

A SYSTEMATIC STUDY OF THE MAIN ARTERIES IN THE  
REGION OF THE HEART—AVES XIV  
GRUIFORMES, PART 2<sup>1</sup>BY FRED H. GLENNY<sup>2</sup>

## INTRODUCTION

ACCORDING to Peters (1934), *Rhynchotos jubatus* J. Verreaux and Des Murs, is confined to New Caledonia. But one species of the genus is known, and this is said to be threatened with extinction.

Peters places *Rhynchotos* with the Gruiformes, Suborder Rhynocheti, Family Rhynochetidae.

Inasmuch as it is a rather singular form, from a taxonomic point of view, this writer feels that perhaps an anatomical note dealing with the species should be kept apart from a consideration of other forms despite the fact that basic ordinal characteristics may be present.

The writer wishes to present the characteristic arrangement-pattern of the main arteries in the region of the neck and thorax of birds as an aid to the better understanding of trends in the anatomical development of the various families and orders. It is not the purpose of this paper, however, to make any attempt to draw conclusions with regard to the degree or extent of divergence within the order, nor to discuss minor similarities and dissimilarities with other members of the order.

## MATERIALS

Two specimens of *Rhynchotos jubatus* were obtained from the alcoholic collection of the United States National Museum (No. 288537 and No. 288538) and dissected and diagrams of the arterial arrangement-pattern prepared.

The writer wishes to express his gratitude to Dr. Alexander Wetmore and Dr. Herbert Friedmann for their coöperation in making possible this and other studies on specimens which are either rare or difficult to obtain.

## OBSERVATIONS

Arising from the left ventricle of the heart and passing anteriorly and diagonally toward the right is the aortic root (1) which divides almost immediately to form the two innominate (2) arteries of the adult bird. The right innominate sends off the right 4th aortic arch (4) which maintains its connection with the right radix aortae (5) and passes posteriorly and diagonally to the left until it comes

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to lie in a dorso-medial position within the thoracic cavity. At the junction with the dorsal aorta (7) the ligamentous vestige of the left radix aortae is found as a prominent ligamentum aortae (3) which may possess a partial lumen or may be entirely occluded. Only the posterior third of this vessel remains as a prominent structure, while anteriorly it remains as a thin, widened band of ligamentous tissue in the supporting fascia.

Along the ventro-lateral face of the right radix aortae, the ligamentum botalli (6) is found as a persistent though much reduced and atrophied vestige of the ductus botalli. Its proximal attachment may be maintained by an almost inconspicuous thread between the right systemic arch region and the right pulmonary artery (8).

Anteriorly, the innominates divide to form the subclavian artery (9) and the short common carotid artery (10). The right thyroid artery (11) arises from the right common carotid artery near its origin from the innominate, while the left thyroid artery (11) arises variously from (a) the innominate artery, or (b) from the base of the left common carotid artery.

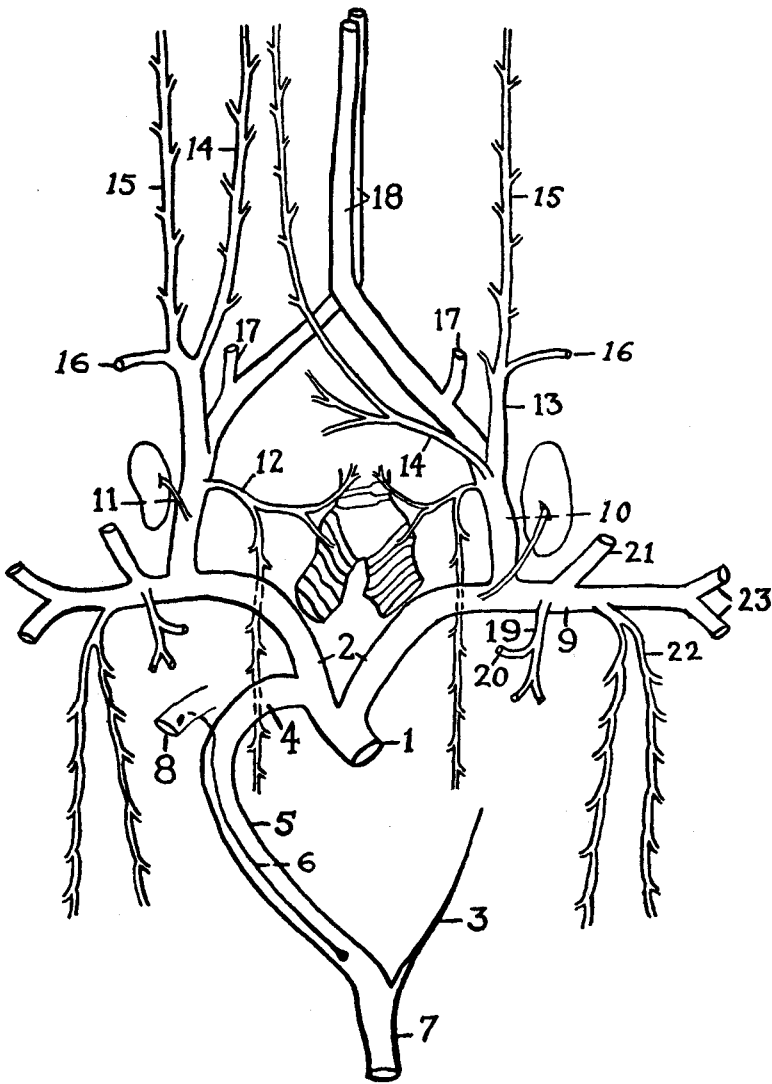
Both left and right ductus shawi (12) arise as very small vessels from the dorso-lateral face of the common carotids, and send very minute branches to the oesophagus and trachea before passing posteriorly to send branches to the bronchi, and other tissues of the dorsal thoracic region.

