justed themselves to loss of their parathyroids. Dog 6 remained free from tetany for ten days after operation but escaped from the laboratory before completion of the experiment. All of the animals developed tetany some time during the experiment, for if the tetany symptoms did not develop spontaneously by the third week, the magnesium was discontinued and the animals were fed meat until symptoms appeared.

3002

The menstrual cycle in the monkey; effect of double ovariectomy and injury to large follicles.*

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In the course of some experimental work upon the effect of injections of ovarian and placental hormones into monkeys, operations have been performed at several intervals of the menstrual cycle. In four monkeys both ovaries were removed; in a fifth, large follicles were injured. The effect of these operations upon the time of appearance and the duration of the next menses provide some evidence as to the cause and nature of menstruation.

The ovaries were removed from the first monkey on the first day of the menstrual cycle (dated from the appearance of bleeding). The operation apparently had little effect for the menses continued to the fourth day. No second bleeding followed this one during a control period.

Double ovariectomy was performed upon the second and third monkeys on the 10th and 14th days of the cycle respectively. At this time the skin of the external genital organs and surrounding regions was considerably reddened. Ovulation had recently occurred in both cases and the corresponding tubes were removed and the ova recovered.[1] Apparently typical menstrual bleeding

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[1] Allen, Edgar, PROC. SOC. EXP. BIOL. AND MED., 1926, xxiii, 381.

began on the 4th day after operation in the second monkey and on the 5th day in the third monkey. The duration of these menses was 8 and 3 to 4 days respectively.

Both ovaries were removed from a fourth monkey at a time when the regions surrounding the genitalia were greatly swollen and reddened. Vaginal smears for several days before the operation were free from leucocytes. Although the time of operation in this animal cannot be dated in the cycle from an observed menstruation, the condition described would indicate a time near or after the middle of the cycle, probably included between the 10th and 20 days. Upon sectioning, the ovaries were found to contain several large follicles. Bleeding began on the 4th day after operation and lasted 7 days.

In the fifth monkey, operated on the 16th day of the cycle, one ovary appeared large and opalescent but no individual follicles could be distinguished from the surface. This ovary was pierced longitudinally by a sterile capillary pipette and some clear liquor aspirated. This was done without handling the ovary or interfering with the blood supply, for the ovary was held by forceps grasp of the ovarian ligament. The other ovary, which was small and opaque, was not disturbed. Bleeding began on the 6th day after the operation and lasted 6 days.

In the first four monkeys from which both ovaries had been removed the reddening and swelling of the vulva and surrounding regions had quite completely disappeared by the middle to the end of the second week following the operation.

Effect of double ovariectomy (1st four cases) and injury to large follicles (last case) on the next menses.

Monkey	Date of operation	Time of operation; day of cycle	Appearance of menses; day after operation	Duration of menses in days
(1) SLE	8/7/25	1st	Already bleeding when operated	4
(2) NS	11/21/25	10th	4th	8
(3) SRE	9/2/25	14th	5th	3-4
(4) S2E	7/21/25	10th-20th	4th	7
(5) SB	1/2/26	16th	6th	6

In performing these operations special care was taken to avoid injuring the uterus. The period elapsing between operation and hemorrhage (in all but the first case) and the duration of hem-

orrhage exclude operative technique as a contributing cause in the results described.

To summarize briefly: (1) Removal of both ovaries on the first day of menstruation had no apparent effect on that period. (2) Double overiectomy or injury to large follicles dated toward the end of, or immedately after, the follicular phase of the cycle was followed by apparently typical menstrual bleeding. These experimental menses appeared from 5 to 13 days before the expectation as calculated by the length of previously observed cycles and by Corner's mode[2] for cycle length of 27 days. (3) External coloring and swelling disappeared after double ovariectomy.

From these data it is concluded that menstruation is probably due to an absence of follicular hormonal stimulus after it has been acting for a certain period of time. In this connection it should be noted that the presence of the follicular hormone has been demonstrated in human *corpora lutea.*[3] It is quite possible that the corpus of the monkey may also continue to secrete the follicular hormone, thus postponing the onset of menstruation.

3003

Extirpation experiments upon the embryonic forelimb of the rat.

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The technique of intrauterine surgery by which experimental methods may be applied to mammalian embryos has recently been described.[1] The results of a preliminary investigation show that rat embryos, operated within the last eight days of development, generally survive the operation, remain viable and are born with the rest of the litter. It is possible to rear such animals although it is difficult to do so.

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[2] Corner, George W., *Carnegie Inst. Cont. to Emb.*, 1923, xv, 73.

[3] Allen, Edgar, PROC. SOC. EXP. BIOL. AND MED., 1925, xxii, 303.

[1] Bors, Ernst, *Roux's Arch. f. Entw.*, 1925, iii.

[2] Gerard, R. W., *Proc. Am. Soc. Physiol.*, 1926.

[3] Nicholas, J. S., *Anat. Record*, 1925, xxxi, 4.