

Research on the Coal Industry in the Qing Dynasty based on Zhuzhi Ci in Western Regions

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Abstract: This paper focuses on the Zhuzhi Ci and related literature in the western regions of the Qing Dynasty to explore the development of the coal industry in Xinjiang in the Qing Dynasty. For a long time, academic circles have paid limited attention to the study of Xinjiang coal history, and the existing achievements are mostly scattered in the research of mining history and economic history and lack of in-depth exploration. This paper makes a systematic analysis of the coal industry in Xinjiang during the Qing Dynasty from the aspects of origin, technical level, and the relationship with people's lives. It is found that although the history of coal mining in Xinjiang was early, it had been interrupted, and the coal industry in Xinjiang in the Qing Dynasty originated from the large-scale development after the unification of Xinjiang by Qianlong. Technically, Xinjiang had mastered mature coal cake processing and coking technology during the Jiaqing period. In daily life, due to the cold climate and other reasons in Xinjiang, coal is more popular than firewood, is low price, and is widely used. People's understanding of coal is also constantly rich, divided into different categories, and know its function. The people knew that coal could easily cause carbon monoxide poisoning, developed the Ruaner pear-eating detoxification method. Zhuzhu Ci in the Western regions provides a unique perspective for the study of the Xinjiang coal industry in the Qing Dynasty and opens up new ideas for subsequent research.

Keywords: Qing Dynasty; Zhuzhu Ci in the Western regions; Xinjiang; Coal industry

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1. Introduction

As an important literary form reflecting the social life and customs of Xinjiang in the Qing Dynasty, Zhuzhu Ci in the Western regions provides a unique perspective for researchers to study the coal industry at that time. Based on the analysis of Zhuzhi Ci and related literature, this paper probes into some specific problems of the coal industry in Xinjiang in the Qing Dynasty. For a long time, academic circles have not paid much attention to the study of coal history in Xinjiang. Most of the achievements in the study of Xinjiang coal history in the Qing Dynasty are only scattered in some journals and monographs on mining history and economic history. For

example, Wang Zhizhong's "Xinjiang Mining Industry in Qing Dynasty" and Cai Jiayi's "Xinjiang Social and Economic History Outline in Qing Dynasty"^[1]. These achievements are limited by the local chronicles about the coal industry in Xinjiang, being too scattered and trivial materials, and the works do not specifically study the history of coal, so most of the cases can only be a simple list of the distribution of the coal industry in Xinjiang, lacking further exploration of the specific problems of the coal industry in Xinjiang in the Qing Dynasty. The real history of the Qing Dynasty is extensive, and the lack of available materials rarely appears in the field of Qing history research. Many research problems are not due to the lack of historical materials to excavate, but depend on whether scholars can fully excavate and integrate existing materials, and incorporate many seemingly unrelated "old materials" into their research fields. For the Qing history researchers, the Western Zhuzhu Ci as a poet's poetic creation research is no longer a novel subject, but the integration and use of multiple western Zhuzhu Ci around the coal history rather than the image of the poem itself such as the "traditional" research direction, then the Zhuzhu Ci can also become a "new material" for the study of coal history. This paper hopes to conduct some specific research on the coal history of the Qing Dynasty based on the Western Zhuzhu Ci, to open new ideas for researchers who are committed to the study of the coal history of the Qing Dynasty that are also limited by materials^[2].

2. The origin of the Xinjiang coal industry in the Qing Dynasty

According to the "Yi Jiang Overview", "Lao Jun Temple in the Kong Erbo coal mountain in Xinsi year, kiln household set up to mine coal, rely on its god's blessing." Xinsi was in the 26th year of Qianlong (1761), when the Qing government had just put down the rebellion of the Mongolian Junggar department of Weilat, flattened the north and south of Xinjiang, and began large-scale city construction work. Emperor Gaozong of Qing believed that the location of a city should not only consider whether it was convenient for defense but also "suitable for its situation and resources." The city should be built in a place where coal or trees are abundant. Regarding this policy, Fu Qing, a poet who was an official in Xinjiang during the Jiaqing period, recorded in his poem, "Eastern coal and iron out of the deserted countryside, cooking and smelting cannot be sought outside. The city builds Huining for the horns. A ripe field looks like an old harvest."

