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THE MORPHOLOGY OF A TERATOLOGICAL CALF

RICHARD WATSON

The calf under study was a two-headed monster. It was born of a Red Polled mother, at term, alive in utero, but died shortly after birth. Data concerning its sex and parentage are lacking. The body of the calf was normal, but the head parts were divided double from the region of the atlas. The heads were joined almost back to back, their mesial lines forming a broad "Y" with the vertebral column. Externally, despite the malformation, the symmetry of the two heads was striking.

In describing the work done, the calf's head closest to the left foreleg will be known as Left (L), and the calf's head closest to the right foreleg will be designated as Right (R). The portions of the calf's heads farthest from the body of the calf (i.e. inner faces of the acute angle of the "Y") will be referred to as the anterior region of the heads. The portions of the calf's heads closest to its



body, will be known as the posterior region. It should be borne in mind that the terms posterior and anterior in this case refer to halves of different heads, while the terms calf L, and calf R refer to whole heads.

Calf R was the larger and had a straight nose. Calf L's nose

was decidedly muzzled. The skin at the vertex of the "Y" showed no trace of demarcation. The eyes and the ears of both heads were normally placed with respect to each head.

The masseters and facial muscles of the anterior faces of the heads had formed themselves into a pad occupying the valley-like space between the mandibles. The two sets of muscles, however, were separated longitudinally by connective tissues.

The arrangement of the posterior bones of these skulls was an interesting picture. Anteriorly (i.e. the right posterior bones of the left skull and the left posterior bones of the right skull) the bones were in contact. The parietal crests were fused though sutured, forming a lateral wall to a double brain case. The occipital condyles were touching, but not grown together; the paramastoid processes were about a centimeter apart. Connecting the external occipital protuberances was a flange of cartilaginous bone to which region was attached the ligamentum nuchae. This cartilage formed the roof of the common brain case due to the extreme size of the foramen magnum. Connecting the basilar portions of the occipital bones was a spongy, triangular block of bone. Its derivation could not be accounted for as it was sharply and completely sutured from the occipital bones. The angles of the mandibles overlapped, the jaw (right) of the Left skull, being outside and farther forward. Posteriorly (i.e. the left posterior bones of the left skull and the right posterior bones of the right skull) the condyles, one from each skull, articulated perfectly in the anterior articular cavities of a single normal atlas.

The cerebral hemispheres of each skull were normal except for orientation. The longitudinal fissure in each case was bent in a broad curve which, if continued, would coincide with the path of the spinal cord. The posterior fossae, instead of tapering to foramina magna of smaller diameter, enlarged to permit sharing of a fused and irregularly globulated double cerebellum beneath which was a single thickened medulla. The brains were completely enveloped in unbroken meninges. The author believes the arteries to have developed in the following manner. The common carotid arteries pursued a normal course to a point just inside the angles of the mandibles; the left artery going to the most posterior mandible of the left skull and the right artery similarly to the right skull. At these points three main branches were given off from each artery. Two of the branches were the external and internal maxillary arteries supplying the posterior faces of each calf-head with blood in quite a normal fashion. The third branch was a continuation of a common carotid proceeding by a devious route to the an-

terior face of each calf where it split into the corresponding internal and external maxillary arteries. It was obvious that the portions of the heads closest to these dividing points received the greatest blood supply as the continued carotid branch and its tributaries dwindled rapidly in size. The venous system was more puzzling. It seemed that the vena cava had split into four large external jugular veins. Two of the jugular veins had fused, forming one large vessel which proceeded ventrally to the trachea to a point between and below the hyoid bones. There it split into two large branches, one going to the anterior portion of each skull. These "jugular" veins each split to form internal and external maxillary veins. Considerably dorsal and lateral to the large fused jugular vein was another jugular vein (external) which proceeded up the sides of the neck, splitting behind the angle of the mandibles to give rise to the external and internal maxillary veins which drained the more posterior sides of the heads.

The incisor teeth of calf R were badly out of line and the right corner lateral tooth of calf L had not yet erupted. The cheek teeth of both calves were normal but all unerupted. The trachea and the oesophagus extended into the head region to their normal termination just below the second cervical vertebra. At their endings here was the normal pair (apices) of arytenoid cartilages about which a fusion of the cricoid and thyroid cartilages had formed a box-like structure. Two epiglottes opened into this vestibule, one from either side. The epiglottes could never have been functional for they were a centimeter from the openings of the trachea and oesophagus, and were situated so that they could merely close one or both entrances into the cartilaginous vestibule. In front of the epiglottis of each calf was a common nasal-oral cavity, both the hard and soft palates having failed to close their entire length by two centimeters.

Each head possessed its full complement of digestive glands, although the most anteriorly placed glands (parotid and mandibular) were much smaller. The mandibular gland of calf L extended ventrally to form a large mass beneath the angle of the mandible. The corresponding gland of calf R was very small. Though the lateral lobes of the thyroid gland extended on each side of the larynx into the different heads, it was not a double structure.

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