A SYSTEMATIC STUDY OF THE MAIN ARTERIES IN THE REGION OF HEART—AVES XV.

GAVIIFORMES—PART 1[1]

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As in other recent studies on the main arteries in the neck and thorax of birds, the writer herein presents the basic arrangement-pattern with such variations as were observed in two species of North American Loons. The present paper is limited to these two forms due to the lack of other species of birds in this Order. This limitation is in part due to the present world conditions. Although the writer had previously planned to discuss a larger number of species in each subsequent paper, it was finally decided that it might be well to present such information as has already been obtained, and such other observations as may be made at a later time would be presented in subsequent papers on this subject. As a result, adequate comparisons between these two species and other species of this order, as well as comparisons between different families of this order, cannot be drawn at the present time.

MATERIALS

Two specimens of each of the two species studied were dissected and diagrams of the arrangement-patterns of the arteries of the neck and thorax prepared. Specimens were made available for this work by the Royal Ontario Museum of Zoology, Toronto, Canada.

Common Loon, *Gavia immer* Linné.

Red-throated Loon, *Gavia stellata* (Pontoppiden).

OBSERVATIONS

As in other birds, the right systemic (4th aortic) arch (3) alone remains as the functional arch of the aorta. The innominate arteries (2) arise from the common aortic root (1), and pass anteriorly to the left and right before dividing to form the common carotid (8) and subclavian (9) arteries.

The subclavian artery gives rise to the coracoid major (10), axillary (13), intercostal (14), and two pectoral (15) arteries in order. The sternotracheal artery (11) arises as a branch of the coracoid major artery. The coracoid minor artery (12) arises from the ventral face of the subclavian artery—opposite the axillary artery—in *Gavia immer*, and from the axillary artery in *Gavia stellata*. The ductus shawi (16) arises from the common carotid artery (8) and sends off branches to the oesophagus, bronchi, and connective tissues in the region of the heart; to the syrinx and trachea (17) and to the oesophagus above the furcula (18). In *Gavia stellata*, an accessory ascending oesophageal artery (23) arises from the left common carotid artery near its point of bifurcation; an accessory meso-oesophageal artery (24) arises from the right common carotid artery; the thyroid arteries arise from these accessory oesophageal arteries (23 and 24). In *Gavia immer*, the thyroid arteries arise variously from the common carotids or one of their branches, chiefly in the region of the ductus shawi.

The common carotid arteries divide to form the superficial cervical arteries (20) and the internal carotid (trunk) arteries (22). Shortly after its origin from the common carotid, the superficial cervical artery gives rise to the scapular artery (19). The right superficial cervical artery serves as the ascending oesophageal artery in the adult bird. The vertebral arteries (21) arise from the internal carotid (trunk) arteries just after the origin of the superficial cervicals.

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Posteriorly, the ligamentous vestige of the left radix aortae—the ligamentum aortae (5)—and the right ligamentum botalli (6) persist. The ligamentum aortae (5) maintains its connection between the left pulmonary arch (7) and the distal portion of the right radix aortae (4), while the ligamentum botalli maintains its proximal attachment with the right pulmonary artery and its distal connection with the right radix aortae.

