

## Book Review

**Lebedkina, N.S.** (2004): *Evolution of the Amphibian Skull*. Pensoft Publishers, Sofia. Advances in Amphibian Research in the Former Soviet Union, vol. 9, 260 pages. ISBN 954-642-222-3 (soft cover 16 × 23 cm). Price 44.50 €.

This is the English version (translation was made by Sergei Smirnov, a close co-worker of N.S. Lebedkina) of the original Russian edition published by Nauka Publishing House, Moscow in 1979. Natalia S. Lebedkina was one of the representatives of the school of Russian evolutionary morphologists founded by A.N. Severtsov and I.I. Schmalhausen. Her book represents two decades of her research focused on the cranial development of caudate amphibians. The mentioned first edition terminated a period during which the main source of information on the development of the amphibian skull were Stadtmüller's (1936) and de Beer's (1937) accounts. Contrary to them, however, Lebedkina presented her own data based on studies of *Ranodon*, *Salamandrella*, *Ambystoma*, *Pleurodeles*, and *Triturus*. It is obvious that she largely focused her attention to the most primitive urodeles from which she could deduce some information on caudate ancestors and trends in evolutionary transitions between the ancestral forms and modern amphibians. Evolutionary considerations are, besides anatomical descriptions of the cranial development, the second important aspect of Lebedkina's book.

Several examples from the descriptive part may illustrate importance of Lebedkina's data to our understanding of the composition of the amphibian skull. Whereas a complex origin of the frontoparietal bone is now confirmed, among others also by Lebedkina who found that even in frogs the frontal develops from several ossification centres, this was not so obvious even in 1950s when some authors were able to observe only a single ossification centre for the whole frontoparietal. However, as Lebedkina mentioned in the footnote on p. 151, incor-

rect statements of these authors on the developmental origin of some compound bones were based on their limited number of investigated developmental stages, whereas important developmental events occurred in stages that were overlooked. Lebedkina also described a composite origin of the bone commonly termed the "squamosal" (from two ossification centres that she homologized with originally separate praeoperculum and squamosum), which was repeatedly confirmed also for various anurans, or the composite origin of some bones in the anuran mouth palate, e.g. the independent palatinum that later coalesces either with the maxillary or vomer.

Such developmental data provide a good basis for phylogenetic interpretations. Developmental trends are compared with evolutionary transformations that can be inferred from comparisons between three evolutionary grades: piscine ancestors of the early amphibians, temnospondyl ancestors of modern amphibians, and contemporary caudates and anurans. In such context, developmental differences are not interpreted as a consequence of random variation, but as reflecting phylogenetic branching. In other words, development is used as important source of data for phylogenetic reconstructions.

This extensive source of data on the development of the amphibian skull is now available also to English speaking scientists. Lebedkina's descriptions of the cranial development of primitive caudate amphibians may be a window through which we can see the anatomical structure of primitive Palaeozoic amphibians and better understand evolutionary processes that ultimately led to the anatomical structure of modern amphibians.

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