

knee-jerk and the Achilles-jerk, especially in the lower groups where 81 per cent of the cases fall.

It is evident that where the knee-jerk is unusually high the Achilles-jerk falls into a lower group, which indicates a lack of proportional increase in extent.

Where the Achilles-jerk is absent, the majority of the cases fall into group 1, while the rest are found in groups 2 and 3. This seems to further indicate a close correspondence between the extent of the two jerks.

This is a preliminary report.

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<sup>1</sup> Tuttle, W. W., *Am. J. Physiol.*, 1924, lxxv, 338.

### 3570

#### Experimental Study of Ovarian Regeneration in Mice.

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Whether or not mammalian ovaries are capable of regeneration following complete ovariectomy seems still to be somewhat of a question. Davenport,<sup>1</sup> working on mice, found that, on the average, regeneration occurred in 64 per cent of his animals following removal of the ovaries. The experimental period ranged in time from 8 to 45 weeks, and he based his conclusions regarding ovarian regeneration upon the fact that post-mortem examination revealed distinct ovarian masses on the site of the original ovaries, and in many cases embryos were found *in utero*. No histological evidence was advanced, however, to show that all of the original ovary was removed in each case, and it seems essential that such evidence be established before it can be stated definitely whether regenerated ovarian tissue actually arises from the peritoneum, or from fragments of the original substance inadvertently left *in situ*.

Considering the importance of this subject in its bearing upon the problem of germ-cell origin, it has seemed desirable to repeat the experiment, basing any conclusions drawn upon histological study. Such evidence would show definitely two things: (1) whether or not all of the original ovary had been removed—a factor of prime importance—and (2) whether or not regenerated tissue actually is ovarian in nature.

Ninety-six operations were performed upon mice; 76 of the oper-

ated cases have been examined in connection with this report, having run over a period ranging from 7 to 16 weeks. Great care was exercised in removal of the ovaries, all of which were preserved for subsequent microscopic study to make certain that removal had been complete. The operative procedure was varied: in some cases the capsule was split and the ovary cut off at the hilus; in a majority of the operations, however, the capsule and hilus were included in removal; and in others a short section of the stalk was included as well. No cases of infection occurred, and subsequent examination showed little or no adhesions in the greater percentage of cases.

The results of examination are tabulated below, and show that in the great majority of cases (70 out of 76) no evidence of ovarian substance could be detected. Three cases showed a formation of bladder-like cysts on the site of the original ovary, but sectioning of the entire region showed no germ-cells or ovarian tissue; in another case a suspicious looking mass in the same position also proved negative. Six were found with regenerated masses which contained ovarian tissue; in checking up on the initial operation it was found that in two of these cases the original notes showed that complete removal of the ovary was doubtful. The remaining four cases of regeneration occurred, according to notes taken at time of the original operation, in animals from which the ovary was apparently entirely removed. However, in view of such a small percentage of positive cases (4 out of 76 operations) it seems highly probable that these cases can be attributed to incomplete ovarian extirpation. It is possible that microscopic bits of ovarian tissue lying in the hilus region may have hypertrophied to this extent.

TABLE I.  
*Summary of cases examined.*

Interval between operation and examination	Number examined	No regeneration	Regeneration
7 weeks	2	2	
8 weeks	11	11	
9 weeks	38	35	3
10 weeks	16	14	2
11 weeks	1	1	
15 weeks	2	2	
16 weeks	6	5	1
	—	—	—
	76	70	6

In addition to the ninety-six complete ovariectomies, five partial operations were performed, with the object in view of ascertaining to what extent regeneration occurs as a result of incomplete removal.

In each case a very small bit of ovarian tissue was left *in situ*, together with a greater portion of the capsule. Although these cases were allowed to run for only five weeks, examination revealed a remarkable degree of regeneration; in all five the regenerated mass approximated in size the average normal ovary. In each instance the capsule was markedly thicker than usual, and was very prominently supplied with bloodvessels.

The above evidence leads to the conclusion that, at least in an 8 to 16 week period, no regeneration occurs, provided the ovaries are completely removed. It is the writer's opinion that in mice ovarian tissue regeneration results from incomplete removal, and that such tissue does not arise *de novo* from non-gonadic tissue surrounding the site of the original ovary.

None of the mice examined was killed, and they will be kept alive over a considerable period, in order that the time-element may not be neglected as a possible factor in regeneration.

This is a preliminary report.

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<sup>1</sup> Davenport, C. B., *J. Exp. Zool.*, 1925, xlii, 1.

### 3571

#### Acid Intoxication of Adrenal Insufficiency in Dogs.

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Recent work on the blood chemistry of dogs and cats suffering from adrenal insufficiency suggests the probability that the adrenal cortex secretes a hormone which in some manner controls the normal functioning of the kidney. Several investigators<sup>1</sup> report marked nitrogen retention following adrenal removal. Swingle<sup>2</sup> and Swingle and Eisenmann<sup>3</sup> demonstrated phosphorus retention, and the existence of an uncompensated non-volatile acidosis in severe adrenal insufficiency. The acidosis was considered to be due to retention of the acid end products of normal metabolism.

Owing to the difficulty of bleeding cats repeatedly, and the fact that considerable quantities of blood are necessary for analysis, the writer made a detailed investigation of the acid intoxication following adrenal removal in dogs.

Adult male and non-pregnant dogs were employed, an interval of 5 to 10 days elapsing between operations. Longer intervals were