

THE AORTIC ARCH

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Comparative anatomy is considered one of the strongest evidences of evolution. The eminent Thomas Hunt Morgan said, "If, then, it can be established beyond dispute that similarity or even identity of the same character in different species is not always to be interpreted to mean that both have arisen from a common ancestor, the whole argument from comparative anatomy seems to tumble in ruins."¹

Horatio Hockett Newman, famous professor and evolutionist of the University of Chicago, said, "Now, a careful survey of the situation reveals the fact that the only postulate the evolutionist needs is no more or less than a logical extension of what the layman considers a truism or self-evident fact, namely, that fundamental structural resemblance signifies generic relationship; that, generally speaking, *the degree of structural resemblance runs essentially parallel with closeness of relationship*. Most biologists would say that this is not merely a postulate, but one of the best established laws of life. . . . If we cannot rely upon this postulate . . . we can make no sure progress in any attempt to establish the validity of the principle of evolution."²

Here is one more of many possible further quotations. In his textbook, Ralph Buchsbaum says, "The most important kind of evidence is that based on a comparative study of the structure and development of various groups. The use of such evidence is based on the assumption that the more closely the body plans of two phyla [taxa] resemble each other, the closer their relationship and the more recent their common ancestor."³

However, there are a number of cases where belief in close evolutionary relationships has been based on similarity of anatomy but later repudiated.⁴ Also there are examples which no doubt would be used as evidence for phylogenetic affinity if they fit the theory, but are neglected because they do not fit. They carry some weight as evidence against the importance of comparative anatomy as an evidence of evolution.

An illustration of this is the mammalian aortic arch. Taxa assumed to be closely related have a different arrangement of the chief blood vessels arising from the aortic arch, and taxa which are very different have the same arrangement. (There are anomalies, the most common being the rise of the right subclavian artery from the aortic arch distal to the others and passing dorsal to the trachea and oesophagus. The condition has been observed in rabbits, dogs, pigs, and man.) Some of these arrangements are shown in Figure 1.

The arrangement number 1 is characteristic of the Artiodactyla: horses, donkeys, zebras, etc., and the Perissodactyla: cows, sheep, goats, pigs, deer, etc.

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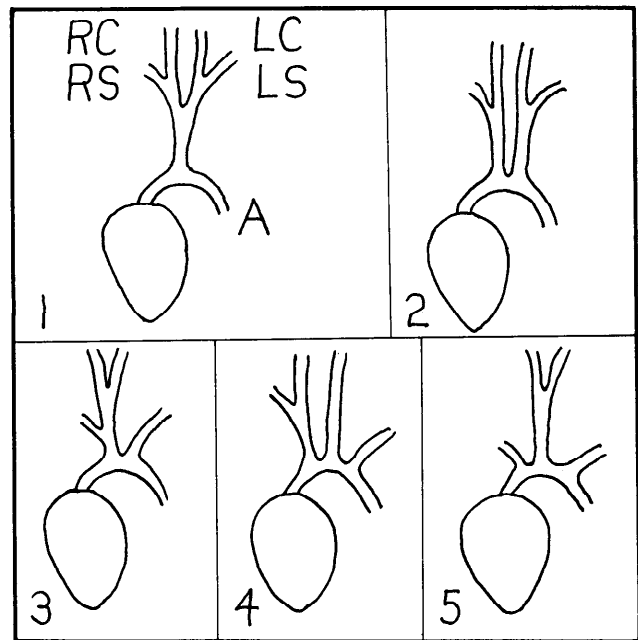


Figure 1. The mammalian aortic arch. The key is as follows: RC: right carotid; LC: left carotid; RS: right subclavian; LS: left subclavian; A: aorta. The kinds of animal which have the various arrangements are mentioned in the text.

The second arrangement is characteristic of some Cetacea: whales and porpoises, and some Insectivora: moles, shrews, hedgehogs.

Included in animals having the third arrangement are the Marsupials: kangaroos, opossums, wombats, etc., the Rodents: rats, mice, squirrels, beavers, porcupines, etc., Carnivores: dogs, cats, bears, skunks, weasels, raccoons, etc., Edentates: anteaters, armadillos, three-toed sloths, and some Primates: apes and monkeys.

The fourth arrangement is found in the Monotremes: the egg-laying duck-billed platypus and echidna; the Sirenia: sea cows and dugongs, and also some bats and man.

The fifth arrangement is that of African elephants and walrus.

References

- ¹Morgan, Thomas Hunt, 1923. The bearing of Mendelism on the origin of species, *Scientific Monthly*, 16(3):237. See p. 246.
- ²Newman, Horatio Hockett, 1932. *Evolution, genetics, and eugenics*. University of Chicago Press, p. 53.
- ³Buchsbaum, Ralph, 1948. *Animals without backbones*. University of Chicago Press, Rev. ed., p. 335.
- ⁴Examples are given in *Evolution and Christian Faith*, Bolton Davidheiser, Presbyterian and Reformed Publishing Co., 1969 et. seq., pp. 232-234.
- ⁵Crary, D. D. and R. R. Fox, 1978. Retroesophageal right subclavian artery in rabbits. *The Journal of Heredity*, 69(1): 19-21.