DESCRIPTION OF A FŒTUS

BORN WITHOUT

HEART, BRAIN, LUNGS, OR LIVER.

BY

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THROUGH the kindness of Dr. Blakely Brôwn, the museum of St. George's Hospital has lately become possessed of a human monstrosity, of which a short description may be interesting to the Society.

The being, like all others of the same character, was a twin. The mother, an unmarried woman, pregnant for the first time, was delivered in Queen Charlotte's Hospital. A healthy female infant was first born, the breach presenting. The monster about to be described was then expelled, the shoulders first. The two umbilical cords were attached, an inch and a half apart, to a single elongated placenta, which unfortunately was not preserved. The female child was apparently in good health, and without peculiarity of any kind. It so remained for the three weeks during which it was under observation in the hospital.

The monstrosity, which is represented in Plate VII, was destitute of any vestige of head or neck. The shoulders were united along the central plane into a rounded fleshy surface, without prominence or inequality to indicate the

position due to the neck. The upper end of the fœtus thus terminated much after the manner of an anchor. The upper extremities were present, but were both curtailed, each apparently by one segment. The hands were imperfect. The left was shortened, and the fingers four only in number. On the right hand were five digits, but they were rather irregularly placed. The trunk was small in proportion to the limbs. On its front surface, in the median line, at a short distance from the upper end, was a small prominence of a reddish colour, which, from the fact of its being clothed with papillæ, was believed to represent the tongue. The umbilical cord was surrounded at its origin by a small membranous bag, which contained a coil of intestine and some serous fluid. The genital organs, which were those of a male, the anus, and all other particulars concerning the outside of the trunk, were natural. The lower extremities were only slightly different from their usual state. The right leg seemed somewhat twisted on its axis. On each foot were four toes only.

The body was generally swollen and œdematous, constricted at the joints, bloated elsewhere.

The skeleton of the trunk, where only were the bones examined in detail, was nearly natural. The spinal column was as usual from the beginning of the dorsal region downwards. Of the cervical vertebræ only the two lowest existed. The upper of these was rounded above, and roofed over by membrane. No trace of any of the cranial bones existed. All the ribs were natural excepting the first pair, which were abnormally shortened. The scapulæ and sternum were complete. The clavicles were wanting.

Upon laying open the trunk, great thickness of integument had to be cut through, owing to a general serous infiltration of the areolar tissue. There was no diaphragm. The heart, lungs, thymus, liver, spleen, pancreas, and suprarenal bodies were altogether wanting. The upper part of the alimentary canal was represented by a hemispherical depression upon the chest, of about half an inch in depth, to the deepest part of which a body resembling the tip of

the tongue was attached. The œsophagus, stomach, and the upper part of the bowels were absent. In the abdomen lay the lower two feet, or rather more, of the intestine, commencing by a rounded cæcal extremity. The bowel contained meconium, and appeared in all respects natural as far as it went. It ended in a natural pervious anus. The most conspicuous bodies in the abdomen were a pair of kidneys of very large size, which reached up so as to occupy the lower part of the chest. These were connected each with its own ureter, almost as thick as in the adult, which terminated in a normal bladder. An urachus connected the bladder with the termination of the umbilical cord. Beneath the kidney, on each side, was an undescended testicle. The space between the walls and the organs mentioned was filled with spongy cellular tissue, containing serous fluid.

The umbilical cord contained a large vein and artery, besides a second artery so minute that it was impossible to follow it.

The great artery of the cord divided, on entering the belly, into two large branches, one of which passed into the right thigh, giving an offshoot in its passage, to its own side of the pelvis. The other division served for all the rest of the body. It swept upwards to the position of the aorta, on the left side of the spine, and gave off from adjacent points a large vessel for the left thigh, and another for the left side of the pelvis.

Thence the artery passed upwards, giving large branches for the kidneys, as well as lateral and posterior filaments, corresponding to the lumbar and intercostal vessels. It terminated between the shoulders by dividing abruptly into two large branches, one of which went to each upper extremity.

Tracing the venous system in the same way from the umbilicus, the great vein passed, with a curve undivided, to the position of the vena cava on the right side. It gave first a branch, which passed with the artery to the right thigh and side of the pelvis; then, about half an inch higher up, another vessel, in similar company, for the left

lower extremity. The main vein then passed up along the right side of the vertebral column, giving lateral branches to the kidneys, many smaller vessels corresponding to those of the artery, and ended in the same way by giving off at right angles to itself a large vein for each arm.

The entire encephalon, as well as the upper part of the spinal cord, were wanting. The cord began opposite the last cervical vertebræ by a rounded, somewhat bulbous extremity, which is well represented in the drawing. The nerve roots passed from this much in the usual manner. The upper pair, on each side, proceeded in an upward direction so as to escape above the sixth vertebra. The ganglia on the posterior roots were as usual. Except that the contributions from the fifth cervical nerve was absent the brachial plexus was formed much in the usual way. No peculiarity was discovered in the distribution of the dorsal and lumbar nerves. Those of the sacrum were not exposed by the dissection.

The sympathetic ganglia were large but not numerous. A chain of ganglia, eight in number, occupied the usual position along each side of the spine, scattered over the space from the second cervical to the last lumbar vertebra. Each of the ganglia sent two or more filaments backwards, which united in an irregular manner with the anterior branches of the spinal nerves. These filaments generally diverged, passing one to an upper, one to a lower nerve. At the upper termination of the chain were several large branches of communication with the brachial plexus near its origin. Below were similar branches connected with the lumbar plexus, with which the sympathetic appeared to end. The ganglia were nearly or quite as large as in the adult.

