nal insufficiency in humans are accompanied by an oliguria. This report indicates that diuresis accompanies relief from adrenal cortical insufficiency.

Summary. After adrenalectomy, rats given a life-sustaining diet show a urinary excretory rate approximately 5 times normal. When the life-sustaining diet is changed to a non-sustaining diet, the excretory rates drop to normal and below, with death ensuing.

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Renal Blood Flow After Subtotal Nephrectomy.

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Arterial hypertension has been produced in animals by two methods of damaging the kidneys, (a) by renal ischemia due to a clamp which narrows the lumen of the renal artery,[1] and (b) by subtotal nephrectomy.[2, 3] With the latter method in the rat, observations have shown that in the first month after operation there is no hypertension although the amount of renal tissue is at a minimum (100 mg. per 100 sq. cm.) and there are polyuria and increased blood urea concentration (200 mg. %). Hypertension does not appear until the second month, when there are proteinuria and greatly hypertrophied renal stumps (200 mg. per 100 sq. cm.).

If the renal tissue had hypertrophied more rapidly than its vascular supply, thus causing a relative ischemia, the mechanism of the hypertension would be analogous to that in dogs with a clamp which narrows the lumen of the renal artery. To test this hypothesis, the rate of renal blood flow was studied.

Methods. Subtotally nephrectomized[2, 3] rats 2 weeks and 5 months post-operatively and unilaterally nephrectomized rats were used. Under ether anesthesia the abdomen was opened. Because of renal-splenic adhesions the gastro-splenic ligament was divided between ligatures; veins from the adrenal, leg, and testis were tied. The aorta and inferior vena cava were tied just below the entry of the left renal vein. Finally the inferior vena cava just cephalad to the renal vein was closed with a small bulldog clamp, and the left renal

1 Goldblatt, H., *et al., J. Exp. Med.*, 1934, **59**, 347.

2 Chanutin, A., and Ferris, E. B., Jr., *Arch. Int. Med.*, 1932, **49**, 767.

3 Rytand, D. A., and Dock, W., *Arch. Int. Med.*, 1935, **56**, 511.

vein immediately entered with a 20-gauge needle through which blood flowed into a citrated one cc. pipette held nearly horizontally. The time required for blood to fill the second 0.5 cc. was measured with a stop watch. The rat was weighed before the final operation; after the experiment it was bled, the kidney and heart weighed, and flow calculated in cc./minute/gram of renal tissue.

Results. The averages are shown in Table I.

TABLE I.

	Subtotal Nephrectomy		Unilateral Nephrectomy
	2 weeks post-operative	5 mo. post-operative	5 mo. post-operative
Rate of blood flow, cc./min./gm.	2.14±0.073	1.73±0.096	1.72
Kidney weight, mg./100 sq. cm.	125	177	259
Heart weight, mg./100 sq. cm.	185	210	180
No. of rats	16	14	6

The results show an identical rate of blood flow (1.7 cc./min./gm.) through the renal stump of the hypertensive rat and through the enlarged kidney of the unilaterally nephrectomized rat. On the other hand, flow is significantly increased by 24% (+ 0.41 ± 0.12 cc./min./gm.) through the freshly prepared stump of the non-hypertensive rat at a time when renal hypertrophy is rapid. The kidney stump, at 2 weeks or 5 months, is under a heavy burden as the blood urea is over 200 mg. %

Hayman[4] has perfused excised human kidneys with Ringer's solution under varying heads of pressure. Through normal kidneys and those of uremic patients with chronic glomerulonephritis the flow was more than doubled by raising the perfusion pressure from 100 to 200 mm. Hg. The flow through uremic kidneys, per gram, was only one-third that of normal kidneys at the same perfusion pressure, but as these kidneys consist largely of scar tissue it is not possible to estimate the flow per unit of functioning renal parenchyma. In the present experiments the most rapid rates of renal blood flow were in rats without hypertension, in the early period of renal hypertrophy. Moreover, within the series of hypertensive rats, there was no correlation between the degree of hypertension (as indicated by heart weight per surface area) and the rate of flow. There is greater dilatation of the tubules of the stumps at 5 months and the kidney weights include more inert matter than at 2 weeks, so the observed rates of flow per gram are too low if thought of in terms of active renal tissue. The results really show no significant decrease in blood flow per gram of active kidney tissue as hyper-

[4] Hayman, J. M., Jr., *J. Clin. Invest.*, 1929, **8**, 89.

tension develops after subtotal nephrectomy. Therefore, if the hypertension is due in some way to a relatively narrow renal vascular bed, its degree is exquisitely adjusted to maintain a normal rate of renal blood flow.

Conclusion. Rats which become hypertensive several months after subtotal nephrectomy do not have renal ischemia; the flow per gram of renal tissue is 19% less than in rats a few days after subtotal nephrectomy, but the same as that in rats with unilateral nephrectomy and without hypertension.

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Experimental and Quantitative Analysis of Local Anesthesia of the Frog's Isolated Sciatic Nerve.

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It is a commonly known fact that the characteristic action produced by certain local anesthetic drugs is a somewhat variable function. The extent and behavior of this variation are not well known. In an attempt to describe this variation, quantitative data on the duration of sensory anesthesia in frogs are herein presented. The data were obtained from class experiments of medical students over a period of several years.

The following experimental technique was used. The frogs were single pithed and one sciatic nerve in each frog was exposed in the thigh. The other leg served as a control. The normal reaction of the frog was determined by immersing the toes of one foot in 1% HCl. This causes a rapid withdrawal of this leg from the acid solution. Then the local anesthetic was applied to the isolated sciatic nerve by carefully placing a whisp of absorbent cotton about 3 mm. wide, thoroughly moistened with the local anesthetic solution but not dripping, under and around the nerve. This was allowed to remain in place for exactly 5 minutes. The whisp of cotton was then removed and the toes of the leg so treated were tested in the acid solution every 15 to 30 seconds until sensory anesthesia was produced (that is, when the leg is no longer drawn out of the acid solution during a period of application of 30 seconds). The duration of anesthesia was determined from this time forward by testing