THE EVOLUTION OF THE SKULL AND THE CEPHALIC MUSCLES: A COMPARATIVE STUDY OF THEIR DEVELOPMENT AND ADULT MORPHOLOGY.*

By H. LEIGHTON KESTEVEN, D.Sc., M.D.

PART I. THE FISHES.

PREFACE.

This work is the result of half a lifetime devoted to the study of the small portion of comparative anatomy and embryology it deals with. For the most part it records actual personal observation. The deductions relative to homologies and the evolution of the vertebrata which the work contains are those which, from my own observations, appear to me to be the most acceptable. These conclusions are in several important instances at variance with those commonly accepted.

Nowhere are the conclusions in the fields of speculative morphology, homologies and evolution, presented as proven. In no single instance have I felt entitled to write Q.E.D. at the end of any section.

An attempt has been made to describe the cephalic musculature of a representative range of each group of the vertebrates. Only such references to the nervous structures have been made as appeared necessary to a proper understanding of the musculature. It is regretted that it has not been possible to include references to the main arterial and venous trunks in their relation to the muscles. It was very early found that it was impossible to dissect, with any degree of success, the blood-vascular system in specimens which had not been injected. Following on this discovery, it was found impossible to obtain specimens already injected, or sufficiently fresh to inject, in sufficient number to make the study even approximately complete. Whilst one must admit that a knowledge of the relation of the muscles to the main blood vessels is desirable, it is believed, looking back over the work done and the observations made, that the conclusions relative to the homologies and phylogenies of the muscles are based on sufficient evidence to justify them, and that a knowledge of the relation to the pertinent blood vessels would, in all probability, add further evidence in support of these conclusions.

Very naturally the embryological work has been largely confined to the later stages of development, during which the muscles are assuming their adult forms. My observations are largely based on actual dissections or serial sections.

In the sections dealing with the cranial structures, descriptions and illustrations of representative forms are given and then the serial homologies of certain of the bones are discussed. It may be accepted that throughout the work all those bones which have been named alike and not been discussed are believed to be homologous, wherever found. These are, of course, those bones about whose homology there is at present complete agreement. Discussions only centre around certain of those about whose homology there is a diversity of opinion.

* The complete Memoir, of which this is the first part, contains the following sections: I. The Fishes; II. The Amphibia; III. The Sauria; IV. The Theria.