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Experimental and clinical observations upon direct transfusion of blood.

By **G. W. CRILE.**

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By means of end to end anastomosis by suture, blood was transfused in 74 dogs. Blood was transfused, retransfused and reversely transfused over a period of a month in the same dogs. There were no aglutins or hemolysins produced, no hemoglobinuria, and no nephritis. Blood was found physiologically interchangeable. Every degree of hemorrhage, even to cessation of the arterial stream was successfully treated.

In six clinical cases of hemorrhage treated by transfusion of blood the results were the same as in the laboratory. The hemorrhage factor was eliminated.

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On the normal peristaltic movements of the ureter.

By **D. R. LUCAS** (by invitation).

[From the Laboratory of Biological Chemistry of Columbia University, at the College of Physicians and Surgeons, and from the Rockefeller Institute for Medical Research.]

Our present knowledge of the peristalsis of the ureter is based essentially upon the observations of Engelmann described by him about 35 years ago. He studied the peristaltic movements by simple inspection of the ureter in dogs, cats and rabbits. According to Engelmann, the contractions of the ureter in rabbits occur at intervals of 10 to 20 seconds. There were practically no other studies of the subject until a few years ago when Fagge investigated the effect of stimulation of the hypogastric nerves upon the ureter and obtained graphic records of the peristaltic movements. He makes the surprising statement that the ureter in many cases was found to be motionless or to present slight contractions or groups of contractions recurring every 30 to 60 seconds.

For the last two years I have been engaged in experimental studies of the ureter, which were carried out in the laboratory of biological chemistry at the College of Physicians and Surgeons. Some of the results of that work I had the honor to present at a meeting of this Society in April, 1905.¹ During the past summer I have studied the course of the normal peristalsis of the ureter (of the dog) at the Rockefeller Institute, under the direction of Dr. S. J. Meltzer.

The results that I wish to report here very briefly are as follows :

In dogs narcotized with morphin the peristaltic *contractions* of the middle part of the ureter occur at intervals varying between 6 and 15 seconds. The curves representing these contractions are of variable but generally of fairly good size. The *duration* of such a contraction may vary from 5 to 15 seconds. The variations of the size and duration of these peristaltic contractions depend upon the size of the animal, the amount of secretion of urine, and many other conditions which I shall not attempt to discuss here. But for the same animal and under the same conditions the characters of the peristaltic contractions remain in general the same for nearly the entire length of the experiment, which sometimes continued about 5 or 6 hours.

These peristaltic contractions are apparently those which Engelmann and other writers had under observation. I found however, *that the renal pelvis as well as the uppermost part of the ureter exhibits peristaltic contractions of another kind*; they are small, of short duration and occur as frequently as every 2 or 3 seconds.

In some animals, in which the contractions from the middle part of the ureter presented fairly large curves, it frequently happened that these curves were superimposed by finer undulations.

From the lower end of the ureter only a few tracings were obtained. Judging from this restricted experience it would seem that in the lower end also the small and more frequent contractions predominate.

Anesthetics, *e. g.*, chloroform or ether, exercise pronounced effects upon the peristaltic movements of the ureter. The small

¹ *Proceedings of this Society*, 1904-'05, ii, p. 61.

and frequent contractions of the ureter offer a greater resistance to the effects of the anesthetic. It sometimes happened that after the administration of an anesthetic the large contractions of the middle part of the ureter disappeared while the superimposed undulations persisted. The same sometimes occurred after prolonged experimentation. The small and frequent undulations are apparently more resistant to fatigue, also, than the larger contractions.

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Gastric peristalsis under normal and certain experimental conditions.

By **JOHN AUER.**

[From the Rockefeller Institute for Medical Research.]

The published observations upon gastric peristalsis in rabbits all seem to show that this organ, under so-called normal conditions, is practically inert. By means of the method to be described, it will be shown that the organ mentioned, under more truly normal conditions, shows active movements. The fault lay with the method; the profound inhibitory effect which opening of the peritoneal cavity exercises upon some of the abdominal viscera was not considered.

But operation is by no means necessary in order to study gastric motility in the rabbit. If a well-fed rabbit is stretched out on its back and the hair of the epigastrium clipped, any observer may see active gastric peristalsis under a closer approximation to physiological conditions than the saline bath affords. Mere inspection of the abdomen now shows that the stomach is far from inert. A short time after preparing the animal, peristaltic waves are seen coursing over the stomach from left to right, increasing in strength as the pyloric third is approached. These waves are easily registered by placing a tambour over the stomach region to be studied and connecting it with a writing tambour or manometer. The writing tambour registers not only the change in volume of the stomach part it overlies, but also the respiration of the animal; in many cases, with delicate adjustment of the writing pen, the heart beats are also marked.