An Anomaly of the Venous System in a Cat, Showing Paired Superior and Inferior Vena Cavae

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A mature cat, dissected in 1932 by Mr. Clark as a part of the laboratory work in Comparative Anatomy, was found to have an interesting anomaly of the systemic veins. From the ventral side (Fig. 1) the ventricles and auricles of the heart appear to be normal. Just anterior to the right auricle there is a rather large, blood-filled sac which is formed by the union of two large veins. One of these veins passes anteriorly as a right superior vena cava with normal branches. The other passes posteriorly as a combined azygous and right inferior vena cava. After passing through the diaphragm it goes into the posterior end of the body receiving normal veins from the right side of the body. There are, however, no hepatic veins emptying into the inferior vena cava. On the left side of the heart a superior and inferior vena cava can be seen. These unite at about the level of the auriculo-ventricular groove to form a large blood-filled sac. The

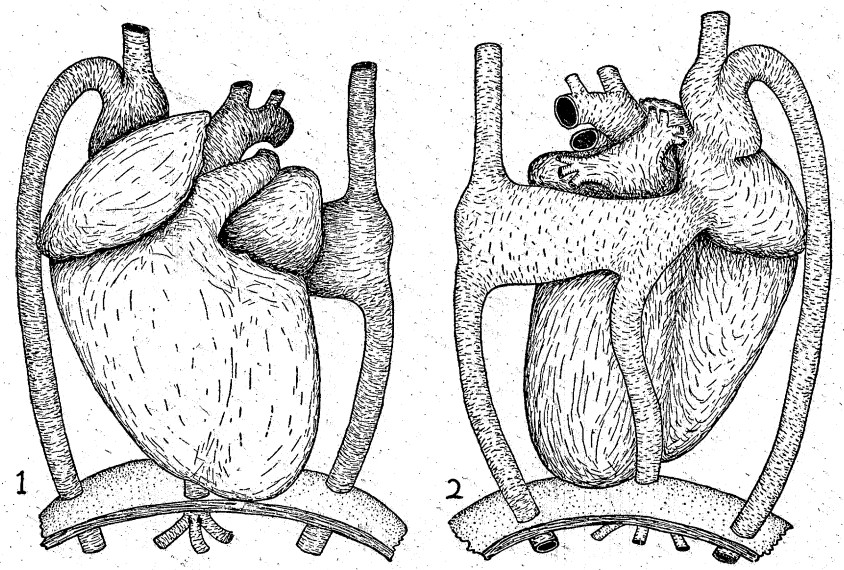

Fig. 1. Ventral view of the heart of cat.
Fig. 2. Dorsal view of the heart of cat.

blood vessels entering the two left vena cavae are similar to those on the right side of the body. Hepatic veins unite to form a common hepatic which passes through the diaphragm and disappears dorsal to the heart.

From the dorsal side of the heart (Fig. 2) it can be seen that these two sacs do not unite but empty into the right auricle by separate openings. The right sac empties into the auricle near the middle of the anterior border. The left sac lies on the dorsal side of the heart in the auriculo-ventricular groove and enters the auricle at the lower left corner. Near the median line of the heart the left sac receives the common hepatic vein.

This anomaly is evidently due to the arrested development of certain blood vessels in the fetal life of the animal. The systemic veins are practically bilaterally symmetrical, resembling those found in the lower vertebrates or in the early stages of fetal development. It seems probable that during fetal development the anterior cardinal veins failed to anastomose and form the left innominate vein. In the abdominal region the right and left subcardinals also failed to anastomose. These, combined with parts of the postcardinals and supracardinals, must have developed into the right and left inferior vena cavae found in this cat. As a result the absorption of the sinus venosus and ducts of Cuvier was incomplete and their remnants remain as the two pouches formed by the union of the superior and inferior vena cavae. The left duct of Cuvier has not been reduced to a mere coronary sinus, but is retained as a large functional vessel. The caudal extension of the hepatic veins evidently failed to anastomose with the subcardinal and umbilical veins so the common hepatic vein passes into the remnant of the sinus venosus on the left side.