to a mammalian temperature shows a course of fatigue similar to that of mammalian muscle, and on the other hand, that a warm-blooded muscle on being cooled, fatigues like the muscles of cold-blooded animals at a similar temperature. From the supposed effects he concludes that in the matter of fatigue there is no real physiological difference between the two groups of muscle.

The author has investigated the question by very careful methods in a considerable variety of animals, and has not been able to confirm Lohmann's conclusions. The muscles of the frog and the turtle show their characteristic method of fatigue whatever the temperature. The muscles of warm-blooded animals on being cooled and then fatigued, show either no slowing of the contraction process or only a slight slowing. The latter seems to be most pronounced in the rodents, namely, the rabbit, the mouse and the rat. [See page 37 (101).]

28 (74). **"On intraureteral pressure and its relation to the peristaltic movements of the ureter,"** with demonstrations: **DANIEL R. LUCAS.** (By invitation.)

By means of a cannula placed in the ureter and retained without ligatures, and which did not materially interfere with the peristalsis of the ureter, the intraureteral pressure and its relation to the peristaltic movements of the ureter were ascertained.

In nine experiments on dogs narcotized with morphin and atropin, the pressure in the ureter arose only to a minute degree, the average being a negative pressure, more pronounced under the influence of diuretics. In five, in which chloroform was used, the pressure was always positive; the irritability and contractility of the ureter were noticeably diminished. In six, under ether, the ureter was noted to be irritable and contractile three hours after the anesthesia was commenced; the pressure was low. In four, in which ether followed the administration of chloroform, ether showed a stimulating effect on the peristalsis, running the pressure rapidly down. In three, in which morphin and atropin, chloroform, and ether were successively tried during the same experiment, the specific effect of each as above noted was again observed. In an animal in which anesthesia was produced by decerebration, irritability and contractility of the ureter muscle were noted; the pressure was low, tending to negative on stimulating the ureter distal

to the cannula. In one animal, anesthetized with cocain by the lumbar puncture method, the same results as with morphin were obtained. In two artificially constructed systems, which were demonstrated, phenomena analogous to those observed in the animals were produced and the causes indicated.

The experiments, which also were demonstrated in part, seem to justify the following deductions:

1. A suction normally follows the peristaltic wave of the ureter; at the same time a force is exerted on the fluid in front of the wave.

2. When the ureter is normally acting, the pressure in the pelvis of the kidney remains very low, fluctuating about a neutral point, this condition obtaining through the anatomical arrangement of the pelvis, which prevents it from collapsing under negative pressure. The rhythmic movements of the pelvis of the ureter effect a milking of the portion of the pyramid which projects into it.

3. Under the influence of chloroform, or conditions which retard muscular tone and activity, the pressure in the ureter becomes greater than that prevailing in the bladder.

4. It seems obvious, then, that the ureter functions as an active agent in the formation of urine. Sollmann has shown in his perfusion experiments on excised kidneys that the formation of urine is largely, though of course, by no means wholly a filtration process.

5. Ether anesthesia does not cause a cessation of the peristaltic movements of the ureter, but because of its suppressing action on the urinary secretion the curves were not recorded.

6. The ureter remains rhythmically contractile when excised and placed in warm physiological salt solution, or for some time after the death of the animal when left *in situ*. Therefore contractility is not dependent on pressure.

7. An increased flow of urine calls forth a more efficient peristalsis, and therefore does not result in an increased pressure.

8. The force of the peristaltic wave was seen to raise a column of water of considerable height.

9. When sufficient force is exerted by the intrinsic pressure to overcome the peristaltic contractions the urine is forced back into the uriniferous tubules and accurate communication is attained