this animal, 3 days after removal of the pancreas an experiment was made to determine whether insulin would affect the blood sugar content in the ordinary way in a dog whose epinephrin secretion was suppressed. The course of the blood sugar curve under the influence of insulin was the same as in a pancreatectomized animal not subjected to the adrenal operation (initial blood sugar 0.227; minimum reached in 4¾ hours 0.063 per cent.).

165 (2125)

The influence of iletin (insulin) on morphine hyperglycemia.

By G. N. STEWART and J. M. ROGOFF.

[*From the H. K. Cushing Laboratory of Experimental Medicine, Western Reserve University.*]

It has been shown by Macleod and his collaborators that insulin prevents the development of the hyperglycemia caused by etherization, asphyxia, carbon monoxide and piqûre, or counteracts it if already present. We have demonstrated that while these forms of experimental hyperglycemia are not essentially related to the adrenals, since they can be well elicited in the absence of those glands, this is not the case with the hyperglycemia produced by morphine in the development of which the adrenals seem to intervene in some way. We have therefore tested the influence of insulin upon morphine hyperglycemia in rabbits and cats. Whether morphine was given before, after, or at the same time as insulin, the characteristic effect of insulin upon the blood sugar was always observed. Thus, in a rabbit to which morhpine was administered 1 hour before insulin the blood sugar, which was 0.083 per cent. at the beginning of the experiment and 0.093 an hour after morphine, was 0.047 per cent. an hour after insulin had been injected. The morphine hyperglycemia had not had time to develop before insulin was given, nor did it develop in the 6 hours over which blood samples were collected. In another rabbit morphine was given an hour after insulin when the blood sugar had already fallen from 0.115 to 0.068 per cent.

It went on falling to 0.052 per cent, and never even regained the initial value.

In a normal cat morphine and insulin were administered at the same time. A marked hyporglycemia developed, the blood sugar sinking from 0.13 per cent. to 0.033 per cent. A similar experiment was performed on a cat whose right adrenal had been excised and the medulla of the left destroyed by a drill, the left gland being then denervated, 19 days before the experiment. The result on the blood sugar was the same as in the normal cat, the percentage falling from 0.103 to 0.040, with no attempt at return towards the initial value. The general symptoms were the same in the two cats, which presented a characteristic mixture of hyperexcitation (due to the morphine) and depression. In both animals the paradoxical pupil reaction was strongly marked in the left eye throughout the experiment (the left superior cervical ganglion had been previously excised), and quite as pronounced in the cat whose epinephrin secretion had been abolished as in the normal cat. The usual hyperthermia produced by morphine in cats was absent in both cases. Except for a slight temporary rise in the animal with the adrenal operation, the rectal temperature went on falling throughout the experiment. In this respect the insulin apparently caused the morphinized cats to behave like dogs or rabbits.

166 (2126)

The relation between chronic irritation of peritoneal mesothelium and the formation of adhesions.

By R. S. CUNNINGHAM.

[*From the Department of Anatomy, Johns Hopkins University, Baltimore, Maryland.*]

During a systematic investigation of the normal and pathological reactions of the peritoneal mesothelium, certain rather surprising facts have been revealed which are interesting because of their bearing on the question of adhesions.

Elsewhere[1] experiments have been reported in which rats re-

[1] Cunningham, R. S., *Amer. Journ. of Physiol.*, 1922, lx, 448-460.