The superficial cervical arteries (13) arise from the common carotids and give rise to the ascending-oesophageal arteries (14), the lateral superficial cervical arteries or comes nervi vagi (15), and the subscapular arteries (16). Just anterior and slightly medially, the vertebral arteries (17) have their origin near the base of the internal carotid (trunk) arteries (18) which then enter the hypapophysial canal to pass anteriorly to the head.

Within the hypapophysial canal these two vessels remain unfused, with the left vessel lying ventral to the right internal carotid.

Laterally, the subclavian (9) sends off the coracoid major (19) which gives rise to the sternotracheal artery (20) before sending off branches to the coracoid muscle.

Next in origin is the axillary artery (21) which arises from the anterior face of the subclavian. On the posterior face of the subclavian and just lateral to the axillary, one may locate the intercostal artery (22) which divides into ventral and lateral branches to supply the intercostal muscles. Finally two, much reduced, pectoral arteries (23) arise from the distal end of the subclavian artery.



TEXT-FIG. 1. DIAGRAM OF MAIN ARTERIES IN THE NECK AND THORAX OF *Rhynchotus jubatus*. VENTRAL VIEW.

KEY TO ABBREVIATIONS.—1, Aortic root; 2, innominate arteries; 3, ligamentum aortae; 4, systemic (4th aortic) arch; 5, right radix aortae; 6, ligamentum botalli; 7, dorsal aorta; 8, pulmonary artery; 9, subclavian artery; 10, common carotid artery; 11, thyroid artery; 12, ductus shawi; 13, superficial cervical artery; 14, ascending oesophageal artery; 15, lateral superficial cervical artery; 16, subscapular artery; 17, vertebral artery; 18, internal carotid (trunk) artery; 19, coracoid major artery; 20, sternotracheal artery; 21, axillary artery; 22, intercostal artery; 23, pectoral artery.

## DISCUSSION

From the above observations it may be noted that *Rhynochetos* maintains the fundamental embryonic bilaterally symmetrical arrangement of blood vessels which in the adult birds tends to become functionally modified or altered with the lateral displacement of the oesophagus.

It will be observed that *Rhynochetos* appears to maintain the basic ordinal arrangement-pattern which appears to be reasonably characteristic for the order Gruiformes (Glenny, 1945). The characteristic bicarotidinae normales condition persists. The accessory oesophageal artery characteristic for this group arises from the left common carotid artery and passes diagonally to the right until it comes to lie along the left side of the oesophagus and passes anteriorly along the left face of the oesophagus.

An additional ordinal characteristic found in both *Rhynochetos* and *Grus antigone* as well as *Anthropoides paradisea* is the point of origin of the vertebral arteries. Greater similarity between *Rhynochetos* and *Grus* with respect to the arterial arrangement-pattern is noted than exists between *Rhynochetos* and *Anthropoides*. An additional feature found in both *Grus* and *Anthropoides* and apparently lacking in *Fulica*, but likewise found in *Rhynochetos*, is that of a bifurcated intercostal artery.

During the dissection of the two specimens of *Rhynochetos jubatus*, the writer observed that both thyroid glands were extremely large structures with respect to other birds of equal or greater size. Furthermore it was noted that while the legs and leg muscles were seemingly well developed, the pectoral muscles, on the other hand, were but poorly developed. While the keel of the sternum is not so developed as that found in the Galliformes and Columbiformes, it is still large enough to provide quite an adequate surface for the attachment of more highly developed pectoral muscles.

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