It appears that the respiratory center is the first to recover, since the alpha bursts described above coincide with the slight, but distinct respiratory movements which are the first manifestations of the return of muscular activity.

Heat narcosis as demonstrated by the electroencephalogram can also be produced by immersion in water of 33 to 35°C, although the frogs have to be immersed for a longer period of time (15 to 20 minutes) and the recovery is more rapid.

*Conclusion.* The effects of immersion of frogs in water of 38 to 40°C on the threshold of denervated skeletal muscle and on the electrical activity of the brain have been investigated. (1) The muscular threshold to electrical stimulation is increased, and returns to normal after 5 to 10 minutes. (2) The brain waves disappear almost completely. After several minutes fast alpha activity appears in single bursts, which occur more often. After 10 to 15 minutes the normal brain pattern returns. (3) The effects on the muscle and on the brain do not appear to be related with each other since the muscular threshold returns to normal before the appearance of a normal electroencephalogram.

The present experiments demonstrate for the first time that the brain is subject to a reversible heat paralysis as other organs.

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## Lobule-Alveolar Growth of Mammary Glands of Hypophysectomized Female Rats.

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In previous experiments we[1] have observed that the simultaneous administration of estrogen and growth hormone induced typical estrogen stimulation of the mammary glands of hypophysectomized male rats. In addition it has been shown that the injection of testosterone into sexually mature spayed rats stimulated growth of the lobule-alveolar system of the mammary glands[2] and furthermore

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1 Reece, R. P., and Leonard, S. L., *Endocrinology*, 1941, **29**, 297.

2 Reece, R. P., and Mixner, J. P., PROC. SOC. EXP. BIOL. AND MED., 1939, **40**, 66.

in hypophysectomized male rats no growth occurred.[3] Consequently it was of interest to determine the effect of testosterone alone and in conjunction with the growth hormone on the mammary glands of spayed hypophysectomized rats.

Twenty sexually mature virgin rats were ovariectomized and hypophysectomized. Beginning on the day following operation 6 of the rats were injected subcutaneously daily for 15 days with 300 $\gamma$ of testosterone propionate† and the remaining 14 rats received subcutaneously 300 $\gamma$ of testosterone propionate plus 0.5 cc of growth hormone‡ intraperitoneally daily for 15 days. The rats were sacrificed on the day after the last injection and the right abdominal mammary glands removed and studied as whole mounts. Completeness of hypophysectomy was checked by sectioning the *sella turcica*. The operation was complete in all animals included in this report.

The mammary glands of the testosterone-treated rats showed involutionary changes, although many lateral buds were still intact (Fig. 1). In marked contrast were the mammary glands of the rats receiving the combined treatment. The lobule-alveolar system had been developed, the development being especially extensive in the

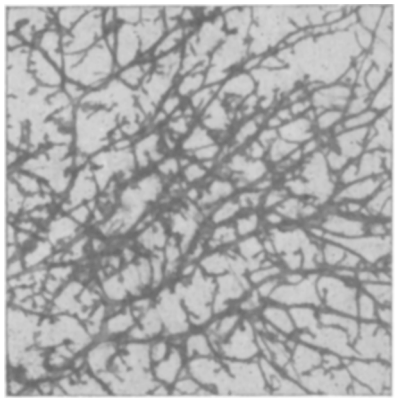

FIG. 1.

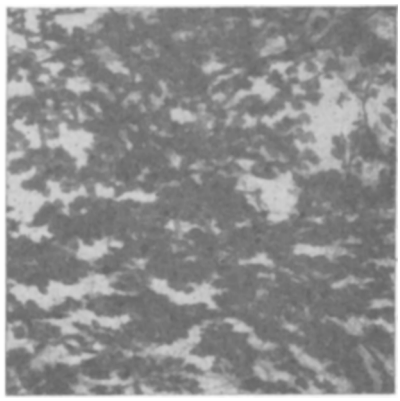

FIG. 2.

FIG. 1. Whole mount of a mammary gland of a spayed hypophysectomized rat injected with 300 $\gamma$ of testosterone propionate daily for 15 days.

FIG. 2. Whole mount of a mammary gland of a spayed hypophysectomized rat injected with 300 $\gamma$ of testosterone + 0.5 cc of growth hormone daily for 15 days.

[3] Leonard, S. L., and Reece, R. P., *Endocrinology*, 1942, **30**, 32.

† The testosterone propionate (Perandren) was kindly supplied by Doctor R. MacBrayer of the Ciba Pharmaceutical Products, Inc., Summit, N.J.

‡ The growth hormone (Squibb) was kindly supplied by Doctor J. S. De Frates of E. R. Squibb & Sons, New Brunswick, N.J.

proximal region of the gland (Fig. 2). The mammary glands of 12 out of 14 injected rats showed alveolar growth.

*Conclusions.* The injection of 300 γ of testosterone propionate daily for 15 days into spayed hypophysectomized rats failed to induce mammary growth. Lobule-alveolar growth of the mammary glands was induced in spayed hypophysectomized rats by the administration of 300 γ of testosterone propionate plus 0.5 cc of growth hormone daily for 15 days. Therefore some pituitary "mammogen" is essential for lobule-alveolar development of the rat mammary gland when stimulated by testosterone.

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## Effect of Magnesium Deficiency on Dentin Apposition and Eruption in Incisor of Rat.

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Seventeen white rats (68-138 days of age) were fed the Kruse-Orent-McCollum diet,[1] which is deficient in magnesium (1.8 parts per million), for a period of 22-85 days. Eleven littermate controls were placed on the deficient diet to which magnesium was added in the form of $MgSO_4 7H_2O$. A group of 7 rats which were fed a modified form of this diet (the salt mixture was reduced one-half in amount) showed similar but less advanced effects.

*Radiographic Findings.* In the incisor the earliest change seen after 22-40 days on the deficient diet is a widening of the periodontal membrane, an indistinct outline of the *lamina dura* and a disturbed contour of the enamel surface. These changes become more marked with longer survival periods (50-76 days), when the pulp is shifted labially, with concomitant thinning of the dentin and folding of the basal portion. The pulp also shows radiopaque longitudinal streaks. The angle of the incisal bevel is increased from the normal of 45° to as high as 75°.

In the advanced stages the molars show a widened periodontal membrane and a rarefied appearance of the alveolar bone, so that the molar roots stand out clearly by contrast.

*Rate of Eruption.* In the deficient animals, the first 2 weeks show a

1 Kruse, H. D., Orent, E. R., and McCollum, E. V., *J. Biol. Chem.*, 1932, **96**, 519.