5.0 mg dose. Consequently we do not believe that his data support such a conclusion. It is our impression that, in the animals castrated after the 14th day, at least, the opposite is probably true, *viz.*, the fetal deaths are due to insufficient dosage.

We are therefore able to confirm the findings of Scipiades that androgens maintain gestation in the castrate rat, but are unable to confirm his conclusion that these androgens are injurious to the fetus.

Summary and Conclusions. Testosterone, testosterone propionate and androstenedione maintained pregnancy with resulting living fetuses in rats castrated during the latter half of pregnancy.

10985 P

Effects of Selective Salivary Gland Extirpation upon Experimental Dental Caries in the Rat.*

VIRGIL D. CHEYNE. (Introduced by G. H. Whipple.)

From the Division of Dental Research, Department of Pathology, School of Medicine and Dentistry, The University of Rochester, Rochester, N. Y.

The production of experimental tooth destruction seems to be one of the most valid methods by which oral pathology can be studied in the rat.[1] Although changes in caries-susceptibility have been obtained by the use of different diets it has not yet been adequately demonstrated whether the saliva plays a part in the observed effects. To test this relationship a procedure[2] for the extirpation of the salivary glands of rats has been reported which makes it possible to study the influence on the teeth of the removal of all or certain types of the salivary secretions. In this report various combinations of glands have been removed and the attending incidence of caries-susceptibility compared.

Experimental. A total of 88 rats were selected from the same Wistar breeding stock at 22 days of age and placed on two different diets. One of these (Hoppert, Webber, and Canniff[3]) was known

* The investigation upon which this report is based was made possible by funds granted by the Carnegie Corporation of New York.

1 Rosebury, T., *The Problem of Dental Caries, Dental Science and Dental Art* (S. Gordon, ed.), Philadelphia, Lea and Febiger, 1938.

2 Cheyne, V. D., *J. D. Res.*, 1939, **18**, 457.

to be productive of caries, and the other (regular stock[4]) has been found to produce little damage to the teeth.†

Groups of rats in each series were operated upon to remove the various salivary fractions. After 100 days the animals were chloroformed, the jaws separated, and all molar teeth examined by means of a fine-pointed explorer under a binocular microscope, magnification 30×. Each jaw was then split longitudinally, radiographed, and affected areas checked with the record. Several sagittal planes of jaw segments were examined histologically in ground and decalcified section to confirm the accuracy of the diagnosis.

Two methods of indexing were employed for differentiating the carious susceptibility between groups. The first made use of counting total carious teeth or cusps and indicating this factor as the "extent" difference. The second was based upon the postulate[5] that mechanical fracture of rat molars precedes most experimental carious destruction. It was assumed that a roughly uniform rate of fracture occurred in all groups on the same diet and the ratio of fractured teeth to carious teeth at the end of the experimental period represented differences in rate of carious involvement of these fractures. This ratio was designated as "activity", and for this reason the two types of lesions were recorded separately. The caries-index established in this manner denoted extent as well as activity of the carious process. Male and female differences were not sufficiently significant to warrant independent consideration in any group.

Results. Table I, series A and B, gives the essential details of the experimental procedures and results. The significant findings are as follows: (1) operated animals with totally removed serous saliva show a high incidence of caries-involvement, and in contrast to other groups, have a low incidence of fracture lesions (groups 2 and 6); (2) disturbance of glandular function by removal of other combinations of glands likewise results in an increased, although less marked, extent of caries; and in addition (although simple measurements of carious extent did not reveal this difference), (3) the animals show a greater caries-involvement of the fractures in direct proportion to the amount of serous saliva removed (groups 5, 3, 4, 6).

3 Hoppert, C. A., Webber, P. A., and Canniff, T. L., *J. D. Res.*, 1932, **12**, 161.

4 Maynard, L. A., *Science*, 1930, **71**, 192.

† This stock diet has been used by us for 9 years and normal stock colonies bred and maintained on it have shown little or no caries.

5 Bibby, B. G., and Sedwick, H. J., *J. D. Res.*, 1933, **13**, 429.

TABLE I.

Group	Exper. condition of animal	No. of animals	No. of molar teeth examined	No. of carious teeth involved		No. of carious cuspal involvements			No. of fractured teeth, per animal (x100)
				Total	per animal (x100)	Total	per animal (x100)	per tooth (x100)	
	Series A: Tooth Involvements in Normal and Operated Animals on Stock Diet.								
I	Normal	39	468	6	15	7	18	1	26
II	Parotid and submaxillary glands removed	19	228	22	116	35	184	15	5
	Series B: Tooth Involvements in Normal and Operated Animals on Hoppert, Webber and Canniff Diet.								
III	Normal	6	72	7	117	11	183	15	200
IV	Parotid glands removed	8	96	22	275	45	563	47	113
V	Submaxillary and major sublingual glands removed	8	96	18	225	47	588	49	263
VI	Parotid and submaxillary glands removed	8	96	81	1013	258	3225	269	38

Conclusions. Disturbance of normal salivary flow in the rat results in an increased incidence of experimental caries. The effect is most marked in rats with retained mucous saliva on a caries-producing diet and is in direct proportion to the amount of serous saliva removed. Caries production has even been observed in operated rats deprived of their serous saliva when fed a diet known to produce minimal dental destruction. The lower ratio of fracture to carious lesions in rats with such saliva indicates that the rate of development of carious lesions in these groups is very rapid.

10986

Responses of Hypophysectomized Immature Female Rats to Mare Serum Hormone.*

J. H. LEATHEM. (Introduced by P. E. Smith.)

From the Department of Anatomy, College of Physicians and Surgeons, Columbia University, New York City.

Hypophysectomized mature and immature female rats have been shown to respond to mare serum hormone by a marked increase in ovarian weight.[1, 2] The ovaries of the mature rats contained stimulated follicles, corpora lutea and corpora lutea atretica.[3] However, in virtually every individual case the period of treatment, the dosage administered and the time elapsing between hypophysectomy and the start of treatment were varied.[1, 3] Due to the persistence of corpora lutea after hypophysectomy the mature rat does not afford a basis for accurate estimation of hormonal action. Recently Noble, *et al.*,[4] have shown that follicle stimulation, granulosa luteinization and interstitial cell development resulted from two different dosages of this material in hypophysectomized immature rats. The first dosage was started 24 hours after the operation and the second 10 days later.

The investigation here reported was undertaken to study the effects of varied doses of the mare serum hormone "Gonadin"† on

* Aided by a grant, administered by Dr. P. E. Smith, from the Rockefeller Foundation, New York.

1 Evans, H. M., Meyer, K., and Simpson, M. E., *Mem. Univ. Calif.*, 1933, **11**, 257.

2 Smith, P. E., *J. Am. Med. Assn.*, 1935, **104**, 553.

3 Hamburger, C., *Endokrinologie*, 1936, **17**, 8.

4 Noble, R. L., Rowlands, I. W., Warwick, M. H., and Williams, P. C., *J. Endocrinology*, 1939, **1**, 22.

† Mare serum hormone, "Gonadin," was generous'y supplied by Doctor Donald Wonder, Cutter Laboratories.