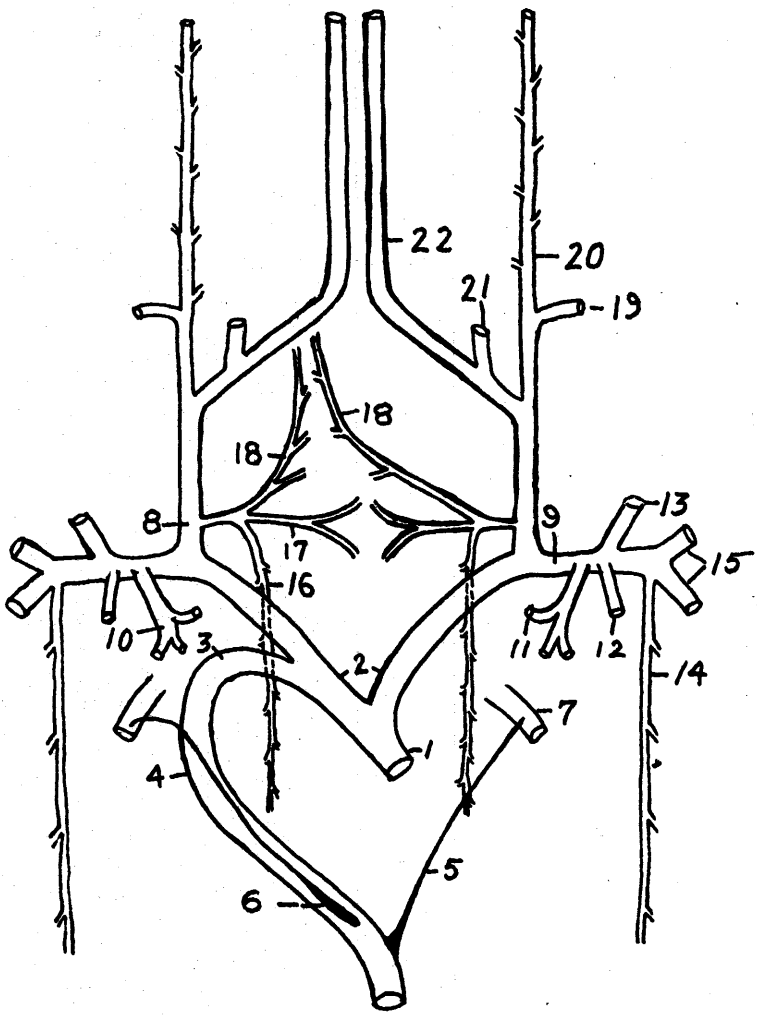

FIG. 1. Diagrammatic representation of the main arteries in the neck and thorax of *Gavia immer*. Ventral view.

KEY TO FIGURES

1. Aortic root; 2. Innominate arteries; 3. Right systemic (4th aortic) arch; 4. Right radix aortae; 5. Left ligamentum aortae; 6. Right ligamentum botalli; 7. pulmonary artery (pulmonary or 6th aortic arch); 8. Common carotid artery; 9. Subclavian artery; 10. Coracoid major artery; 11. Sternotracheal artery; 12. Coracoid minor artery; 13. Axillary artery; 14. Intercostal artery; 15. Pectoral arteries; 16. Ductus shawi; 17. Syringo-tracheal artery; 18. Meso-oesophageal artery; 19. Scapular artery; 20. Superficial cervical arteries (serves as the ascending oesophageal artery on the right side); 21. Vertebral artery; 22. Internal carotid (trunk) arteries; 23. Accessory ascending oesophageal artery; 24. Accessory meso-oesophageal artery; 25. Thyroid arteries.

CONCLUSIONS

In basic arrangement-pattern, the main arteries of the neck and thorax of these two species of Loons are alike. Only minor differences in origin or arrangement of accessory oesophageal arteries are to be noted. Whether or not these minor differences are of any value cannot be evaluated at the present time.

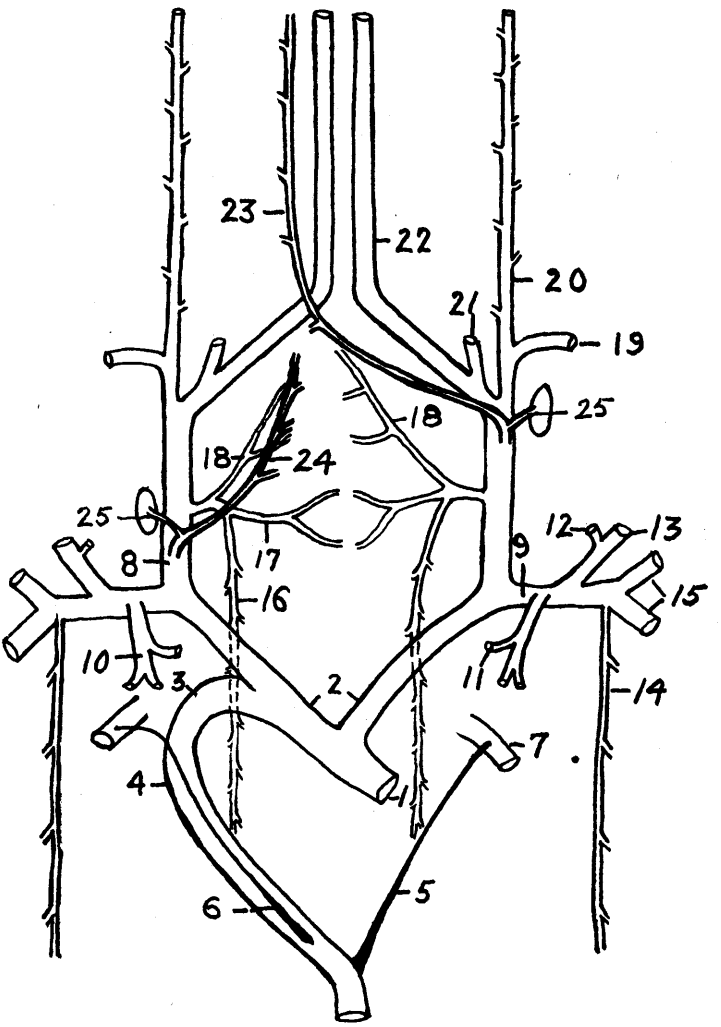

FIG. 2. Diagrammatic representation of the main arteries in the neck and thorax of *Gavia stellata*. Ventral view.

Origin of the coracoid minor artery in the two species may later prove to be of some minor significance. If this group of birds is in a "fluid" state of evolution—or in a state of "flux"—these differences may become increasingly more significant.

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