upon cell proliferation as manifested in the healing of extensive wound surfaces treated with this substance fail to take into account that the use of the dilute alcohol as solvent may be actually responsible for the good clinical results. Surgeons are well familiar with the beneficent effect of dilute alcohol wet dressings.

Since this paper was written two articles came to my attention which should be mentioned here. Gaunt[4] studying the division of fresh water snail eggs under the influence of cysteine failed to find any stimulating action. Secondly, Voegtlin and Chalkley[5] in a splendid investigation on the effect of reduced and oxidized glutathione on the division of *Amoeba proteus* have brought forth evidence of a stimulating action on *nuclear* division, which, however, is conditioned by the state of "maturation" of the cell, *i. e.,* upon some purely intrinsic factors, the nature of which is entirely unknown. These results are extremely significant, but they have little bearing upon Hammett's simplified scheme of mitosis of which SH is the key.

Summary. Neither thio-p-cresol, thio-phenol, thio-glycollic acid or cystine accelerates the process of regeneration in the *Podarke obscura.*

5541

Effect of Oestrin and Lutein Combinations on Uterus of the Mouse.

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It is well established that the physiological effects of the oestrin or follicular hormone of the ovary, when injected into various animals, will cause enlargement of the uterus. Allen and Doisy have very recently reviewed literature on the subject.[1] Advantage has been taken of this property of the ovarian hormone in a most interesting way by A. C. Siddall for the diagnosis of pregnancy and also for the evaluation of commercial ovarian products.[2, 3] From a study of a large number of mice, Siddall found that the ratio of the weight of

[4] Gaunt, R., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 660.

[5] Voegtlin, C., and Chalkley, H. W., *Public Health Reports,* 1930, **45**, 3041.

[1] Allen and Doisy, *Physiol. Rev.*, 1927, **8**, 60.

[2] Siddall, *J. Am. Med. Assn.*, 1928, **90**, 380.

[3] Siddall, *J. Am. Med. Assn.*, 1928, **91**, 779.

the uterus of a non-pregnant, mature white mouse to its body weight is usually over 400. When material containing the ovarian hormone is injected into such mice, hypertrophy of the uterus is produced so that the ratio of the uterine weight to the total body weight becomes less than 400. The present author has made a study of a series of normal mice and determined the ratio of the weight of the uterus in non-pregnant condition to the weight of the animal and was able to confirm Siddall's findings in this respect. In all cases the ratio was over 400 and, indeed, was often very much higher. Of 60 normal mice, the average ratio of the weights of the uteri to the body was 596, the lowest reading being 404 and the highest, 970. Of the 60 readings, 19 were between 404 and 500, 19 between 500 and 600, 3 between 600 and 700, 8 between 700 and 800, 7 between 800 and 900, and 4 between 900 and 960. These findings, together with the much more extensive findings first described by Siddall, suggested the present investigation.

A series of healthy, mature, non-pregnant white mice, weighing from 15 to 20 gm. each, and occasionally a little more, were divided into 2 groups. One group was injected daily with a standardized solution of the follicular hormone obtained on the market. The dosage injected daily varied from 1 to 2 Allen-Doisy mouse units. Another group of the same series of mice was injected with the same quantity of the follicular hormone together with an aqueous extract of corpus luteum prepared in these laboratories by a method previously described.[4] At the end of 10 days or more, the animals

TABLE I.
Injections of Oestrin Alone and Oestrin Plus Lutein
(October 24 to November 15, 1929).

	Oestrin alone, 0.2 cc. daily			Oestrin, 0.2 cc., plus lutein, 0.5 cc. daily		
	Weight of Body gm.	Weight of Uterus mg.	Ratio	Weight of Body gm.	Weight of Uterus mg.	Ratio
I	20,000	50	400	22,700	25	908
II	22,200	50	444	19,500	20	975
III	25,800	65	397	24,700	45	549
IV	27,200	70	389	19,000	20	950
V	22,000	170	129	27,200	85	320
VI	20,150	55	366	16,800	30	560
VII	20,840	55	379	21,450	30	715
VIII	20,550	55	374	20,950	30	698
IX	25,560	125	204	23,400	45	520
X	22,500	110	205	21,550	40	539
	226,800	Average	282	217,250	Average	587

[4] Macht, Stickels and Leach, PROC. SOC. EXP. BIOL. AND MED., 1929, **27**, 152.

were killed and carefully weighed. They were then cut open; the uteri were carefully dissected out and weighed on the chemical balance; and the ratio of the weight of the uteri to the total body weight was determined. Ten series of these experiments were performed; and the findings with such injections are illustrated in Tables I to

TABLE II.

