prevent but rather aggravated the condition. Acid autoclaved liver extract prevented the condition, but its action may have been due to its pantothenic acid content.

The activity of pantothenic acid in the prevention of adrenal necrosis has been reported by Daft, F. S., Sebrell, W. H., Babcock, S. H. J., and Jukes, T. H., (*Public Health Rep.*, 1940, **55**, 1333) but due to an oversight the authors did not find their paper until after this note was submitted for publication.

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Effect of Testosterone Propionate on Regenerating Anal Fin of Adult *Platypoecilus maculatus* Females.*

CLIFFORD GROBSTEIN. (Introduced by B. M. Allen.)

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It has been found previously that administration of testosterone propionate to adult female poeciliid fishes masculinizes the anal fin but does not produce a typical male copulatory organ or gonopod (Regnier[1]—*Xiphophorus helleri;* Grobstein[2]—*P. maculatus, P. variatus*). The present experiments were performed to determine whether the incomplete masculinization may be due, in whole or in part, to lack of capacity of the reacting fin for gonopod formation.

Sixty-six adult *P. maculatus* females (9 months of age or older, 25 to 35 mm in length) were injected intraperitoneally with testosterone propionate during anal fin regeneration. In the 5 separate series that were run, both dosage and the interval between time of removal of the anal fin and beginning of injection were varied in an effort to obtain the most typically male response possible. Concentrations of 2.5, 5.0 and 25.0 mg/cc were used and injection was begun at intervals of 0, 5, 10, 12, 20, 24 and 56 days after removal of the anal fin. In all series but one 0.05 cc of solution was injected every fifth to seventh day until the response was completed.

Controls were of 3 types: 15 were untreated during anal fin regeneration, 10 were injected during regeneration with sesame oil,

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1 Regnier, M., *Bull. Biol.*, 1938, **72**, 385.

2 Grobstein, C., unpublished data.

the medium in which the hormone was administered, and 17 were normal females receiving testosterone propionate of appropriate concentration simultaneously with the experimental animals.

The anal fin was removed with sharp surgical scissors by cutting across the rays approximately one millimeter from the body. In all cases good ray stumps remained. Bleeding was absent or limited. Mortality, either from injection or anal fin removal, was negligible.

Results. Following amputation a characteristic female anal fin is regenerated by normal or sesame-oil-injected females in approximately 30 to 40 days. Under the influence of testosterone propionate, however, a structure is produced (Figure 1-C) which, while not typical, is clearly more like the normal male gonopod[3] (Figure 1-A) than that produced by treating females with intact anal fins (Figure 1-B). The third ray of the masculinized regenerate (Figure 1-C, 3) is strongly thickened and, together with the fourth and fifth rays, is elongated to form a short, but conspicuous promontory ("3, 4, 5 complex"). Within the promontory may be recognized the various specialized structures characteristic of the normal gonopod, *viz.*, spoon support (ss), spoon (sp), proximal teeth (pt4), distal teeth (dt), terminal hook (th), and blade (bl). The specialized structures

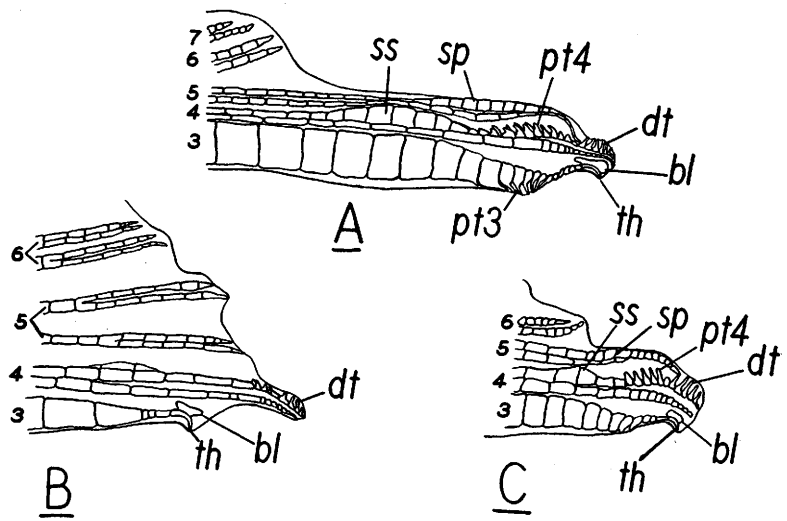

FIG. 1.

A. Distal half of normal male gonopod. B. Distal portion of rays 3, 4, 5, 6 of masculinized anal fin from a normal adult female injected with testosterone propionate. C. Distal portion of rays 3, 4, 5, 6 of anal fin regenerated by an adult female injected with testosterone propionate. bl—blade; dt—distal teeth; pt3—proximal teeth of third ray; pt4—proximal teeth of fourth ray; sp—spoon; ss—spoon support; th—terminal hook.

[3] Grobstein, C., *Univ. Calif. Publ. Zool.*, 1940, **47**, 1.

resemble those of the normal male but are more or less atypical in form. Thus, the teeth and terminal hook are thick and blunt, the blade is poorly shaped, the spoon is a jumbled mass, and the spoon support is little more than a thickening of 2 or 3 segments in the caudal ramus of the fourth ray.

While some variation in structural detail has been observed with the different concentrations of hormone injected, the fundamental pattern of the response appears to be the same. Greater differences were obtained by varying the interval between the time of removal of the anal fin and the beginning of injection. When injection was begun from 0-20 days after removal of the anal fin the response was essentially similar to that described above. Beyond 20 days, however, there was a noticeable decline in the capacity for gonopod formation and, by 56 days, the structure produced was very much like that resulting from injection of normal adult females (Figure 1-B).

The data so far available support the idea that the anal fin during the regenerative course passes through a period of maximal capacity for gonopod formation and that this capacity declines as the definitive female form is attained. It is likely, therefore, that at least one factor involved in the incomplete and atypical masculinization of the intact adult female fin by testosterone propionate is limited capacity of the reacting tissues for gonopod formation.

Summary. Treatment of adult *P. maculatus* females with testosterone propionate, begun during the first 20 days of anal fin regeneration, produces an anal fin which is more male-like than that obtained by treatment of normal females but which differs clearly from the typical male gonopod. Beyond 20 days of regeneration the capacity for gonopod formation declines until, by the time the characteristic female form is attained, the capacity is no greater than in the normal adult female fin.