Fu Qing wrote a note for this poem, "Fifty miles east of Yili, said Bayandai, now Huining City, garrison troops. Fifteen miles to the east of Huiyuan, there is Peilou, which controls the Oruo Mountain. It is rich in coal and its Yin produces iron"^[3]. Both Huiyuan City and Huining City were built on coal mountains, which provided great support for military needs, and the situation of the cities built thereafter was generally the same.

With the stability of the situation in Xinjiang, the number of soldiers and civilians increased, and it was difficult to pay for firewood. In this context, the coal mines near the military centers of Yili, Urumqi, and Hami in northern Xinjiang were all mined for kilns during the Qianlong period. The local records show that the coal industry in Yili and other places should have originated from this campaign of large-scale official coal kilns in the Qianlong period. However, according to recent archaeological findings, coal was mined for use as a domestic fuel in the Yili region about 3,600 years ago. The Commentary on the Book of Water quotes Shi Shi's Record of the Western Regions as saying "There are mountains 200 miles north of Kuzi, fire at night, and smoke day and night. People take this mountain of carboniferous, smelt this mountain of iron, and fill the thirty-six states"^[4]. This was present even until the Yuan Dynasty in the Yili area. According to these data, the coal industry in Xinjiang seems to have been inherited from ancient times to the present, which erases the "founding" of the

coal industry in Xinjiang by the Qing Dynasty. In fact, due to the long period of turmoil, in the Junggar period, the fuel levied in northern Xinjiang was mainly “forking and cutting the plants and trees for burning charcoal and digging the year artemisia for burning fire”^[5]. It seems that the coal industry in the Yili area had been forced to stop long ago because of the destruction of the war, and strong evidence for this speculation is given in the Zhuzhi Ci in the Western Regions of the Qing Dynasty. In the 33rd year of Qianlong (1768), Xu Buyun was exiled to Yili due to his connection with the salt invasion case between Huaihe, and was greatly appreciated by General Shu Hede of Yili, “General Shu Wenhede felt like a friend at first meeting, kept his master’s house, and also called into his hand all manuscripts and other official documents sent by Tuerte”^[6]. Xu Buyun certainly had extensive access to a large number of materials retained in Xinjiang during the Qianlong period, and the records are quite reliable. At that time, coal development was booming in Xinjiang during the Qianlong period, and Xu Buyun was also very interested in it. There is a poem about it, “Carboniferous suspected from the ancient birth, and Crag Yan did not make five ding Kai. Shan Ling Zhen secret no one knew, was left to the heavenly court to find”^[7]. Xu Buyun commented on the poem: “Ili did not know the coal production at the beginning and was ordered to search and collect it.” In addition, in the second year of Jiaqing (1797) exiled to Yili and other places poet Shu Qishao’s poem “Charcoal coal” is similar, which can be corroborated by each other, stating: “Wood and stone in the mountains without grass, the main fireworks and clouds. After Zhu Lan went to bundle square less, who to Kunming to distinguish looting ash”^[8]. The “looting ash” in the poem is about coal, as the Han emperor Wudi dug the Kunming pool of black ash, first asked Dongfang Shuo who did not know, after the monk Zhu Lan called it looting ash. Poets in the Qing Dynasty often called coal by looting ash, the so-called “after the Zhu Lan is gone, there are few bunches, who can distinguish the looting ash to Kunming”, the expression of the meaning is also Xinjiang’s local “no one knows” coal.

In short, although coal mining in Xinjiang had a long history, it had long been interrupted and was not developed again until Qianlong. In other words, the coal industry in Xinjiang in the Qing Dynasty originated from the large-scale coal exploitation of Xinjiang after the unification of Xinjiang in the Qianlong period^[9].

