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## **Petr CHIKHACHEV (1808-1890) – the creator of the first geological map of the Altai region (Russia)**

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### **Introduction**

Investigation of geology of the Altai region started in the 18<sup>th</sup> century when prospectors discovered high-grade copper and silver deposits. In the course of their mining, geological maps of surrounding areas were compiled and geological documentation was maintained. But there were no unified geological map of the Altai till the 40<sup>s</sup> of the 19<sup>th</sup> century. This map (Fig. 1) was first compiled by a prominent Russian researcher, geologist and geographer Petr CHIKHACHEV. Academician of the Russian Academy of Sciences and a member of many scientific societies in Russia, he was also elected a member of Paris, Berlin, Munich, Vienna, and Philadelphia academies as well as Berlin, Rome, Italian, and Royal London geographical societies. He traveled in the Apennines, Asia Minor, the Balkan Mountains, the Pyrenees, and North Africa. Results of his studies were published in multi-volume writings. His publications were comprehensive and covered such spheres as geography, geology, paleontology, botany, ethnography, social-economic aspects due to his many-sided scholarship and variety of scientific interests.

### **Summary**

His trip to the Altai is a great contribution of this prominent scientist-encyclopedist to the science. The trip lasted over 6 months. He visited places where there had been no geologists before: upper reaches of the Chuya, Chulyshman, Bashkaus, Abakan and other rivers. In areas unknown to the science, he gathered collections of rocks and minerals, paleontological and paleobotanic remains, compiled a herbarium of new plants, described the way of life and customs of Altaians, Tuvians, and other ethnic groups, gave main economic characterization of the Altai region, gave much attention to culture of native Altaians as well as to political relations of Russia and China.

In 1845, a detail report about this expedition consisting of 20 chapters was published in Paris in French. The second part of the monograph (13 to 19 chapters) is devoted to the description of the geological structure of the Altai and neighboring part of Kalba, including the Kuznetsk Coal Basin. The text is accompanied with drawings of outcrops (Fig. 1).

The Report accompanied with an album with beautiful drawings of Altai mountain landscapes made by artists E. E. MEIER and I. K. AIVAZOVSKY (Fig. 3, Fig. 4). This investigation of geology of the Altai and adjacent areas resulted in the compilation of a 1M geological map. This was first geological map of a significant part of the Asian part of Russia. While compiling, P.A. CHIKHACHEV took into consideration all available data on Altai geology. For this purpose, he studied materials of searching parties headed by mining officers and collections made by them that were kept at the Mining Institute (St. Petersburg). Schemes of mine workings at several mines are also included in the Report. The CHIKHACHEV's work was of great importance. New geological map of this scale that covered the whole Altai area was published only 100 years later.

At present, the A.P. CHIKHACHEV's map is only of historical interest. But he absolutely correctly identified and reflected on the map that marine Carboniferous rocks occur only in the southwestern Altai. It is quite clearly shown on the map that the Carboniferous band is stretched northwestward. P.A. CHIKHACHEV greatly anticipated his contemporaries in some aspects. He did not assume the schist as Achaean as believed scientists before and after him, but he noted that this schist always occurs near granite and therefore it had been formed under its influence. CHIKHACHEV asserted that there were no "primeval" (Achaean) rocks in the Altai.

He showed on the map weakly and intensively altered rocks including mica schist. The age of metamorphic rocks is not indicated on the map, but in the description it is indicated that these are Silurian and partly Devonian rocks. Igneous rocks (granitoids, porphyry, diorite, and serpentine) are shown with different colours. The granite is separated from gneiss and syenite by hatching.

The geological map compiled by P.A. CHIKHACHEV during hundred years remained the only map that provided insight into the geological structure of the Altai region.



Fig. 1: Petr CHIKHACHEV: map of the Kuznetsk Coal Basin, Altai Mts.

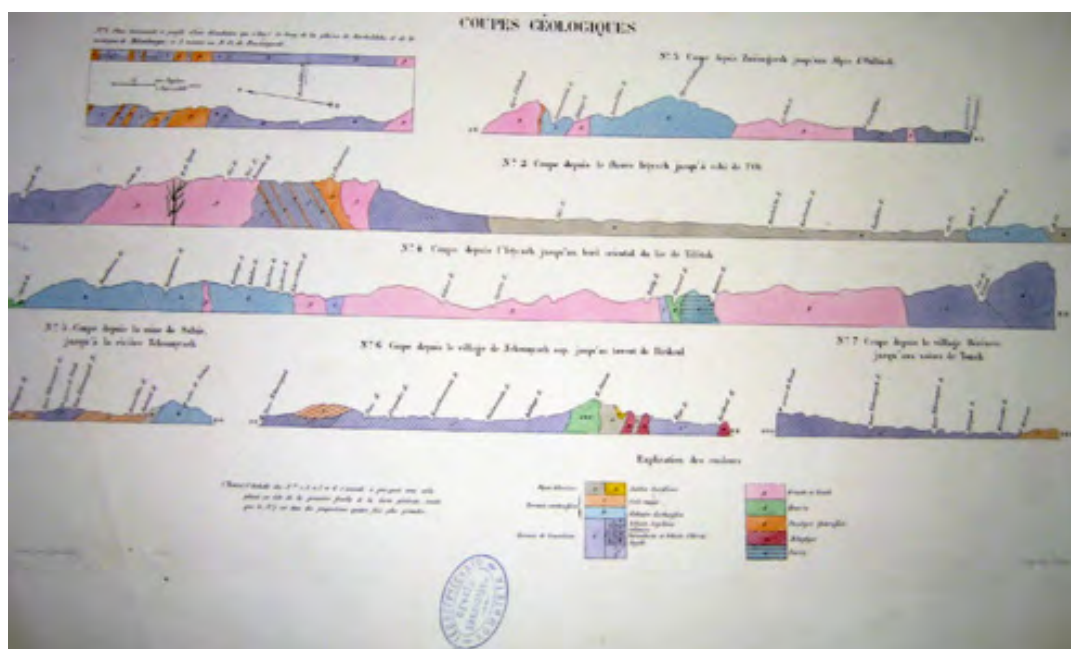


Fig. 2: Petr CHIKHACHEV: sections of the Kuznetsk Coal Basin, Altai Mts.





*Fig. 3: Altai mountain landscapes made by artist E. E. MEIER*



*Fig. 4: Altai mountain landscapes made by artist I.K. AIVAZOVSKY*

### **Literature**

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