dilution of the small amount of injected (and smaller amount of cleared) material by the relatively large extracellular fluid volume results in insignificant concentrations of isotope in the arterial blood. In the case of the small animal, the dilution is not nearly as great and the returning isotope is responsible for a significant and increasing fraction of the total activity seen by the counter over the injection site.

The apparent linearity of short term experiments in animals can be accounted for if one recognizes that the arterial concentration is progressively increasing, and that while after 30 minutes the returned isotope may account for as much as half of the total activity at the injection site, during the first few minutes the correction is but a negligible one. Results based on the clearance during the first few minutes after injection are therefore admissible; the advantage to be obtained from making the correction outlined herein has to do with extending the period of observation. Several workers (*e.g.*, McGirr) have called attention to the variability in clearance during the first 3 to 5 minutes after injection of the isotope. The clearance measurements without correction must therefore be based on a relatively short length of curve beginning after the initial irregularities and ending before the returning isotope is present in sufficient concentration to cause significant error.

Conclusions and summary. We have shown that a major factor responsible for the apparently nonlinear tissue clearances as measured in small animals is the return of isotope to the area of the injection in the arterial blood. By means of a relatively simple procedure it is possible to make correction for this error and to obtain reasonable, exponential clearances. This correction is made by subtracting the simultaneously measured activity over a corresponding area of tissue from the count over the injection site.

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Effects of Alpha-estradiol Benzoate and Methyl Testosterone upon the Platyfish, *Xiphophorus maculatus* Skeleton.* (20446)

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It has been shown that estrogenic hormones induce profound modifications of the pelves in pocket gophers and mice through the resorption of cartilage and bone(1,2). Recent morphological studies of 2 species of viviparous fishes indicate that there is a partial resorption of the anterior hemal spines in females(3,4) Fig. 1. In the light of these data, the present experiments were undertaken to evaluate the influence of an estrogen and an

androgen upon sensitive areas of the skeleton of the common platyfish, *Xiphophorus maculatus*.

Fifty-four fish were separated into 4 groups according to age and sex. Thirty-three of them were maintained in 3-liter glass jars containing conditioned water and synthetic hormones. Once a week, the jars were thoroughly cleaned and fresh quantities of conditioned water and hormones were added. The remaining, untreated 21 fish, used as controls, were maintained under similar conditions. At the conclusion of the experiment, all of the fish were fixed in 2% KOH, stained with Alizarine Red S and mounted for study in glycerine. This technic renders the muscles transparent and stains the skeleton for immediate observation. Weekly dosages of 0.03 mg/liter of alpha-estradiol benzoate from an alcohol stock solution was placed into water jars containing platyfish males. Animals treated with this estrogen constitute Series I which contained 3 groups, A, B, C. Group A consisted of 10 immature males. Sexes were determined by genetic methods(5,6). Group B included 10 maturing males. Group C was made up of 15 adult males. Series II consisted of 19 adult females which were treated with 5.0 μg/liter of methyl testosterone.

Results. Series I, A. Of 6 immature males treated with alpha-estradiol benzoate for 12 weeks, 5 showed dissolution effects at the anterior hemal spines. In 4 of the 5 animals, the first hemal spine of each was detached from the vertebral column and had undergone dissolution. In the fifth animal, the first 2 hemal spines were detached and were partially dissolved. All of the remaining, intact anterior hemal spines of the estrogen-treated fish were deflected posteriorly. They resembled their more posterior counterparts in structure and orientation. In the 4 control animals, on the other hand, all of the anterior hemal spines were retained and deflected anteriorly.

