

Experiment 3. Killed 30 seconds after copulation. Left horn clamped 24 seconds later, the right 9 seconds after that. No sperms were found distal to the clamps, but plenty of them in the lower half of each uterine horn.

Experiment 4. Killed as quickly as possible after mating. Right horn clamped 54 seconds, left 63 seconds after coitus. Plug with active sperms in vagina, none in cervix or uterus.

From the last experiment one might conclude that something has to happen in the genital tract of the female within a few seconds of the effective coitus to effect the entrance of the semen into the cervix.‡ However, the experiments as a whole show conclusively that once the sperms enter the rat uterus they are rapidly carried, by contraction of the uterine wall itself, quite passively throughout the uterus to its distal end and the very portal of the fallopian tube. The transport of sperms, at least in the uterus of the rat, is a matter not of hours or of minutes, but of seconds. It is easy to observe contraction waves in the uterus at this period. Parker,³ however, described the rabbit uterus as sluggish and concluded from his experiments that 2 hours was the time required for the journey covered in a half-minute in the rat.

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Implantation of Juvenile Testicular Tissue into the Hypertrophied Right Gonad of Ovariectomized Fowl.*

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In our early ovariectomy experiments¹ sex-inversion was incomplete owing to the fact that we failed to find spermatogenesis in the hypertrophied testis-like right gonad, though the individuals were otherwise equipped to function as males. In a subsequent series of experiments² in which the operations were performed at an earlier

‡ A similar observation was made by Parker³ in the rabbit.

³ Parker, G. H., *PROC. SOC. EXP. BIOL. AND MED.*, 1930, **27**, 826.

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¹ Domm, L. V., *PROC. SOC. EXP. BIOL. AND MED.*, 1924, **22**, 28; *J. Exp. Zool.*, 1927, **48**, 31.

² Domm, L. V., *W. Roux' Archiv. f. Entw. mechan.*, 1929, **119**, 171.

age, the majority under 4 weeks, some cases of spermatogenesis have been found. In these cases the spermatid tubules are almost invariably isolated and confined to very limited areas of the gonad so that such poultards are probably rarely, if ever, capable of functioning as males. In order to determine whether the poultard could function as such special experiments were devised.

Sixteen poultards showing masculine characteristics, particularly head furnishings, were selected. These had been operated at a relatively late age, hence were not likely to reveal spermatogenesis. Laparotomies were performed and into the right testis-like gonad of each juvenile testicular tissue was placed. Two short incisions were made on the exposed surface of the gonad approximately 8 mm. apart. By means of a curved probe a tunnel was made between these and the tissue introduced. This technique was essential since it relieved the pressure which, with a single incision and tunnel, invariably expelled the tissue introduced. The birds were kept under observation from 10 to 14 months when they were killed and examined.

Mating tests were conducted which proved negative, no fertility having been found over a period of approximately 5 months. None of the birds were actually known to tread, though their behavior otherwise was characteristically masculine. External characterization remained typically poultard, no perceptible modifications appearing in plumage, head furnishings, or spurs. Cases showing successful implantations appeared no different from those unsuccessful. Except in one case, which showed pronounced hypertrophy due to growth of engrafted tissue, the right gonads did not differ macroscopically from controls. Vasa deferentia all revealed growth, some having become definitely coiled, though none were better developed than those found in the normal poultard. The oviducts likewise were characteristic of the normal poultard. Gonadal smears were made in each instance on post-mortem, 3 of which proved positive. These showed numerous motile spermatozoa.

Serial cross sections were made of the entire gonad in each of the 16 cases. Histological examination revealed spermatogenesis in 5 cases. The spermatid tissue in these cases revealed the general character of testis grafts being principally composed of the following types of tubules. (1) Tubules containing cells in all stages of maturation without mature spermatozoa. (2) Tubules similar to the first but containing spermatozoa. (3) Tubules showing various degrees of desquamation of germinal epithelium. (4) Sterile tubules similar to those which characterize the testis-like gonad of the normal poultard and also found in parts of the host gonad. The com-

parable tissue of the host gonad was composed of the usual cords and tubules.

The distribution of the tubules of the graft within the host gonad varies. In some the tubules of the graft are rather definitely confined in certain parts of the gonad, while in others they may be quite uniformly scattered, while another condition was that in which the tubules were arranged in small scattered aggregations. In places the engrafted tubules were rather conspicuously partitioned from those of the host. The extent to which the host gonad had been penetrated by the implanted tissues is variable. In 1 case practically the entire gonad had been invaded while in the rest the invasion has not been so extensive, though in none does less than one-third of the series reveal some tubules of the graft. The abundance of these in any particular cross section varies from a single tubule to those in which practically the entire tissue is composed of seminiferous tubules.

That the poularde has the potentialities of developing a complete male genital system from gonad to cloaca cannot be questioned, for occasionally such a system may be demonstrated. However, in the present series a preliminary study has failed to demonstrate a connection between the tubules of the implanted gonad and the efferent system of the host gonad. Evidence for spermatoc infection of the tubules of the host gonad is difficult to determine.

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Artificial Insemination with Motile Sperm from Ovariectomized Fowl.*

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Our recent studies¹ have demonstrated the occurrence of spermatogenesis in the ovariectomized Leghorn fowl and explained the conditions under which it arises. In these cases ovariectomy was performed at a relatively early age before the primordial germ cells in the right rudimentary gonad were known to disappear. In a

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¹ Domm, L. V., *PROC. SOC. EXP. BIOL. AND MED.*, 1929, **26**, 338; *W. Roux' Archiv. f. Entw. mechan.*, 1929, Bd. 119, p. 171; *Anat. Rec.*, 1929, **42**, 15.