The fœtus unopened (Plate VII), as well as after dissection (Plate VIII), has been very accurately drawn by Dr. Westmacott.

Many abortive productions have been from time to time described, which resemble in all essential points the one under consideration. The laws of mutual dependence which govern such organizations may be as yet beyond our reach, but the Society may deem it worth while to place another instance upon record for the use of future physiologists.

Since there was no communication between the veins and arteries of the fœtus, answering to the foramen ovale, but the veins throughout the body were simply continuous with the umbilical vein, and the arteries with the umbilical artery; it follows that either in the cord, or in the body of the monstrosity, the usual direction of the blood must have been inverted. If it passed as usual from the mother down the umbilical vein, then it must have been continued into the tissues by the veins of the fœtus. On the other hand, if the course of the circulation was not thus reversed in the fœtus, the artery of the cord must have brought the supply from the placenta.

In every cardiac fœtus hitherto described the monstrosity has been a twin, attached, with a perfect fœtus, to a common placenta.

Sir B. Brodie, in a paper upon a similar formation, communicated to the Royal Society expressed his opinion that the circulation was carried on by the action of the vessels, alone. He afterwards, however, assented to a suggestion of the late Dr. Young, that the heart of the companion fœtus served as the motor power, acting through the common placenta. Sir A. Cooper afterwards had the opportunity of examining the vessels both in the body, and in the placenta, of another production of the same kind ('Guy's Hosp. Reports,' vol. i). Both cords were, as is constant in such cases, attached to a single placenta. Upon the surface of this organ were large vessels by which the two cords were united, the vein of the one communicating with the vein of the other, and the arteries of the one with the corresponding vessels in the other. This double anastomosis, as may be noticed in passing, may occur where both twins are natural. There is a preparation in Dr. Lee's collection which shows this. Sir Astley con-

cludes that the artery in the cord of the imperfect fœtus was simply a branch of that belonging to the healthy child, and that it therefore conveyed blood in an inverted direction, i.e., *from* the placenta, while the umbilical vein of the monster brought the return current *to* the placenta. Thus the circulation in the supernumerary growth would appear to be so far normal that the blood would enter it by the arteries, and return by the veins; in the cord only would the blood flow reversely to the ordinary direction.

The invariable attachment of a healthy child to the placenta which is in connection with the acardiac monstrosity argues strongly in favour of Dr. Young's supposition; while the elaborate objections raised to Sir A. Cooper's views by Dr. Houston, of Dublin, appear to admit of considerable question.

Dr. Houston dwells upon the fact that at the placental end of the cord of the imperfect fœtus, certain branches both from the artery and the vein, pass into the substance of the placenta. Now, as there is but one placenta, and that serves for a living and healthy child, it is clear that the circulation in that organ must be natural. The blood must therefore leave it by the veins. The Dublin physician considers it necessary that the umbilical vein of the monster, which is continuous with these branches, should in a similar manner to them, carry its contents away from the placenta. If we hold, with Sir A. Cooper, that the circulation in the cord of the abnormal fœtus is reversed, we must allow that while the umbilical vein is pouring blood towards the placenta, the tributaries of this vessel are receiving blood from the placenta. This, Dr. Houston considers, would imply the existence of conflicting streams in the cord. He states that "it is impossible that the branches and trunks of the same vessels, while continuous and open, could transmit the blood contained in them in opposite directions." ('Dublin Journal,' vol. x.)

An explanation, however, may be suggested, which will show that the views of Sir Astley are perfectly consistent with all the habits of circulating blood.

The question may be, at first, limited to the veins. The umbilical vein of the healthy child receives a large communicating vessel from the corresponding channel in the cord of the monster. This must be looked upon as a main trunk, which receives branches in two directions ; from the placenta on one side, from the cord of the monstrosity on the other. The contrariety only remains until the two streams are mingled in their common channel. The blood passing from the placenta by the venous radicles, would be mixed with the blood coming from the monster by its umbilical vein, and both together would be conveyed, by the communicating vessel, into the umbilical vein of the healthy child. A similar explanation would of course hold good as regards the arteries.

We may then be content to adopt the view suggested by Dr. Young, and worked out by Sir Astley Cooper. The circulation in such monstrosities depends on the heart of the healthy twin, which acts through great anastomosing vessels upon the surface of the placenta.

In conclusion, I must express myself much indebted to Mr. R. T. Gore, of Bath, for a great deal of valuable information connected with the literature of the subject.

DESCRIPTION OF PLATES VII AND VIII.

PLATE VII.—The fœtus previous to dissection. The conical projection on the superior part of the trunk is the tip of the tongue.

PLATE VIII.—The trunk laid open by a conical incision. The main arterial vessel is seen on the left side of the spine; the vein, on the right. Near the artery the sympathetic ganglia are seen with their communications with the spinal nerves. One of the kidneys is left *in situ*, the other has been turned aside and cut open. Near each kidney is an undescended testicle. At the upper part, the brachial plexus is visible, below the lumbar, while the intercostal nerves and ribs are seen between. The bladder, urachus, and a portion of the intestine are seen emerging from the pelvis.

The outline at the side (*a*) represents the upper end of the spinal cord, with the nerve-roots in connection with it.