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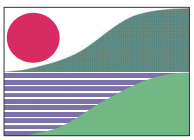


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The International Scientific Conference on the Jurassic/Cretaceous boundary

Proceedings volume

September 7-13, 2015
Samara, Russia

Togliatti

УДК: 551.762.3/763.12
ББК 26.323

The International Scientific Conference on the Jurassic/Cretaceous boundary. September 7-13, 2015, Samara (Russia). – Togliatti: Kassandra, 2015. – 96 p.

The present volume compiles short papers with new data on the Jurassic-Cretaceous boundary strata and their fauna of different regions of Russia (Volga region, Siberia, Crimea, Primorye) and of North America. Most papers are devoted to problems of biostratigraphy and paleontology of marine animals and their trace fossils. Besides this, some data on magnetostratigraphy, interregional correlations, history of defining J/K boundary in the Decisions of ISC, and eoomic value of the interval.

For geologists, paleontologists, stratigraphers, students of geological and geographical profiles.

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Международная научная конференция по проблеме границы юрской и меловой систем. 7-13 сентября 2015 г., г.Самара (Россия): Материалы совещания. – Тольятти: Издательство «Кассандра», 2015. – 96 с.

В сборнике опубликованы новые данные о пограничных отложениях юры и мела различных регионов России (Поволжье, Сибирь, Крым, Приморье) и Северной Америки. Большинство работ посвящено биостратиграфии и палеонтологии морских животных и следов их жизнедеятельности. Кроме того, приводятся сведения о магнитостратиграфии, межрегиональной корреляции, истории проведения границы юры и мела в постановлениях МСК, и экономической важности этого интервала.

Сборник представляет интерес для геологов, палеонтологов, стратиграфов, студентов геологического и географического факультетов.

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Верстка: А.П. Ипполитов
Перевод статей В.В. Ефимова, И.А. Мелешина, Е.Л. Васильевой: А.П.Ипполитов

ISBN 978-5-91687-161-6

Отпечатано в типографии «Кассандра»
445061, Тольятти, ул. Индустриальная, д. 7; тел./факс (8482) 57-00-04: kassandra1989@yandex.ru
(Адрес для корреспонденции: 445035, г.Тольятти, до востребования)
Подписано в печать с оригинал-макета 25.08.2015
Формат А4. Гарнитура Ариал.
Бумага офсетная. Печать оперативная.
Тираж 70 экз. Заказ № 124

A VALANGINIAN ICHTHYOSAUR FROM KIROV REGION (RUSSIA) SUPPORTING THE JURASSIC-CRETACEOUS BOUNDARY CROSSING FOR ICHTHYOSAURS

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***Abstract**: Here we gave a brief description of an ichthyosaurian remains from the Lower Valanginian of the European Russia (Kirov region) referable to the family Ophthalmosauridae Baur, 1887. The record of ichthyosaurs from the Berriasian–Barremian interval is extremely limited so even fragmental remains are of great interest. This finding confirms the assumption that the Jurassic–Cretaceous boundary extinction event had a negligible effect on ichthyosaurs [9].*

***Key words:** Ichthyosauria, Ophthalmosauridae, Cretaceous, Valanginian, Russia.*

Introduction. Berriasian-Valanginian marine reptiles, inter alia ichthyosaurs, are quite rare all over the world, as repeatedly pointed out by many authors [2, 9, 13]. Considerable part of the ichthyosaurian remains from this stratigraphic interval for a long time was defined only as Ichthyosauria indet., Thunnosauria indet., Ophthalmosauridae indet. and Platypterygiinae indet. [1, 5, 12, 18]. Only a few platyperygiines from the Berriasian-Valanginian were identified at genus and species level: *Aegirosaurus* sp. (Valanginian, southeastern France) [8], *'Platypterygius' hauthali* (Huene, 1922) (Valanginian–Hauterivian, Chile) [15, 19] and *Caypullisaurus bonapartei* Fernandez, 1997 (Tithonian–Berriasian, Argentina) [6, 19]. It was previously believed that the representatives of the subfamily Ophthalmosaurinae Baur, 1887 became extinct at the Jurassic–Cretaceous boundary. In recent years, it has been found that ophthalmosaurines did not disappear in the Late Jurassic and continued to exist in the Early Cretaceous [8-10]. This was evidenced by the recently described remains of *Acamptonectes densus* Fischer et al., 2012 (upper Hauterivian, Germany) [9], *Leninia stellans* Fischer et al., 2013 (Lower Aptian, Western Russia) [10], cf. *Ophthalmosaurus* (Uppermost Tithonian to Berriasian, England) [9] and indeterminate ophthalmosaurines in Cambridge Greensand (Uppermost Albian, England) [11].

