Acta Theriologica 36 (1 – 2): 178, 1991.

Morphogenesis of the Mammalian skull

Morphogenesis of the Mammalian skull. H.-J. Kuhn and U. Zeller, eds. Mammalia Depicta, Beihefte zur Zeitschrift für Säugetierkunde, 13. Verlag Paul Parey, Hamburg and Berlin, 1987, 144 pp. 3-490-17718-5.

This issue of the interesting library edition entitled "Mammalia Depicta" contains six papers concerning the cranial ontogeny of vertebrates against the background of skull phylogeny. In these works, the cranial development in the first days of ontogeny and the structural succession in braincases of the lower vertebrates have been presented in much detail. The role of factors influencing the final skull shape have also been discussed. The collection of papers is a common achievement of authors from a few scientific centres in Germany (Frankfurt am Main, Göttingen, Hamburg) and England (Nottingham).

U. Zeller deals with the ontogeny of the braincase in *Tupaia belangeri* paying special attention to the developments of *regio ethmoidalis, orbitotemporalis, otica,* and *occipitalis.* He also presents the precise chronology of the bony formation in endo- and exoskeleton. The author stresses the differences in the processes of chondrification in representatives of particular phyla. According to him, not all the changes in cranial ontogeny reflect the same processes in phylogeny, which seems disagreeing to the beliefs hitherto held.

Using a few specimens of *Ornithorhynchus anatinus* and *Tachyglossus aculeatus* crania, as well as skulls of several dozen or so embryos and adults of the higher vertebrates, H.-J. Kuhn and U. Zeller detect the development of the *cavum epitericum.* This term, quite unfortunate as it is not based on the Greek word "*pteryx, pterygos*", in reptiles and monotremes refers to the cavity confined between the primary and secondary walls of the braincase which, among other things, contains the trigeminal ganglion and cranial nerves. Of special concern to Kuhn and Zeller is the origin of the secondary wall of the *cavum epiptericum* since some authors suggest that this structure developed from the epipterygoid of reptiles, and in the opinion of others from the alisphenoid of *Theria.*

In the mammalian skull, there is no other region so complicated in its development as the orbitotemporal one, because the final bony structure of this area is a cluster of several fetal bones. It is this cranial part that W. Maier devotes thorough investigation to, focusing on material from *Monodelphis domestica.* He introduces the term of the ascending process of the *ala temporalis.* This process, according to Maier, results from the tectonic movements of the braincase wall, and caused, among other things, by the stress of the chewing muscles on one side, and by the cerebral expansion on the other. The effect of these movements is the absence of the *cavum epiptericum* in mammals.

H. Schliemann has conducted comparative research on the cartilaginous elements of the nasal floor in some predatory mammals. Among his considerations are the developments of the *cartilago ductus nasopalatini* and the *organum vomeronasale Jacobsoni.* The author deals with the development, homology and topography of other cartilaginous structures of the nose too, yet frequently using Latin expressions formulated *ad hoc.*

M. Klima is interested in a similar question in sea mammals. He has proven that the relocation of the front external nostrils on the top of the head in the *Odontoceti* is an effect of not phylogenic but rather ontogenic changes. The nasal passage and all the cartilaginous elements of the *Odontoceti* nose except for the *nasal septum* are turned through 90 degrees. The nasal septum protrudes forward and, typically for these animals, creates the rostrum.

The last paper by D. A. N. Hoyte is interesting because in the study, the method of coloring cranial bones in living animals with alizarin red is employed. It is known that the bone-formation processes in the braincase have two directions which can be well traced utilizing the author's method: i. e. the apposition of the bony tissue and its destruction due to the activity of osteoclasts. The balance between these two tendencies gives the actual shape of the skull, a seemingly inflexible bony case.

All the papers discussed above are valuable since they present the latest views and achievements in the field of investigating the cranial ontogeny in particular vertebrate phyla. The works contain an extensive bibliography too. As a volume gathering several papers of the same subject – the morphogenesis of the mammalian skull, the book ought to be widely used in craniological research of both the early and late periods of ontogeny.

Franciszek KOBRYŃCZUK, Department of Animal Anatomy, Warsaw Agricultural University, Nowoursynowska 166, 02-766 Warsaw, Poland.