The Influence of Professional Activities of Railway Engineers on the Development of Architecture in the Far East at the Turn of the 19th -20th Centuries

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Abstract. The article discusses the main directions of professional activity of the following railway engineers: G. V. Adrianov, V. I. Alexandrov, V. A. Barry, F. N. Drozdov, S. V. Ignatius, S. I. Kerbedz, N. A Kruse, S. T. von Offenberg, N. I. Prilezhayev, N. S. Sviyagin, V. M. Trenyukhin, who worked in the Russian part of the Far East and the Chinese Eastern Railway (CER) right-of-way in the late 19th - early 20th century. Authors give brief biographical facts, reviews the activities of above-noted engineers in the construction of railways and the infrastructure of the station towns and settlements. Special attention is paid to the influence of the professional activities of railway engineers on the development of the architecture of the region.

1. Introduction

Began in 1891, the construction of the Trans-Siberian Railway gave a powerful impetus to the development of towns in the Russian Far East, and also contributed to creating a large number of jobs and attracting professional engineers to the region. The emergence of continuous transport links between the western part of the country, Pacific ports and Asian countries led to the development of trade and the influx of large foreign investments into the region, which in turn contributed to the intensive economic and socio-cultural development.

The Trans-Siberian Railway was divided into: the West Siberian section (from Chelyabinsk to Ob - 1,418 km), the Central-Siberian section (from Ob to Irkutsk - 1,871 km), the South Ussuri section (from Vladivostok to Grafskaya station - 408 km), North Ussuri region (from Grafskaya to Khabarovsk - 361 km), the road from the station Mysovoy to Sretensk - 1104 km), Circum-Baikal Road - 261 km and Amur Road (from Sretensk to Khabarovsk - 2130 km) [1].

In the period of 1897–1903, at the same time with the construction of the Trans-Siberian Railway, the Russian government carried out the laying of a highway through the territory of Manchuria (Chinese Eastern Railway) to create the shortest route to the Pacific Ocean and connect the Trans-Baikal and the Ussuri region (figure 1). A large number of specialists of different categories were sent to carry out design and construction, and subsequently the operation of railway lines to the Far East and Manchuria, the main part of which, as the study showed, were railway engineers who received an education at St. Petersburg Institute of Railway Engineers.
2. Literature review

The scientific basis for this study were the works of Russian and foreign scientists, various sources and materials that reveal some aspects of the problem under study. Scientific works of N. P. Kradin [2–3], S. S. Levoshko [4–5], C. Wang [6], Zeng Shuangshuang [7], Chan Huaysheng [8] give a detailed picture of the urban development, historical and cultural development of the Far Eastern towns of Russia and the CER right of way. Works of N. E. Ablova [9], M. A. Vivdich [10], A. A. Lisitsyn [11], T. Y. Troitskaya [12] are dedicated to the history of the construction of the Chinese Eastern Railway (CER). Publications of Chinese scientists Yingli Mao, Yinghui Mao [13], Kai Jun and Liu Daping [14] observe some planning and stylistic features of the settlements built along the CER.

Biographical data and the work of a number of engineers who worked in the Far East of Russia and in northeastern China from the middle of the 19th century to the beginning of the 1920s are considered in the works of N. P. Kradin [15, 16], Yves Franken and A. A. Khisamutdinov [17].

However, the available literature does not fully reflect the peculiarities of the professional activities of railway engineers in the Far East, their influence on the development of the region’s architecture, as a result of which the problem requires more serious analysis and systematic study.

3. Materials and research methods

The main method of this study is a multipronged and interrelated study of various sources on this issue (archival, literary, cartographic materials). The author conducted an archive search and on-site survey, carried out measurements and photographic images of the extant buildings made by railway engineers in the Far East. This made it possible to identify and introduce new scientific information into the scientific circulation and analyse the structures of various typological purposes. As a result, the main directions and features of the professional activities of railway engineers who worked in the region during the period under review were identified.