3. Technical level

There is no record of the technical level of the coal industry in Xinjiang in the middle of the Qing Dynasty. Only from the abundant records of the late Qing Dynasty, can researchers know that the mining technology in the late Qing Dynasty was still in the stage of “soil method” mining, so it was backward. The coal mining in the middle of the Qing Dynasty also adopted the traditional way of “hand digging and shoulder carrying.” The larger scale coal mine only increased the wheeled cart pulled by livestock as a lifting tool. The Zhuzhu Ci in the Western regions contains direct evidence of coal mining techniques in the middle Qing Dynasty, which is lacking in other historical materials. At the latest in the Jiaqing period, the Xinjiang region mastered mature coal cake processing and coking technology. In the 21st year of Jiaqing, Shi Shanchang, who was exiled to Urumqi, described in vivid detail the coal production process in Xinjiang at that time in his poem Ode to Coal: “The power of producing coal can turn the sky back, and the frost will disappear and the power will turn to the foreign side. Without the original property of the furnace hammer, it can also be round from the inlay. Zhen long understand the color of the air, through the fall after the opening edge. Only stay for Jun Ding Nai, Mo teach block lei easy smoke”^[10].

In the poem, “it can be round even from inlaying” describes the processing process of coal cake, using a “furnace hammer” to change the “original” coal, then mixing coal foam with a binder such as clay, quartz, or

limestone particles, adding water, stirring and kneading, and finally embedding in the mold to form a round coal cake. The last sentence, “Mo Jiao block Lei is easy to produce smoke”, describes the local coking technology, the coal is loaded into the furnace, and the coal is packed tightly as far as possible to reduce the gap^[11]. Then use masonry or soil and other materials to seal the furnace to reduce heat loss and air entry, through heating and retorting so that coal in a high temperature and anoxic environment pyrolysis reaction, after some time of retorting, stop heating, let the coke in the kiln for natural cooling. After cooling, open the kiln mouth and take out the refined coke. The texture of the coal cake is tight, not easy to break, and easy to store and transport. The “coke” calorific value after coking is higher, and the temperature supply is more stable, suitable for the smelting industry, coal is anthracite after coking, which is less poisonous during heating. These two important technological advances provide a guarantee for the development of the coal industry^[12].

4. Coal and life

Since the official history and local Chronicles did not record the living conditions of the people after using coal in the middle of the Qing Dynasty, the nature of Zhuzhu Ci itself just determined the rich diversity of the social life content of the place where it was recorded. In the western regions of the Qing Dynasty, the historical features of people’s charcoal-burning life recorded in Zhuzhu Ci can be roughly divided into three aspects.

4.1. Coal is more popular than firewood among Xinjiang people

The natural environment of Xinjiang has not changed much since historical records began. In general, Xinjiang goes deep into the hinterland of Eurasia. It is generally dry and rarely rains, with a low average vegetation coverage. The winter climate is very cold, so coal is the best solution for many people in Xinjiang to keep out the cold, “with the cold climate of Di, if there is no coal mine, people will freeze to death, the day can be described as thick.” Jiaqing after five years of exile in Yili Hong Liangji described “animal charcoal red furnace, the first can be strange cold.” Before coal mining, the people generally used wood, in many desert Gobi areas, could only burn grass as fuel. The quality of coal in Xinjiang is excellent, Chen Zhongqi said in a note for “Coal warming Yang Return Valley” that “Coal outside the mouth, burning will not reduce the day”^[13]. At the same time that the governments in Xinjiang continue to exploit coal, the people in Xinjiang also realize the benefits of coal and have to use coal as a salary, “There are coal trucks all over the street, and it is not good to burn materials to make charcoal”^[14].

“Bitter cold turns the taste of grain coal” — Generally speaking, Xinjiang’s preference for coal is caused by its cold climate, and the popularity of coal in the Qing Dynasty from scratch is the reflection of this mentality of Xinjiang people at that time. For this development of the urgent eagerness for coal, Qi Yunshi’s “coal fire” poem describes it as follows, “The popularity of fumigating the atmosphere and winter is also idle. The only thing is that there is less ash wood to add to the furnace and more carbonaceous coal in the truck mountain”^[15].

4.2. Low price and common use

During the Qianjia period, coal was already mined under official auspices in Ili, Urumqi, Bizhan, Tarbahatai, Hami, Barkol, Karashar, and other places. After that, no new coal mines were recorded in official archives until the establishment of Xinjiang province in the tenth year of Guangxu (1884).

