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Lesions in the lacrimal glands of rats in experimental xerophthalmia.[1]

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The marked changes in lacrimal secretion associated with experimental xerophthalmia, suggested a study of the lacrimal glands of animals suffering from this condition. Young rats weighing from 45 to 50 grams were subjected to a diet deficient in fat-soluble A. The diet consisted of casein, mineral salts, starch, lard, and yeast. There were 24 animals in the series including 6 with early eye changes, 8 with advanced changes, 4 cured cases and 6 normal controls. In the early 6 cases the lacrimal glands appeared little altered, although in some the glandular epithelium looked to be somewhat modified, the cells being markedly vacuolated and quite ragged in outline. Of the 8 advanced cases, one showed a widespread suppurative inflammatory process with polymorphonuclear leukocytes filling the tubules. In three there were foci of necrosis, which were quite numerous in one instance. In the four remaining cases the parenchymal cells were possibly slightly altered. Three out of four cured cases showed mononuclear cell accumulations, foci of atrophy, or fibrosis. In the glands of the six normal animals definite changes were found in one only.

From a review of all the material, we believe the following tentative conclusions are justified:

1. The lacrimal gland may be the seat of a marked pathological change, either degenerative or inflammatory in nature.

2. Such changes are much more marked in xerophthalmic than in normal rats.

3. Variations in the size, form, and staining properties of the cells are frequently seen and are probably referable to functional disturbances related to the ophthalmia.

[1] This investigation was made in coöperation with Drs. Thomas B. Osborne and Lafayette B. Mendel, under whose direction the feeding of the experimental animals was conducted. The Connecticut Agricultural Experiment Station and the Carnegie Institution of Washington shared the expenses of the research.

4. These changes may account for some of the phenomena of xerophthalmia, particularly the drying of the cornea in the later stage of the condition.

184 (1931)

Increased blood sugar coincident with ovulation in pigeons.

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The data of an earlier communication by one of us[1] have made it nearly certain that in healthy pigeons the suprarenals usually undergo extensive and regular enlargement at the period of ovulation. This result, in view of many facts which indicate an influence of the suprarenals on the mobilization of sugar, naturally leads to an inquiry as to whether the blood sugar also undergoes a similar and simultaneous increase in amount. The data reported here indicate that such an increase of blood sugar does also regularly occur.

Scott and Honeywell[2] concluded that in non-reproducing common pigeons of unknown sex the blood sugar amounts on the average to about 185 mgm. per 100 c.c. of blood as determined by MacLean's method. This same method was used in the present study and a similar amount of sugar was found for birds not actively ovulating. Ring doves in other than ovulation periods have, however, distinctly less blood sugar. Both of these kinds of pigeons, together with a third group—"scraggly" common pigeons—have been used by us. The "scragglies" are a mutational or aberrant form having a quite imperfect epidermal system (including the feathers) and bearing suprarenals earlier observed to show wide variation in size. Because of these variations it seemed desirable to include observations on this group. Males and females, both adult and young, of all the three groups have

[1] Riddle, Oscar, PROC. SOC. EXPER. BIOL. AND MED., 1922, xix, 122.

[2] Scott, E. L. and Honeywell, H. E., *Amer. Jour. Physiol.*, 1921, lv, 362.