Mouse	A Injected Oestrin Alone, 0.5 cc.			B Injected Oestrin, 0.5 cc., Plus Lutein, 0.5 cc.			C Injected Oestrin, Plus Prediegested Lutein, Same as in B		
	Weight of Body gm.	Weight of Uterus mg.	Ratio	Weight of Body gm.	Weight of Uterus mg.	Ratio	Weight of Body gm.	Weight of Uterus mg.	Ratio
I	12,770	32	399	18,780	40	469	20,380	45	453
II	11,500	25	460	18,860	45	419	21,550	35	616
III	23,000	125	184	25,030	62	403	22,120	50	442
IV	23,825	75	317	20,730	40	513	19,070	35	545
V	20,300	70	290	26,050	65	401	21,900	45	487
VI	25,200	125	202	23,800	58	410	21,680	40	542
VII	24,100	110	215	17,030	40	426	20,810	35	594
VIII	16,400	65	252	17,050	40	427	18,830	45	418
IX							20,080	50	402
X							18,780	45	417
	Average		289	Average		434	Average		492

III. In Table I are recorded experiments made with 0.2 cc. of a diluted follicin solution, equivalent to about one Allen-Doisy mouse unit of follicin, and 0.5 cc. of lutein, equivalent to 100 mg. of the dry corpus luteum gland substance. It will be seen that after the injections of oestrin alone, definite and decided hypertrophy of the uteri was found, as indicated by the ratio of the uterine weight to the total body weight. These findings could be easily seen on inspection of the organs with the naked eye. On the other hand, when the same doses of oestrin were injected together with an extract of corpus luteum, no hypertrophy of the uterus occurred and the figures obtained for the ratio of the 2 weights were over 400. In another series of 10 mice each, a different preparation of follicular hormone was used and similar results were obtained. The oestrin series gave ratios of 248 to 390 with an average of 295, and oestrin plus lutein gave ratios of 340 to 516 with an average of 465.

In Table II are recorded another series of experiments with 3 groups of mice. In Group A, the oestrin alone was injected, in doses of 0.5 cc., or about 2 mouse units. In Group B, the same amount of oestrin was injected together with 0.5 cc. of corpus luteum extract; and in Group C, the oestrin was injected together with a corpus luteum extract prepared from *predigested* corpus luteum gland substance. Here again, it will be noted that the oestrin alone produced hypertrophy of the uteri, as indicated by the low ratio of the uterine and body weights. In Group B, the combination of oestrin and lutein did not produce hypertrophy of the uterus, and in Group C, the results obtained with *predigested* lutein were the same as those obtained with ordinary lutein solution. Other series of experi-

TABLE III.
Feeding Experiments.

	Oestrin Alone			Oestrin Plus Lutein		
	Weight of Body gm.	Weight of Uterus mg.	Ratio	Weight of Body gm.	Weight of Uterus mg.	Ratio
I	21,600	55	393	21,840	30	728
II	27,000	70	357	24,440	40	611
III	28,000	80	350	21,000	25	840
IV	28,100	80	352	18,370	22	835
V	23,600	60	393	17,820	20	891
VI	24,700	65	380	20,370	25	815
VII	27,150	70	388	24,620	40	616
VIII	20,520	55	380	13,580	19	714
IX	13,940	35	398	15,900	20	795
X				22,500	35	898
		Average	377		Average	774

ments, performed in the same way as those illustrated in the tables, gave similar results. It would therefore seem that an injection of corpus luteum extract tends to counteract the hypertrophy-producing effect of the oestrin or follicular hormone in mice.

The authors furthermore made studies of a similar nature in regard to the feeding of follicular hormones and extracts of corpus luteum. This was done by sprinkling on a slice of bread a solution of oestrin alone and of oestrin together with lutein and feeding the different groups of mice. After 10 days very little effect was noted, but, on continuing the feeding experiments for periods of from 2 to 5 weeks and examining the animals after killing them, it was found that there was a distinct difference in the size of the uteri and in the ratios obtained between uterine and body weights. In Table III is illustrated one series of such experiments in which oestrin alone in doses of from 2 to 5 mouse units was devoured by each mouse daily, on the one hand; and, on the other, in which the same quantity of the oestrin was fed with 0.5 cc. of the lutein solution on bread. It may be added that injections of corpus luteum extracts alone produced no appreciable change in the size of the uteri of control mice. Investigations are being continued and it is hoped that this method may furnish a practical way of evaluating the physiological activity of corpus luteum preparations.

5542

Reaction of Blepharisma to Golgi Impregnation Methods.

IMOGENE MOORE. (Introduced by L. L. Woodruff.)

From the Osborn Zoological Laboratory, Yale University.

From a study of the normal and regenerating contractile vacuoles *in vivo,* evidence was obtained that the normal contractile vacuole in *Blepharisma undulans* is not a permanent cell organ, but a system of temporary, potentially independent fluid vacuoles.[1] In view of the fact that conflicting opinions concerning the permanence of contractile vacuoles have arisen from the failure of investigators to study both living and stained preparations, the above conclusions have been tested by a study of fixed material, derived from the pedigreed cultures. The Nassanov methods and the original Kolatschev technique were employed, not only because of their proved

[1] Moore, I., *Anat. Rec.*, 1930, **47**, 346.