

NOTE ON THE FŒTAL MEMBRANES OF THE RAIN-DEER (*Rangifer Tarandus*). By PROFESSOR TURNER, M.B., F.R.S.

IN the month of May I received from Professor A. H. Garrod the foetal membranes of a rain-deer, which had been shed, after the birth of a foetus, in the Gardens of the Zoological Society of London.

The chorion consisted of two horns, of which the one that had contained the foetus was not only longer but much wider than the other. The horns were continuous, and at their junction the membranes showed a large rent. The torn spot had, without doubt, corresponded to the os uteri, and marked the spot where the foetus had escaped during parturition. Only six caruncles, or foetal cotyledons, projected from the outer surface of the chorion. One was situated 2 inches from the tip of the foetal horn, another 7 inches from its tip, and a third 12 inches. Three caruncles belonged to the other chorion, of which one was close to its tip, a second $5\frac{1}{2}$ inches from the tip, and a third in immediate proximity to the rupture in the chorion, where the foetus had escaped. The carunculæ were situated almost in line with each other, on that part of the chorion which corresponded to the sac of the allantois, and in the foetal cornu to the belly of the foetus. They were of large size, almost circular in form, and averaged about 3 inches in diameter. The chorion was non-villous in the intervals between the caruncles, but near the free end of the foetal horn, and in the greater part of the opposite horn, it was elevated into shallow folds, which had undoubtedly been adapted to a ridge and furrow-like arrangement of the uterine mucous membrane. The border of each caruncle was precisely defined, and in the foetal horn especially the chorion was raised into a definite fold around each caruncle. The foetal villi were not closely crowded together within the caruncle, but were, for the most part, in tufts, separated from each other by intermediate smooth surfaces. The villi varied considerably in size, some being very short and stunted, whilst others were about half an inch long. The villi branched, and in the larger villi the branching was repeated, and

the branches gave origin to multitudes of slender elongated offshoots, which had, without doubt, fitted into small crypt-like compartments in the maternal cotyledons, whilst the stems and larger branches of the villi had occupied the larger pit-like recesses. The villi were very vascular; branches of the umbilical vessels entered the stems and branches of the villi and ended in capillaries, which formed elongated slender loops within the slender offshoots of the villi.

To the naked eye the free surface of the chorion, intermediate to the carunculæ, seemed to be absolutely smooth; but when examined under a simple lens it was seen to be minutely subdivided into polygonal areas, arranged with apparent uniformity over its entire surface. When examined with different powers of the compound microscope, these areas were seen to be bounded by ridge-like elevations of the chorion, intersecting each other at various angles.

The inter-caruncular part of the chorion was very vascular; not only did it contain the larger branches of the umbilical vessels passing to and from the caruncles, but numerous smaller vessels which ended in a fine capillary network distributed in the non-villous inter-caruncular part of the chorion.

As an injection had been passed into the umbilical vessels, the vessels of the villi in the caruncles were injected, and also those of the chorion between the caruncles. The latter ended in a fine capillary network, the arrangement of which was in a series of whorls not unlike the *venæ verticosæ* of the choroid coat of the eyeball, and these capillaries were distributed in relation to the walls of the polygonal areas above described. These areas reminded one of the vascular pockets that I had described¹ in the inter-caruncular part of the chorion in the cow and the giraffe, but in the rain-deer they were much shallower, and more uniformly distributed over the entire surface of the non-caruncular part of the chorion.

The sac of the allantois was very capacious. It extended from the tip of one cornu of the chorion to that of the other, but did not give off diverticula through and beyond the chorion, as is the case in the sheep and cow. The allantoic sac did not fill

¹ *Lectures on the Comparative Anatomy of the Placenta*, pp. 65-67. Edinburgh, 1876.

up the foetal horn of the chorion, but occupied the region opposite the belly of the foetus. It lined the inner surface of the chorion where the caruncles were situated, and formed in relation to each of the caruncles a pocket-like recess, which was not so deep on the foetal as on the opposite horn of the chorion. The amnion was a capacious sac occupying the major part of the foetal horn of the chorion. It invested the end of the umbilical cord next to the body of the foetus, but the end next the chorion was enveloped by the membrane of the allantois, where it formed the wall of the allantoic sac situated in the larger horn of the chorion. The umbilical cord contained two arteries, two veins, and a long and slender patent urachus, which opened by a funnel-shaped mouth into the sac of the allantois.

The amniotic investment of the cord had in connection with it a number of white, rounded bodies, which varied in size from small to large shot. Similar bodies were also present in large numbers in relation to the wall of the amniotic sac generally. They were in contact, not with the free, but with the attached surface of the amnion, and in those localities where the amnion and allantois were in opposition to each other they were situated between the two membranes, and projected towards both the amniotic and allantoic sacs. When examined microscopically, these bodies were found to be made up of polygonal cells resembling in size and appearance the large tessellated epithelium covering the free surface of the mucous membrane of the mouth. In their structure they resembled the well-known whitish bodies found in relation to the amnion in the cow, but owing to the amnion being prolonged over them, they could not be raised from that membrane as can be done with the bodies in the cow.

In the paucity of the cotyledons, the rain-deer, therefore, as Professor A. H. Garrod has pointed out,¹ corresponds with the other Cervidæ, and belongs to his group Oligocotyledontophora. The specimen in the Museum of the Royal College of Surgeons of England, referred to by him in his paper, had four caruncles in one cornu; the other cornu apparently had not been preserved.

¹ "Notes on the Visceral Anatomy and Osteology of the Ruminants," *Proc. Zool. Soc.* London, Jan. 2, 1877.