young were recovered alive after being allowed to remain *in utero* for one and 2 days past the expected date of parturition. Placentae, including those of previously removed foetuses, were viable and healthy.

A second group of 10 females was subjected to precisely the same treatment, with the exception that the 'extra' placentae were included in the surgical removal of foetuses on the 12th or 13th day. Following removal of the second ovary none carried to term. Autopsy on the expected date of delivery revealed markedly involuted uteri containing no indications of embryonic substance. A control group of 11 animals, treated in the same manner with the exception that the second ovary was not extirpated, carried through successfully, and normal delivery occurred in each instance at the expected time.

In the rat, therefore, the ovaries are not essential for the maintenance of pregnancy at least during the last third, providing (1) only one foetus is being carried, and (2) sufficient viable placental tissue is present. The birth mechanism, under conditions of the experiments, is inhibited.

These results, to be considered *in extenso* elsewhere, indicate that the placenta may supply progestin, and hence may serve in an auxiliary capacity to the ovaries. It is suggested that the degree of development of this auxiliary capacity may determine the relative freedom from dependence upon ovarian support encountered in certain mammals.

8268 C

Sex Reversal in Amblystoma. VIII. Sex Type of Gonads Developed from Gonadic Preprimordia of A. punctatum Implanted in Axolotl Females.*

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The writer[1] and Burns,[2] using different technical methods, have demonstrated that the testis (or potential testis) of *A. punctatum (maculatum)* may undergo reversal or transformation to an ovary

* Material obtained through the kindness of Dr. Cranford Hutchinson and the Morris Biological Farm of the Wistar Institute.

1 Humphrey, R. R., *Anat. Rec.*, 1935, **62**, 223.

2 Burns, R. K., Jr., *Anat. Rec.*, 1935, **63**, 101.

when kept throughout development under the influence of a female of the more rapidly developing species, *A. tigrinum*. The structural changes involved in this reversal have been described.[1, 2] The present report offers further evidence of the occurrence of such reversal of testis to ovary.

Right gonadic preprimordia of *A. mexicanum* (Mexican axolotl) embryos were removed and replaced by the corresponding preprimordia of *A. punctatum* donors. All operations were performed during tail-bud stages (28 to 32 of Harrison's series), employing the technique previously described.[3] Embryos serving as donors were reared whenever possible as a check upon the sex type of the gonad derived from the transplant. This gonad has been studied in serial sections in the case of hosts dying or killed during earlier stages, or its type has been ascertained by exploratory operation in the case of hosts surviving to more advanced ages (4 months or over). The sex of the host has been ascertained by similar study of its remaining gonad (on left side).

In the 37 hosts found to be females, the gonad derived from the transplant proved to be a testis in only 2 cases (5.4%) instead of the 50% expected on the basis of the approximately 1:1 sex ratio exhibited by the donor species. Of the donors furnishing transplants for these 37 hosts, 28 survived—16 females and 12 males. There are thus 10 cases in which the gonad of the transplant, although an ovary, is known to have been derived from a gonadic preprimordium supplied by a *male* donor. In 2 other cases the structure of the graft ovary indicates its probable development by reversal from a testis, since the cortex is relatively thin and the central cavity or ovarial sac contains free spermatogonia or other cells derived from the disintegrating testicular component of the gonad. Further, one of the 2 grafts classed as a testis, although it has attained a large size and has induced a pronounced modification of the ovary of the host (killed at 95 days), nevertheless exhibits features indicative of a probable later reversal to ovary (hypertrophy of the male cortex, marked degeneration of spermatogonia, and expansion of rete cords to form small ovarial sacs).

The findings noted above are in harmony with those previously reported by the writer[1] for *A. punctatum* transplants developing in *A. tigrinum* females; among the latter, normal testes were found in only 2 out of 88 cases. That these results cannot be dismissed as due to intermixture of host and graft tissues is shown by their close correspondence to the findings of Burns[2] in *A. punctatum*

[3] Humphrey, R. R., *J. Exp. Zool.*, 1929, **53**, 171.

males joined in parabiosis to *A. tigrinum* females. Although in younger age groups the expected proportion of such pairs may be readily identified, pairs consisting of *punctatum* male and *tigrinum* female are almost completely lacking in older age groups, due to the tranformation of the testes of the *punctatum* cotwin into ovaries. In older grafted animals, as in older parabiotic twins, reversal of the testis is found to be completed, but in these the known male sex of the donor may afford conclusive evidence that reversal of the sex potentialities of the transplant has been induced by the female host.

It is concluded that reversal of sex type in gonads derived from *A. punctatum* males is the general rule when these gonads develop in axolotl females, only an occasional graft testis proving capable of attaining a dominance over the ovary of the host and continuing its normal development.

8269 P

Pelvic Changes Occurring in Male Mice Receiving Large Amounts of Folliculin Benzoate.

W. U. GARDNER. (Introduced by Edgar Allen.)

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The resorption of the pubic bones of the male pocket gopher has been induced experimentally by the administration of estrogenic hormone (Hisaw[1]). In the guinea pig 2 hormones, one of follicular origin and one present in the blood of pregnant rabbits or in the corpus luteum, were necessary to induce a relaxation of the pelvic ligaments (Hisaw[2]). In these species sexual dimorphism in the structure of the pelvis of matured animals exists. Males have the pubic bones well united by cartilage while the pubic bones of mature females have a ligamentous attachment.

This sexual dimorphism of the pubic symphysis was not noted in rats (Todd[3]). The pubic bones were well and firmly attached at the symphysis on both males and females. Observations to be reported here indicate that large amounts of estrogenic hormone are effective in inducing changes in the symphysis of the mouse in which a sexual dimorphism of the pelvis also occurs.

1 Hisaw, F. L., *J. Exp. Zool.*, 1925, **42**, 411.

2 Hisaw, F. L., *Physiol. Zool.*, 1929, **2**, 59.

3 Todd, T. W., *Am. J. Anat.*, 1923, **31**, 345.