As such, a partial ichthyosaur skull and two associated vertebrae from the Valanginian are of considerable interest. The material is deposited at the Vernadsky State Geological Museum of Russian Academy of Sciences, Moscow (specimen SGM 1574-02, 1574-03). Remains belong to a medium-sized ichthyosaur. The scarcity of the material does not permit to unambiguously identify it and conduct a detailed comparative analysis. The presence of a relatively large orbit and a narrow postorbital bar demonstrates similarity with several ophthalmosaurines - *Ophthalmosaurus* Seeley, 1874, *Paraophthalmosaurus* Arkhangelsky, 1997, as well as the peculiar

platypterygiines *Aegirosaurus* Bardet et Fernandez, 2000 and *Sveltonectes* Fischer et al., 2011. Thus, we conservatively identify the remains as a small form belonging to the family Ophthalmosauridae.

The history of discovery and geological settings. The bones were found in Vyatka phosphorite mine, located in Verkhnekamsk district of Kirov region. Mine was organized in 1915, but the mechanized mining operations were started here only in 1930. The find was made in August, 1926, obviously due to the manual artisanal mining process of phosphorite recovery. Currently the mine is not functional.

According to the label, the remains were found in Pyankovka branch that was situated near the village Pyankovka, now a part of Rudnichny township (**Fig. 1**).

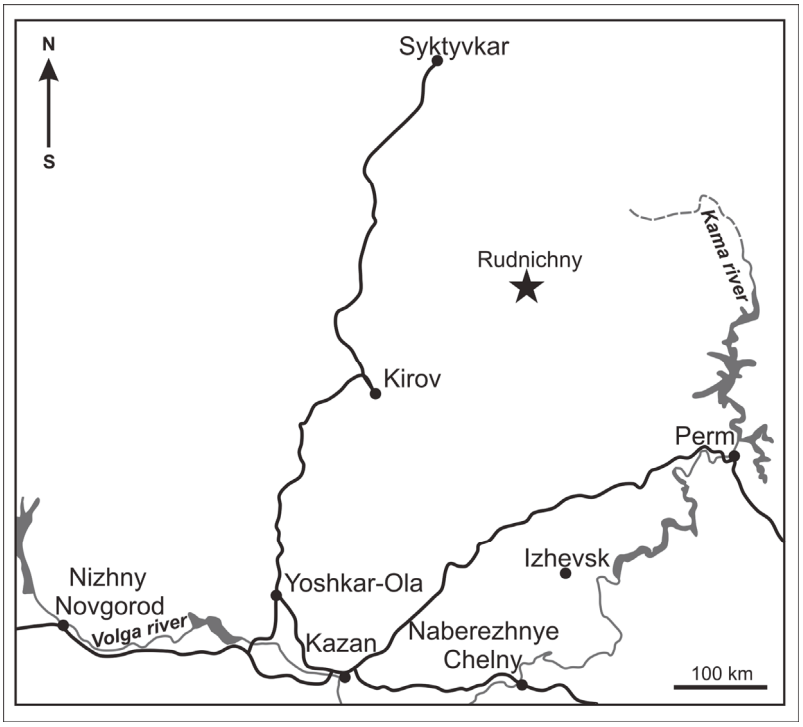

Fig. 1. Map showing the discovery site of SGM SGM 1574-02 Ophthalmosauridae indet. Locality is marked with an asterisk.