4. Results

4.1. Activities on the construction of railways

In the period from the end of the 19th to the middle of the 19th centuries a large number of railway engineers, technicians, mechanics and representatives of other specialties who came to the region from central Russia and neighbouring Siberia worked on the construction of Far Eastern railways. The activities of many of them were fairly modest and inconspicuous, but prominent figures who had a
significant influence on the formation of transport infrastructure in the Russian Far East and in neighboring China also worked in.

Filaret Nikolayevich Drozdov worked in the region even before the construction of railway lines. Immediately after graduating from the St. Petersburg Institute of Railway Engineers in 1887, he was sent to the Far East, where he worked as a junior technician for an expedition to produce surveys of the South Ussurian Railway. From 1891 he led the construction of one of the sections of the Ussurian Railway. In the same year, Nikolay Sergeevich Sviyagin took the head position of the 4th section’s construction of the Ussurirsk feeder of the Trans-Siberian Railway. After four years of employment, he conducted surveys, then took the task on the construction of the Nikolskaya railway line to the Grodekovo station, and then in 1898 led the expedition to Manchuria and developed the future route for the CER. The proposed northern route of the railway in the same year was approved on the highest level [18]. N. S. Sviyagin was in fact one of the founders of Harbin, since the construction of the city is connected with the construction of the CER. From 1899, N. S. Sviyagin was the head of the Eastern Construction Division of the CER in Vladivostok. In 1900, he supervised the construction of a highway in the area from Nikolskaya station to Mulun station, at the end of which the railway approached the Pacific Ocean. Until the revolution, he held responsible posts in the departments related to the railway, and after 1917 he began working as an engineer in the administration of the CER, but already in Harbin [19, 20].

From the first years of the construction of the Chinese Eastern Railway, along with N. S. Sviyagin, V. I. Aleksandrov, S. V. Ignatius, S. I. Kerbedz, S. C. von Offenberg, V. M. Trenyukhin worked in the region, supervising the construction of lines of communications. Working in the Road Construction Administration, they also participated in the construction of various infrastructure facilities.

A hereditary nobleman Nikolai Ivanovich Prilezhayev, who arrived in the Far East in 1903 and worked on the construction of the Ussurirsk railway (Bikinsky, Nikolsky and Khabarovsky sections) for five years, made a major contribution to the development of the Far Eastern railways. Prilezhayev was engaged in designing and supervising the construction of various related structures. Thus, with his participation, eight houses were built in Nikolsk-Ussuriysk, 18 house-barracks and 68 railway bridges. Since 1910, he served as head permanent way engineer of the Evgenievka station. In 1912 he built four residential houses, three churches and the community hall at the station. In the same year, he participated in the construction of the People’s Theater in Vladivostok [21]. The activities of most railway engineers in the Far East are inextricably linked with Harbin, some of them worked on the construction and maintenance of the CER lines before the revolution, others found themselves in this city with a wave of emigration. N. I. Prilezhayev was no exception. From 1917 he moved to the CER employment, in 1920 he worked in Manchuria at Mulun station, in 1921 he was transferred to Harbin, then appointed to head permanent way engineer of the Yaomyun station. Living in Harbin, the engineers of the railways not only worked on the construction of the CER and associated facilities, but also engaged in teaching at the Technical School, the Harbin Polytechnic Institute and the Institute of St. Vladimir.

4.2. Contribution to the development of the architecture of the region

The construction of railways and related structures has created an extensive field for attracting a large number of qualified technical, engineering and architectural personnel. The study showed that the activities of the graduates of the St. Petersburg Institute of Railway Engineers, as well as other engineering schools of St. Petersburg, who made up the largest part of them, had a strong influence on the development of railway communications in the region, and also contributed to the development of settlements around the railway stations, some of which later became major cities. The construction of railways in the Far East and in the north of Manchuria led to the emergence of a large number of station villages, the main contingent of which were builders, workers on the maintenance of railways and railway stations, and their families. The remoteness of such settlements from large cities in the region necessitated the formation of an appropriate near-station infrastructure. The study showed that the activities of graduates of the St. Petersburg Institute of Railway Engineers in this process were of
key importance. Most of the railway engineers were engaged in the creation of transport infrastructure: they carried out research and supervised the construction of railways, bridges, tunnels and technical facilities. However, in the course of the study, it was established that some railway engineers carried out projects and carried out civilian construction projects and made a certain contribution to the development of the architecture of station settlements. Among such railway engineers should be highlighted following people: G. V. Adrianova, V. A. Barry, N. A. Cruze, N. I. Prilezhayev and N. S. Sviyagin.