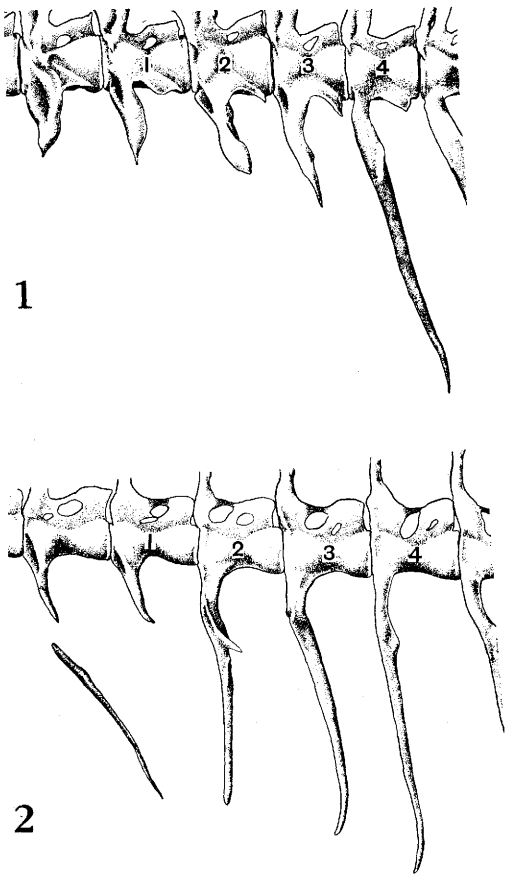

FIG. 1. A portion of the axial skeleton of a normal adult female. First 3 hemal spines have dissolved from caudal vertebrae 1, 2, 3.

FIG. 2. A portion of the axial skeleton of a normal adult male. The first hemal spine is detached from the first caudal vertebrae; succeeding hemal spines remain intact.

Series I, B. Six maturing males, 2 weeks short of sexual maturity as determined by their anal fin structure(7), were treated with estrogen for 8 weeks. In 2 fish the first hemal spine of each was dissolved and the second spine was detached from the vertebral column. The 4 remaining treated animals and all 4 controls retained their anterior hemal spines (Fig. 2).

Series I, C. The anterior hemal spines of 9 adult males, treated with estrogen for 8 weeks, were indistinguishable from those of 6 controls (Fig. 2).

Series II. Two series of small, sexually dimorphic bones called mesonosts and baseosts,

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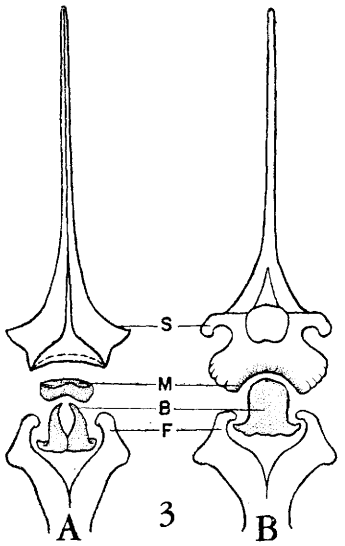

FIG. 3. Anterior view of a unit of the anal fin suspensorium at the level of the fifth interhemal spine (S). A. Normal adult female: the mesonost (M) and baseost (B) are discrete, the baseost being bipartite. B. Normal adult male: the mesonost (M) is fused to the base of the interhemal spine (S) and the baseost (B) is unipartite. Abbreviations: S—interhemal spine; M—mesonost; B—baseost; F—anal fin ray.

comprise the basal portion of the anal fin suspensorium. In normal adult females they are discrete; the baseosts being bipartite (Fig. 3A). In normal adult males, the mesonosts are apparently missing, but they are actually fused to the ventral surfaces of the interhemal spines (Fig. 3B). The baseosts in males are discrete but unipartite.

In 6 of the 12 adult females treated with methyl testosterone for 8 weeks, the entire series of mesonosts was fused to the ventral surfaces of the first 8 interhemal spines. In the 6 remaining animals, the anterior mesonosts were fused while the posterior ones were close to but not fused to their corresponding interhemal spines. In all of the treated animals, the baseosts had begun to take on the unipartite condition characteristic of normal males. The 7 control females had normal, discrete mesonosts and bipartite baseosts.

Summary. Alpha-estradiol benzoate induced the dissolution of one or two anterior hemal spines in a significant number of immature and maturing male platyfish but elicited no response in adult males. Methyl testosterone, administered to adult female platyfish, induced the fusion of 2 series of small, basal bony elements, the mesonosts and baseosts. The mesonosts ordinarily discrete, became fused to the ventral surfaces of the interhemal spines. The baseosts, normally bipartite, became unipartite.

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Rate of Disappearance and Metabolism of Hydrocortisone and Cortisone in the Synovial Cavity in Rheumatoid Arthritis.*† (20447)

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Several investigators have found that the acetate of hydrocortisone (Kendall's Compound F, 11-hydroxy-corticosterone) is effective in suppressing inflammation when injected into joints with synovial effusions(1-3). Since

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