small a thing as the construction of road bridges should not be overlooked when by minor changes it is possible to allow for the increase or maintenance of several species of our beautiful and beneficial birds.

In central Nebraska the two species of phoebes, Say's and Eastern, are present in a ratio of 4.6 Say's to one Eastern. Both are commonly found nesting beneath bridges. They both average slightly more than four young per brood for two broods. Determining the average number of young raised per given number of bridges presents a usable method of estimating changes in phoebe populations in areas as large as or larger than counties.

Ord
Nebraska

A SYSTEMATIC STUDY OF THE MAIN ARTERIES IN THE REGION OF THE HEART—AVES XVII COLYMBIFORMES, PART I[1]

BY FRED H. GLENNY[2]

INTRODUCTION

GARROD (1873) reported that *Colymbus glacialis*, *Alca torda*, and *Uria troile* presented two carotid arteries (aves bicarotidinae normales), while *Podiceps cristatus*, *Podiceps minor*, and *Arctica alle* had but one carotid present—on the left side.

Although the present writer has not had an opportunity to check Garrod's findings in these respects, further studies on this group of birds have shown that still other species present the condition referred to by Garrod as "aves laevo-carotidinae."

MATERIALS

Only single specimens of *Podilymbus podiceps* (Linnaeus), *Colymbus grisegena holböllii* (Reinhardt), and *Colymbus auritus* Linnaeus were dissected and diagrams of the arterial arrangements prepared.

Materials for this study were made available by Dr. Alexander Wetmore and Dr. Herbert Friedmann, United States National Museum, and Mr. L. L. Snyder, Royal Ontario Museum of Zoology.

OBSERVATIONS

The basic family arrangement-pattern of arteries in the neck and thorax is characteristic for the species studied. The aortic root (1)

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divides to form the innominate arteries (2); the right systemic (4th aortic) arch arises from the right innominate just after its origin. The innominates then divide to give rise to the common carotid (8) and subclavian (9) arteries. The subclavian then gives rise to the coracoid minor (10), coracoid major (11), axillary (12), intercostal (13), and two pectoral (14) arteries in order. The common carotids give rise to the ductus shawi (16), vertebral (18), superficial cervical (19 and 23) and internal carotid (20 and 22) arteries. The right internal carotid artery (22) becomes functionally modified to serve as the primary ascending-oesophageal artery, while the left internal carotid (trunk) artery (20) alone enters the hypapophysial canal (Glenny, 1944). Both the ligamentum aortae (5) and the right ligamentum botalli (6) are present and prominent—maintaining both proximal and distal attachments. The thyroid arteries (27) arise variously from the common carotids or one of the cervical branches. Beyond the above basic arrangement, specific and presumably individual variations occur.

Colymbus auritus (Text-figure 1): The sterno-tracheal artery (15) arises as a branch of the coracoid minor (10); the ductus shawi gives rise to syringo-tracheal branches (17) and a basi-oesophageal branch (26); the right vertebral artery (18) gives rise to a small basi-oesophageal artery (25); the thyroid artery (27) arises near the base of the vertebral and internal carotid arteries; a scapular artery (21) arises near the base of the right vertebral artery. While no left scapular vessel was observed, one may be found arising from the left superficial cervical (19). A right superficial cervical (23) was not observed although it may be present in other specimens as a reduced vessel. The ascending-oesophageal artery (22) also serves as a superficial cervical artery.

Colymbus grisegena holböllii (Text-figure 2): The sterno-tracheal artery (15) arises as a branch of the intercostal artery (13); a bronchi-tracheal artery (28) arises from the left subclavian artery before the origin of the coracoid minor (10); the ductus shawi gives off syringo-tracheal branches (17) and a basi-oesophageal branch (26) arises from the right ductus shawi; a meso-oesophageal artery (24) arises from the common carotid; both left and right scapular arteries (21) are present; the right superficial cervical artery (23) arises as a branch of the ascending-oesophageal artery (22) which also sends branches to other tissues of the neck.