The bones were removed from the main phosphorite seam by I. Galin in August, 1926 and later (25.03.1927) they were delivered to Geological Cabinet of Moscow State University. Now the bones are deposited at V.M. Vernadsky State Geological Museum of RAS. According to the literature, the mine was a part of the Vyatka-Kama phosphorite deposits. It is located 150-200 km north-east from Kirov. It stretches from south-west to north-east between the rivers Vyatka and Kama for 120 km and was 30-50 km in width. The phosphorite deposit is confined to a broad trough formed by the Jurassic, Cretaceous and Quaternary sediments. The main phosphorite layer refers to the lower Valanginian Nikitinoceras hoplitoides Zone [3, 14]. The mined seam lies almost horizontally, folded by black and dark brown phosphorite nodules up to 10 cm, at the top - up to 20-30 cm, are firmly concentrated in the quartz-glauconite sands. The overburden is represented by the Hauterivian dense, micaceous, sandy clays

interbedded with thin layers of quartz-glauconite sands and phosphorite gravel. In the clays, eluvial-diluvial and alluvial loams and sands commonly occur. Thickness of phosphorite horizon is 0.5-1.7 m. The depth of the reservoir is from 1-2 m to 60-80 m [16, 17].

SYSTEMATIC PALAEONTOLOGY

Ichthyosauria Blainville, 1835
Neoichthyosauria Sander, 2000
Thunnosauria Motani, 1999
Ophthalmosauridae Baur, 1887
Ophthalmosauridae indet.
Fig. 2

Description. Preservation of bones is poor. The orbit is large, oval in shape, slightly constricting posteriorly. It is incompletely preserved, its ventral and front edges are missing (**Fig. 2A-C**). Dorsally it is formed by the postfrontal, posteriorly by the postorbital. The postorbital is thin and gracile, slightly extended downward. The suture between the postfrontal and the supratemporal is undistinguishable. A small fragment of the quadratojugal is preserved.

The sclerotic ring is preserved in three dimensions, but partially broken. The diameter of the external area is 130 mm, the diameter of the aperture is 50 mm, as in the must larger taxon *Caypullisaurus* [10], suggesting a relatively large eye size for SGM 1574-02. Nine sclerotic plates are preserved, eight of them are in natural articulation. The sclerotic ring occupies the entire area of the orbit, which probably suggests SGM 1574-02 was a juvenile [7].

Two anterior caudal vertebrae are preserved (**Fig. 2D-F**). They are relatively elongated (length to height ratio - 0.43).

Material. State Geological Museum of RAS, SGM 1574-02, fragment of right half of skull related to the orbital area, sclerotic ring, SGM 1574-03, two anterior caudal vertebrae; Kirov region, Verkhnekamsk district, near the township Rudnichny, Vyatka phosphorite mine, Pyankovka branch; Lower Cretaceous, Lower Valanginian, Nikitinoceras hoplitoides Zone.

Conclusion. The studied remains may be identyfined as a representative of the family Ophthalmosauridae. Ichthyosaurian remains previously described from the Valanginian of Crimea [4] are also could be defined only as Ophthalmosauridae indet. Thus, in the Valanginian the Russian Sea and adjacent water basins were inhabited by medium-sized ophthalmosaurids, most likely specialized on hunting for small soft-bodies nekton – fish and cephalopods. This finding confirms that ichthyosaurs successfully crossed the Jurassic-Cretaceous boundary and thereby further search for the Lower Cretaceous ichthyosaurs in Central Russia should yield positive results. View of the fact that ichthyosaurs were not affected by the Jurassic-Cretaceous boundary extinction event [9], and their taxonomic composition appears to be the same in both the Upper Jurassic and early Early Cretaceous, they can not be regarded as stratigraphic indicators for the Jurassic-Cretaceous boundary at the current level of knowledge.

