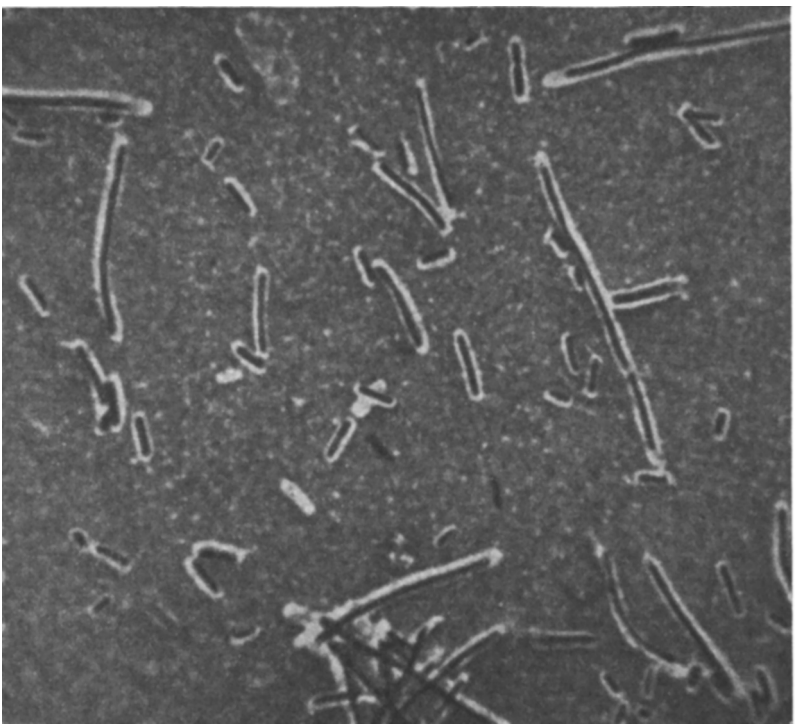

FIG. 1.
Heavily encapsulated form of *B. typhosus* appearing at low temperature incubation. Photograph by Dr. A. J. Salle.

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Effect of Testosterone Propionate in Eunuchoidism.

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Although the exact form and nature of the hormone secreted by the testis are unknown, testosterone, which has been extracted from bull testis, constitutes together with certain of its esters the most potent of known substances in repairing castration defects in animals. We wish to report the influence of synthetic testosterone propionate*

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in eunuchoidism, a syndrome whose clinical expression is practically entirely that of testicular deficiency and in which it has already been shown that the excretion of androgens in the urine is materially diminished.[1, 2]

Four eunuchoids (N.D., age 31; N.T., age 30; H.K., age 24, and J.H., age 36) received 25 mg. of testosterone propionate, intramuscularly, from 5 to 7 times weekly for 28 to 95 days. Thereafter, in the last 3, from 10 to 25 mg. 3 to 7 times weekly was given, with interruptions, for 152, 108, and 160 days respectively. In all instances there was an early increase in the frequency of erections and a marked increase in the size of the prostate (day 12 to 36). The penis elongated from 1 to 2 cm. in all but N.T. In 2 (J.H., H.K.) there was a distinct deepening of the voice (day 27-95, 26-36) and a striking development of hair in the pubic area, up the linea alba, over the thighs and on the face, while in N.T., who was further advanced to begin with, the fairly deep voice did not change and the increase in hair, while definite, was quite moderate. In J.H., nubbins of breast tissue 3x2.5 cm. in diameter appeared under the nipples (day 42) and in J.H. and H.K. a slightly opalescent fluid could be expressed from the nipples. These findings are in agreement with those of Hamilton.[3]

Each of these 4 men gained in weight, the amounts being for N.D. 6 kg. in 28 days, for N.T. 4.5 kg. in 41 days, for H.K. 8.5 kg. in 64 days, for J.H. 7 kg. in 42 days. An increase in appetite was reported in J.H. and H.K.; demonstrable edema was observed in J.H. and N.D.

Three eunuchoids (N.D., age 31; F.R., age 26; M.D., age 51) were studied in the hospital while on a diet constant in calories, protein, carbohydrate, fat, water and minerals, and sufficient to maintain unchanging weight. In 2 (F.R., M.D.) 3 alternate diets were used, in N.D. one diet only, served hot and cold on alternate days. Studies of the insensible weight loss on the "cold" days (N.D) by the method of Newburgh and coworkers[4] disclosed an increase, if anything, in total calories expended during the experiment. Testosterone propionate (25 mg.) was given daily for 9 to 12 days. In all patients there was a definite increase in weight (F.R. 3.0 kg.,

[1] Gallagher, T. F., Peterson, D. H., Dorfman, R. I., Kenyon, A. T., and Koch, F. C., *J. Clin. Invest.*, 1937, **16**, 695.

[2] Kenyon, A. T., Gallagher, T. F., Peterson, D. H., Dorfman, R. I., and Koch, F. C., *J. Clin. Invest.*, 1937, **16**, 705.

[3] Hamilton, J. B., *Endocrinol.*, 1937, **21**, 649.

[4] Newburgh, L. H., Johnston, M. W., Lashmet, F. H., and Sheldon, J. M., *J. Nutrition*, 1937, **13**, 203.

M.D. 1.3 kg.; N.D. 1.7 kg.), in all a sharp decline in urinary nitrogen, such as described by Kochakian and Murlin[5] in the castrate dog. This decline was reflected completely in the urinary urea (N.D.) and was unaccompanied by significant change in the nitrogenous blood constituents (N.D.). The nitrogen stored at the point of maximum weight gain (61 gm. in F.R., 23 gm. in M.D., 24 gm. in N.D.), means a storage of protein of from 144 to 381 gm., far in excess of any conceivable requirement of the growing prostate and seminal vesicles but insufficient, together with the accompanying water, to account for more than a third to a half of the total weight gain. There was in all 3 a drop in the urinary sodium and in F.R. of the urinary chlorides. The estimated sodium retention of 7.6 gm. in F.R., 5.0 gm. in M.D., and 3.8 gm. in N.D. was sufficient or more than sufficient to account, together with the associated water, for the additional weight gain and the edema observed in the longer experiments. This is in accord with the observations of Thorn and Harrop,[6] who have induced sodium retention in the normal dog by testosterone, estrone, etc., similar to that caused by large doses of the adrenal cortical hormone. The basal metabolic rate in all 3 patients increased slightly (from 7 to 11 points) and the R.Q. in 2 experiments (F.R., M.D.) was unchanged. In one patient (F.R.) a significant creatinuria was abolished, in the other 2 creatinuria was inconspicuous. During recovery the urinary nitrogen, sodium and chloride increased and the basal metabolism declined.

Conclusions. Testosterone propionate causes enlargement of the prostate and progression of secondary sex characters in the eunuchoid, together with a gain in weight, nitrogen and sodium retention, and a slight increase in the basal metabolic rate.

[5] Kochakian, C. D., and Murlin, J. R., *J. Nutrition*, 1935, **10**, 437; Kochakian, C. D., *Endocrinol.*, 1937, **21**, 750.

[6] Thorn, G. W., and Harrop, G. A., *Science*, 1937, **86**, 40.