Podilymbus podiceps: The arrangement is similar to that of *Colymbus grisegena holböllii.* An accessory ascending-oesophageal artery arises from the left common carotid at the base of the left superficial cervical

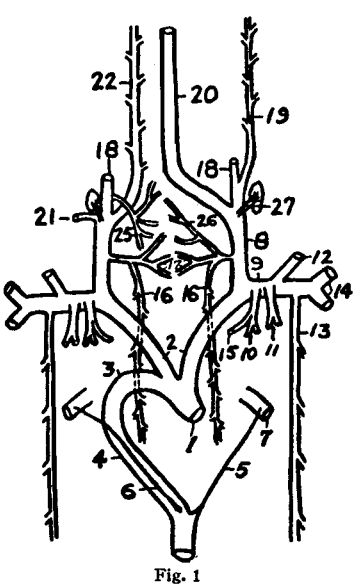

Fig. 1

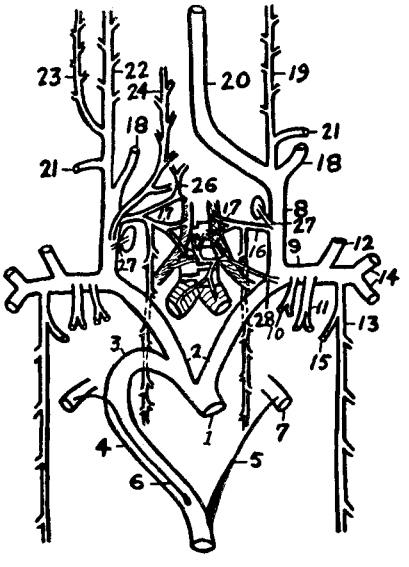

Fig. 2

KEY TO TEXT-FIGURES

MAIN ARTERIES IN THE NECK AND THORAX OF: Figure 1.—*Colymbus auritus* ventral view. Figure 2.—*Colymbus grisegena holböllii* ventral view.

1, aortic root; 2, innominate arteries; 3, right systemic arch; 4, right radix aortae; 5, ligamentum aortae; 6, right ligamentum botalli; 7, pulmonary artery; 8, common carotid artery; 9, subclavian artery; 10, coracoid minor artery; 11, coracoid major artery; 12, axillary artery; 13, intercostal artery; 14, pectoral arteries; 15, sterno-tracheal artery; 16, ductus shawi; 17, syringo-tracheal artery; 18, vertebral artery; 19, left superficial cervical artery; 20, left internal carotid (trunk) artery; 21, scapular artery; 22, right superficial cervical/ascending-oesophageal artery; 23, right (accessory) superficial cervical artery; 24, meso-oesophageal artery; 25, basi-oesophageal artery; 26, basi-oesophageal artery; 27, thyroid artery; 28, bronchi-tracheal artery.

artery (19) and passes diagonally to the right until it comes to lie alongside the oesophagus and then passes anteriorly.

DISCUSSION

It would appear that there are two arrangements of internal carotid (trunk) arteries in the Colymbidae. It appears, however, that there is a tendency for the condition indicated by the term "aves laevo-carotidinae" to predominate in this family. It is obvious that more complete studies must be made in the future to determine the essential differences (as well as family characteristics) of the two groups illustrated by Garrod (1873).

It is probable that many individual or specific variations may be found among members of this order of birds.

ABSTRACT

Three species of Colymbidae were dissected and diagrams of the arrangement of the main arteries in the region of the neck and thorax prepared. Individual differences in arrangement-pattern were noted. Although a previous worker reported both "aves bicarotidinae normales" and "aves laevo-carotidinae" in the Colymbiformes, the species included in this study were "aves laevo-carotidinae." Both the ligamentum aortae and the right ligamentum botalli were present and prominent.

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TWO NEW BIRDS FROM THE ANDES OF COLOMBIA

BY F. C. LEHMANN V.

Bubo virginianus colombianus, subsp. nov.

CHARACTERS.—Similar to *Bubo virginianus nigrescens* Berlepsch, from Ecuador, but with color pattern between this and *Bubo virginianus elutus* Todd, of the arid Caribbean coast of northern Colombia; facial disc paler than in *nigrescens* or *elutus;* upper parts rufous brown, paler than in *nigrescens,* but more uniformly colored than in *elutus;* barring on breast and abdomen different, with the bars broader and less in number.

TYPE.—Adult male from Peñablanca, western side of the Central Andes, east of Popayán, Colombia; elevation 2,900 meters. Collection of the Museo de Historia Natural, Universidad del Cauca, Popayán, Colombia, collected by F. C. Lehmann V., August 10, 1938.

DESCRIPTION.—Forehead and crown dark brown, densely spotted with yellowish white and buff on the forehead, and with yellowish buff at the base of the ear-tufts and on the hind neck; ear-tufts brownish black, with a narrow yellowish white margin on the inner side, this pale margin not reaching the tips of the feathers; hind neck, scapulars, greater wing-coverts, and rest of upper parts rufous brown, paler than the crown and lesser wing-coverts, spotted with yellowish white and buff; scapulars and greater and middle wing-coverts with conspicuous square-shaped white spots on their external webs, giving a spotted