Grigory Vasilyevich Adrianov worked on the construction of the Trans-Siberian Railway in Transbaikalia at the turn of the 19th – 20th centuries, also supervised the construction of schools and churches at the Undurg (Adrianovka), Onon (Tinova) and Borzya stations [22]. It should be noted that the construction of religious orthodox buildings in the villages adjacent to the railway stations at that time was associated with the nation state program for the construction of the railway itself. For the development of vast new sparsely populated areas in the eastern suburbs, the nation state was engaged not only in the development of transport links, but also in solving social and educational issues. Road builders, convicts and immigrants needed not only to be settled and arranged in a new place, but also to spiritually nourished. Such temples and churches, built at many large stations of Transsib, received the name "railway" in public settings. So, for example, in 1901 a wooden church of St. Nicholas of Myra in Miracles was built at the station of Pogranichnaya (now Suifenhe) by N. S. Sviyagin (figure 2).

Figure 2. Church of St. Nicholas of Myra in Miracles at Pogranichnaya station (now Suifenhe), 1901.

Vladimir Andreevich Barry, who was the author of a number of buildings in St. Petersburg, worked in the Far East during the Civil War. First, he was involved in drafting elements of bridge structures, pipes and racks for the western sections of the Amur Railway, and then he conducted an inspection of...
port workshops (figure 3) in Vladivostok for their reorganization [23]. According to N. P. Kradin [24], on the basis of the results of that survey, a “State Far Eastern Shipbuilding facility” was created on the basis of the workshops, and V.A. Barry was an appointed chairman of it. From 1921 he lived in Harbin, where he worked as an engineer in the technical department of the Board of the China-Eastern Railway and a professor at the Harbin Polytechnic Institute.

Another railway engineer was Nikolai Aleksandrovich Kruze. In 1921–1922 he worked as a city engineer at Manchuria station, and then on the CER, where he was engaged in the construction of various facilities at the station. Border and train stations at the Yablonya, Paishan, Wujimihe stations [25].

As noted earlier, at the beginning of the 20th century railway engineer Nikolay Prilezhayev worked on the construction of railways in the Far East. The study showed that he was the author of projects and the builder of a large number of buildings and structures of various functional purposes (houses, churches, water-lifting structures, etc.) in Russia and China.

It should be noted that railway engineers often used in their work projects from albums of typical and executive drawings, developed in St. Petersburg, adapting them to local conditions (relief, building materials, population of the settlement, etc.), which explains certain stylistic unity of buildings made along the lines of railways. For example, in 1910, at the Evgenievka station (now Spask-Dalniy), following a typical drawing of a regimental church, designed by the architect F.M. Verzhbitsky, railway engineer Prilezhayev, built the stone church of Nicholas the Wonderworker (figure 4).

Figure 4. Church of Nicholas the Wonderworker at the Evgenievka station (now Spask-Dalniy), 1910.
Architect F.M. Verzhbitsky, builder N. I. Prilezhayev

5. Conclusion
The appearance of railway transport in the Far East had a tremendous impact on the development of these territories. The construction of railways and related technical facilities required the involvement of a large number of qualified technical and engineering personnel. Around the railway stations began to develop settlements, some of them later turned into major cities. The presence of a continuous transport connection between the Eastern suburbs and the central part of Russia contributed to the formation of a single economic space throughout the country and to improve the management of remote areas.

The data obtained in the study show the multidimensional professional activities of graduates of the St. Petersburg Institute of Railway Engineers in conducting survey and design work, serving in the construction of lines of communication, as well as in designing and building buildings and structures
for various purposes in the Far East. Some of them have made a significant contribution to the development of the architecture of the Far East.

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