night urine examined, P. S. P. test, urine analysis, and blood chemistry determinations were performed. All were within normal limits.

These animals were also bled to death, the kidneys removed, sectioned and stained with Sudan III, and again fat was found in the tubules. We, therefore, concluded that microscopically demonstrable fat droplets occur normally in the tubules of dog's kidneys. Experiments to determine the fat content of normal as compared to denervated kidneys are in progress.