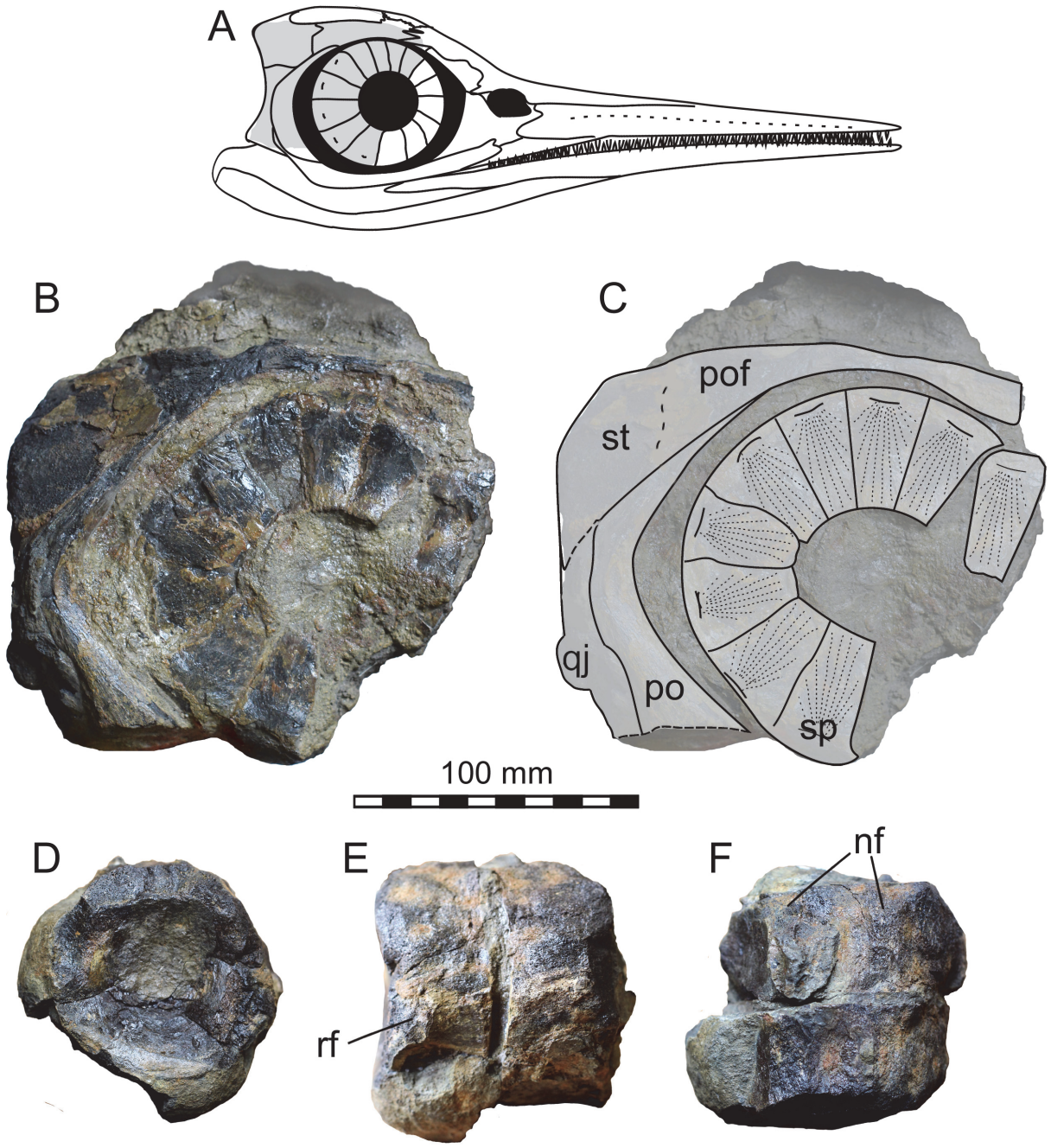

Fig. 2. Ophthalmosauridae indet. (SGM 1574-02, 1574-03): A – a position of the described fragment in the skull; B – fragment of the skull; C – interpretive outline; D-F – anterior caudal vertebrae (SGM 1574-03) in anterior (D), lateral (E) and dorsal (F) views. Abbreviations: nf – neural arch facet, po – postorbitale, pof – postfrontale, qj – qadratojugale, rf – rib facet, sp – sclerotic plate, st – supratemporale.

Acknowledgements. We thank I.A. Starodubtseva and V.B. Basova (V.M. Vernadsky State Geological Museum of Russian Academy of Sciences, Moscow) for their assistance during our study of the museum materials and V. Fischer (University of Oxford, UK) for valuable advices.

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