

## Civilization 237

### Chapter 237 Charcoal Burning and Crows

Etalik, despite his age, moved briskly and powerfully, speeding along like the wind. His step was precise, his limbs coordinated, and his strides were soft and supple. As he walked, the old samurai would lead with his hips, his center of gravity shifting ever so slightly, creating a natural and leisurely rhythm.

Seeing this, Bertade's gaze sharpened, and he pushed off with his feet, running like a tiger. His long strides alternated, bringing with them a sense of anticipation for a leap, rhythmically harmonious yet bearing the pace of a leopard or tiger.

Xiulote was agile. Although he couldn't compare with the two seasoned warriors who had been tempered a thousand times, he had fully mastered the running techniques of a samurai. As the youth moved, his muscles were seamlessly integrated -- flexible, fast, balanced, and explosive -- embodying the four standards of combat readiness at all times.

In an era where ranged weaponry was weak and stone weapons lacked lethality, personal martial prowess was showcased to its fullest extent. Samurai training, spanning a decade, could firmly suppress militias several times in number, naturally advancing far in the exploration of physical enhancement. Unparalleled warriors could control their pace, entering and exiting disorganized formations with ease, while the militias' stone spears posed no threat.

However, the charcoal before Xiulote, mixed with sulfur and saltpeter, was set to end the era of such warriors' dominance far ahead of its time!

The use of charcoal in Central America can be traced back to the Teotihuacan civilization. In murals depicting feasts, the ancestors roasted venison over charcoal fires. Yet for the youth, the technique of charcoal production was an essential cornerstone of civilization. Charcoal could be used to make brushes and ink for painting, absorb moisture to predict the weather, and purify the air from dust...

Most crucially, charcoal could be used as a high-temperature fuel, involved in the mixing of gunpowder and the forging of metals!

While the invention of charcoal dates back quite some time, its quality and production rates can vary greatly under different methods of production.

The essence of charcoal is carbonized porous wood, produced by incomplete combustion or pyrolysis. It is easily flammable, smokeless, high in heat value, and extremely low in water content. The quality of charcoal is reflected in its per unit heat value, which depends on the temperature conditions during carbonization. The higher the carbonization temperature, the greater the per-unit heat value of the charcoal, and thus, the better the quality. The production rate of charcoal is the efficiency of converting a fixed weight of wood into charcoal.

In Xiulote's memory, the power of black gunpowder lay in the heat release and gas emission of the reaction. The sharply increased temperature would heat the large amount of released gas, exponentially increasing its volume and producing an explosive expansion. Therefore, the better the quality of the charcoal, the higher the combustion temperature it could produce, and the greater the power of the black gunpowder.

In the field of metal forging, the biggest constraint of classical technology was insufficient temperature. The performance of gray cast iron would improve with a rise in temperature below 1500 degrees Celsius. Due to the addition of carbon, the starting forging temperature of steel was 200-300 degrees lower than the optimal temperature for casting iron, roughly around 1200 degrees, and then the finishing forging temperature would gradually decrease to about 800 degrees.

To achieve such high temperatures above a thousand degrees, besides designing blast furnaces, the use of high calorific value quality charcoal or coke is essential.

In other words, charcoal, a high-heat fuel, simultaneously affects bronze, ironware, gunpowder, and even the industrial age, and is an indispensable driving force in the development of civilization!

Xiulote stood in front of a pile of smoldering charcoal, silently contemplating as he faced the kneeling charcoal burners.

Seeing the calm prince, the chief of the charcoal workers inched forward on his knees, bowing his head to the ground.

"Respected prince, blessings from the Fire God! We have just completed the pile burning of two heaps of charcoal, and we invite you to inspect them," said the chief.

At these words, Xiulote looked up. In front of him was a blackened mound of earth, resembling a "grave mound" no more than one meter in height with a bottom diameter of roughly two meters.

The mound's surface already had several cracks, hastily covered with fresh mud of a lighter color. At its base, there were several ventilation holes, presumably left for oxygen pathways, though they were all blocked now. At the top of the mound, there was a fire mouth large enough for two palms, still not entirely sealed. Wisps of blue smoke curled up from the "grave mound," which in the youth's eyes, seemed like an auspicious omen from Celestial Empire legends.

Xiulote then turned to the side, where another pile of charcoal was already burned and cooled.

The chief of the charcoal workers, with a face covered in dirt, gently urged on the workers, who collectively moved forward, scraping off the mud mound and pulling out handfuls of black charcoal. The chief sorted through it, picking out several glossy, hard, pitch-black pieces of good charcoal from the upper layers and holding them in his arms, offering them to the prince like a gift.

"Your Highness, look, this is the finest quality charcoal! Hard, thoroughly black with a sheen, and it burns both hot and fierce. If you knock two pieces together, I guarantee it'll sound crisp and clear!" he exclaimed.

Recognizing the significance of charcoal in matters of the state and military, Xiulote extended his hand to take two pieces, tapping them near his ear to listen. His palm quickly turned black, the familiar smell of charcoal invading his nostrils, and indeed, a crisp sound echoed by his ear. Memories from long ago surfaced in the youth's mind, and he nodded slightly.

Afterward, Xiulote stepped forward, to the surprise of the charcoal workers, and crouched in front of the charcoal pile to inspect and evaluate the structure of the mud mound. Then he dug out two more pieces of charcoal from the bottom, which were slightly softer to the touch and lacked the black sheen. The chief's face instantly turned ashen. When the young prince hit the pieces of charcoal together, the sound was dull, indicating insufficient heat and lower quality.

Taking a step back, Xiulote stood before the pile of charcoal, deep in thought. The chief stood by, carefully explaining the specific process of charcoal burning.

Clearly, the technique used by the charcoal workers was the most primitive pile burning method, roughly on par with the tribal techniques of the Black African Continent. They would first place a wooden stake in the center of an open space as a support pillar, pile up standing wood on either side, then wrap the pile with leaves, coat it with wet mud, and leave ventilation and fire holes.