

THE FECUNDITY AND PLACENTATION OF THE
SHANGHAI RIVER DEER. By J. COSSAR EWART, M.B.
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MR SWINHOE,¹ when describing some years ago the Shanghai river deer (*Hydropetes mermis*), mentioned that they were reported to be very prolific—bringing forth, it was said, as many as four or five or even six young at a time. Since then these reports have at different times been corroborated, and now they are placed beyond doubt by a uterus containing four embryos recently sent from Shanghai, and placed in my hands for examination by my friend Dr Thin.

Since first described by Swinhoe, this deer has excited considerable interest in this country. At first reports as to its being so prolific were received with much doubt, but when it was proved that, notwithstanding the great annual slaughter, they were rapidly increasing, zoologists were prepared to credit statements that at one time were considered mere exaggerations.

Some months ago a deer in the possession of a gentleman in Shanghai brought forth three young ones; the uterus in my possession contains four, hence we may consider the question practically settled, that the Shanghai river deer is much more prolific than the other deer we are acquainted with.

Having settled this point, I next directed my attention to the uterus and placenta, and shall now shortly mention the results of my examination. During the earlier stages of gestation, the uterine horns, as I learned from the examination of a uterus containing two embryos about 1 inch in length, are curved and almost completely separated from each other, but in this specimen, in which the embryos are 3 inches long, the horns are united to form a somewhat semilunar sac, slightly notched on the upper margin, measuring 9 inches from side to side, and 6 inches from the cervix to the median notch—the remains of the original deep cleft between the horns. The ovaries were half an inch in length, and presented on their surface indications of four corpora lutea.

¹ *Proc. Zool. Soc.* 1870.

Through the thin walls of this double sac two foetuses could be easily felt in each side, and near them, in the left side, three firm oval convex masses,—the maternal cotyledons,—and in the right side, three large and one small mass, lying near the cervix.

The uterine vessels having been injected with a gelatine solution of Berlin blue, an incision was made in the mesial line, extending from the cervix forwards and upwards, in order to expose the internal surface, and remove the chorion with the enclosed embryos. When the inner surface was examined, cotyledons similar to those in the cow were seen projecting from the posterior wall of the uterus. The six large cotyledons were from 1 to $1\frac{3}{4}$ of an inch in length, half an inch in breadth, and projecting half an inch above the level of the mucous membrane. The small one in the right horn was about half an inch in diameter, and not raised more than a quarter of an inch above the surface. All the cotyledons were attached to the posterior wall, and were about two inches apart from each other—one near the cervix, one near the middle line, and the other near the outer margin. But besides these cotyledons there were, between and around them, a number of small elevated vascular patches, resembling somewhat the rudimentary cotyledons found in the sheep. Twelve such patches formed very decided elevations, and measured from four to five lines in diameter.

On examining sections of the uterine wall, which was on an average two to three lines in thickness, it was seen to be composed of two well-marked layers, between which was a thin layer of fine areolar tissue.

Passing obliquely through the inner or mucous layer were large branching glands. These opened separately or in groups at the least vascular parts of the mucous membrane.

The connective tissue between the glands was made up of fine parallel bundles, in connection with which there were at least three different forms of nuclei. The smallest were narrow oval nuclei, lying on or between the finer bundles; others were arranged as if they were the nuclei of flat cells, which had formed an investing layer for the larger bundles, similar to those found in tendon; and lastly, small oval and spindle-shaped nuclei, having apparently fine elastic fibres in connection with them, were seen all through the tissue.

Large and small blood-vessels and capillaries ramified in the connective tissue around and between the glands, but were especially numerous in the vicinity of the cotyledons. The surface of the maternal cotyledons when examined with a pocket lens presented a somewhat spongy appearance, the upper surface being especially irregular and villous, and contrasting with the margin, which presented regular crypts or spaces surrounded by narrow smooth bands of connective tissue. Sections showed each cotyledon to have a dense fibrous base, through which tortuous vessels passed, and a superficial spongy layer composed of anastomosing fibrous bundles, the spaces between which served for the lodgment of the foetal villi. At the surface the spaces or crypts were of a considerable size, but they rapidly diminished as they extended towards the base, and on section smaller spaces were seen to pass from them for the lodgment of the secondary branches of the foetal villi, exactly similar to the arrangement described by Professor Turner as existing in the maternal cotyledons of the cow.¹ Lining all the spaces was a layer of epithelium, under which, ramifying amongst the fibrous and elastic tissue, was a fine capillary network. No glands were seen to open into the crypts or spaces in the substance of the cotyledons, but many passed obliquely under the cotyledons to open around their margins. The small cotyledonary patches when examined with a low power presented a beautiful network composed of anastomosing beams of connective tissue, well supplied with blood vessels. The spaces between the framework extended from two to three lines into the substance of the mucous membrane.

The chorion exactly fitted the two uterine horns, and thus it presented two wide dilatations united by a narrow neck which lay in the body of the uterus. In each dilatation were two fetuses, each coiled up and surrounded by an amnion, and measuring when uncoiled about three inches in length. Ramifying through the whole of the chorion were numerous blood-vessels, and on its surface were large and small villous patches, corresponding in size and position with the cotyledons, and elevated vascular patches, described above, on the inner surface of the uterus. The villi of the foetal cotyledons did not form a

¹ *Lectures on the Comparative Anatomy of the Placenta*, p. 63, 1st series, Edinburgh, 1876.

cup-shaped mass, as is the case in the cow, but simply projected as fine branching tufts from the outer surface of the chorion. The parts of the chorion from which the villi projected were not much thicker, but decidedly more vascular, than the non-villous surface.

The base of each villus, where the vessels entered, was somewhat compressed, but about a line from its attachment it was rounded, and from this point to the apex lateral branches were given off at nearly right angles to the main stem. When connected with the maternal cotyledon, the villi and their branches occupied the crypts, and continuations from them, which we have described above in the uterine cotyledons. A small artery and vein passed to and from each villus, and in connection with these were capillaries which extended into all the secondary offshoots from the main stem.

On the surface of the villi was a layer of epithelium, and between this layer and the vessels was a varying amount of connective tissue held together by delicate elastic fibres.

We may conclude this note by saying that the two points of interest in connection with this singular little deer, which lives chiefly amongst the coarse grass reeds so plentiful on the islands in the rivers of Northern China, are first, that instead of bringing forth one fetus, which is generally the case with deer, it may bring forth as many as four, perhaps six, young at a birth; and in the next place, though the placentation resembles closely the condition obtained in the cow, we have in *Hydropetes* a very limited number of cotyledons, probably never more than six well-developed—the number present in the two specimens I have had the opportunity of examining. In the small number of its cotyledons the river deer closely approximates to the roe-deer as described by Bischoff,¹ and the red-deer as described by Turner in his *Lectures on the Placenta*, already referred to.

¹ *Entwicklungs geschichte des Rehens*, Giessen, 1854.