But this is only the official coal kiln because in many places in Xinjiang region, “coal is produced near the mountains, let people dig, there is no lawsuit, so cheap”, in the folk, coal has gradually penetrated the life,

that is, “pay the price and use the general” said in the previous “charcoal coal” note. Such as “charcoal coal” described in the “ten thousand fireworks” in the western regions of the Zhuzhi Ci seen quite a lot. During the Daoguang period, the poet Yang Tingli once wrote a poem that said “Ten thousand stove bituminous coal light and indifferent, thousands of forest Qiongshu white slowly.”

From the thirty-third year of Qianlong (1768) to the thirty-sixth year of Qianlong (1771), the famous literator Ji Yun, who was banished to Urumqi, had witnessed the lively scene of many coal households rushing to the city in the morning and wrote a poem called “Ming Rujing”, “Cut through the root stone sinus, toward the coal households to the city. The north mountain is better than the west mountain, it is necessary to distinguish cold furnace ashes overnight.” According to Ji Yun’s note, the coal used in the city at this time was mainly divided into three categories: the coal in Beishan could be used for fuming, burning smokeless and tasteless, incandescent and difficult to ember, gray as snow, but more than three silver stars per carload; The coal of the West Mountain can be used for cooking, gray yellow, but silver three stars per car; It is said that two beams stone is a little heavier, often non-combustible, but the price is less. There are also coals priced at two stars per car, which the extremely poor and thrifty home used. Two stars are two money in silver, a car of about seven hundred pounds, and a car of coal is only worth 0.000289 two silver, even a very poor family can afford, so “Xinjiang New Year’s Evening travel” poem says “The border city hundred things very expensive, reef carbon sold more than mountain bottles.”

4.3. The understanding of coal is gradually rich

“Western Xinjiang Miscellaneous poem” stated, “Along the cliff cave evergreen coal, stone fire can provide thousands of households cooking.” With the deepening of the people’s use of coal production and living practices in Xinjiang, people got rid of the “unknown” state of coal in the early Qing Dynasty and had a profound understanding of the nature of coal. At that time, the people in Xinjiang region divided coal into coal, blue carbon, fuming carbon, and other categories, each of which had different functions.

In the Qing Dynasty, the rich households in Xinjiang used fireplaces to burn coal, “leading smoke out of the room, smokeless fire gas”, but ordinary people used fire pots or fire kang, the furnace used was very imperfect, and it was easy to be poisoned by carbon monoxide. There are many records in the poems of the Qing Dynasty. Tang Dao commented in his poem, “There are coal poisoning houses, and even people die, and even people get sick.”

Later, the working people gradually developed a method of eating soft pear detoxification in practice: “Stay until the next day, when it is frozen and rotten, soak it in cold water for a short time, the ice is revealed, wrapped in the outside, cover the ice to eat it, where the coal smoke poison coma to vomit, you can immediately solve.”

5. Conclusion

The Zhuzhu Ci in the Western regions of the Qing Dynasty is of great value in the study of the Xinjiang coal industry in the Qing Dynasty. Through the in-depth analysis of these Zhuzhi Ci and related literature, the development course of the Xinjiang coal industry in the Qing Dynasty is demonstrated. Its origin can be traced back to the large-scale coal development after the Qianlong unified Xinjiang, which made up for the interruption of coal mining caused by war and other factors in history. In terms of technology, during the Jiaqing period, Xinjiang was quite mature in coal-cake processing and coking technology, which provided strong support for the development of the coal industry. In social life, Xinjiang’s unique climatic conditions make coal an

important energy choice for people. Coal is cheap and widely used by the people. As time goes by, people's understanding of coal continues to deepen, not only can distinguish the function of different kinds of coal, but also for the carbon monoxide poisoning problem that is easy to occur in the use of coal, find a way to eat Ruaner pear for detoxification. These poems enriched the connotation of Qing Dynasty literature and provided a unique perspective for the study of the history and culture of the western regions in the Qing Dynasty. In today's society, researchers should draw wisdom from Zhuzhi Ci, attach great importance to the rational development and utilization of coal resources, and strengthen the protection of the natural environment to achieve sustainable development. In a word, the Western regions of the Qing Dynasty are like a precious historical and cultural treasure house, which is worthy of in-depth study and excavation, and can provide useful references for the protection and inheritance of historical and cultural heritage.

Disclosure statement

The author declares no conflict of interest.

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