

Paper Number: 3926

Cambrian System in Siberia – discovery "[at a desk](#)".

Konikov A.Z.¹, [Kolbantsev L.R.](#)²

¹Senior geologist, St Petersburg, Russia, geotor@mail.ru

²A.P. Karpinsky Russian Geological Research Institute, St Petersburg, Russia; Leonid.Kolbantsev@vsegei.ru

The Paleozoic rocks in Siberia were established academically by expeditions in the 18th -19th centuries. Silurian rocks were considered the most ancient. Only in 1876, I.D. Chersky found Laurentian (Archean) formations in the Baikal region. The primary information about the presence of Cambrian sediments in Central Siberia was obtained by F. Schmidt in 1886. He was the first to identify three forms of Cambrian trilobites in the collections of the Geological Museum of the Academy of Sciences (A. Czekanowski, G. Maydell, N. Pavlovsky's specimens from the Olenek and Vilyui rivers). These fossils had no topographic and stratigraphic referencing so did not provide ideas on the nature and distribution of the Cambrian deposits [1]. In the basins of Lena, Olenek, Tunguska Rivers, the age of sediments remained uncertain for a long time. They were attributed to the Silurian (F. Schmidt, G. Lindström), Devonian (F. Schmidt), Carboniferous (N. Meglitsky, V. Obruchev, A. Czekanowski), Triassic (A. Erman). Now regarded as classic, the sequence of the Cambrian red-sandstone and limestone in the Lena River basin, was noted as far back as D.G. Messerschmidt in 1723, but it was not dated authentically for a long time and was attributed to various stratigraphic divisions, starting from Silurian.

Extensive development of Cambrian sediments was identified by E.V. Toll, the Geological Museum employee and Geological Committee member, participant and head of three polar expeditions. In A.L. Czekanowski's collection, Toll defined brachiopod *Kutorgina* and trilobite *Microdiscus*, close to the Early Cambrian forms of North America. Studying the geological data of Czekanowski [3], E. Toll determined the existence of Cambrian rocks in the Lena River basin, with close to horizontal bedding and making up a vast territory within the plains of Siberia [1]. Another important discovery of Toll became the age determination for the formation of Torgashino limestones, on the northwestern end of the Eastern Sayan. Their age determination was contradictory, despite the abundance of fossils in them. In particular, F. Schmidt defined the Devonian trilobites and "Corals" in them. After studying museum collections, Toll revised Schmidt's definition and attributed the "Coral" to the *Archaeocyathid* group which was then insufficiently studied. This required a redefinition of the age of both the limestones and trilobites found in them. Toll showing insight and scientific courage, came to the conclusion on their Cambrian age, and made a monographic description of the Cambrian trilobites and archeocyathids of Siberia (1899). This marked the beginning of a long chain of the Cambrian rock discoveries in platform and folded regions of Siberia and the Far East (G.G. Petz, 1902; O.O. Backlund, 1907; V.N. Zverev, 1912; Ya.S. Edelstein, 1916; K.A. Vollosovich, 1930, and others).

The Cambrian System in Siberia was established thanks to efforts of several generations of geologists, but was firmly established by E. Toll in the Museum, at a desk, "on a feather tip". Toll offered an impressive picture of a subhorizontal platform plate, stretching for huge distances from the Yenisei River in the West to the Far East. It was a discovery of world importance. Finding of the Cambrian deposits in the lower part of the sedimentary cover contributed in future to the formation of ideas about the Precambrian crystalline shields - Anabar and Aldan; an ancient basement overlapped by a platform cover; an unconformity, largest in the geological history, between the Precambrian basement and Riphean-Phanerozoic cover. Early Caledonian structures were established in the folded framing of the Siberian Platform, and the Salair (Early Caledonian) geotectonic stage of folded areas development was allocated. The last quarter of the XIX century was time of brilliant achievements of the Siberian geological school. Opening of the Archean and Cambrian in Siberia had a decisive impact on all further course of knowledge of the Asian geological history.

References:

- [1] Toll E. (1895) Proceedings of the Imperial Russian Mineral. Soc. 33(1): 273-281 (*in Russian*).
- [2] Czekanowski A.L. (1896) Proceedings of the Imperial Russian Geograph. Soc. 20(1): 1-298 (*in Russian*).
- [3] Schmidt F.B. (1886) Bull. Ac. Sci. 30: 501-512 (*in Russian*).

