

Civilization 238

Chapter 238 Charcoal Burning and Crows_2

When the top flame vent is lit, oxygen flows in from the bottom vent, causing the flame to move downward, burning against the direction of the oxygen flow. The charcoal makers control the size of the flame by adjusting the ventilation; they seal up the vent that the flame reaches and then block the flame vent, until they see blue smoke emerging, which signals that it's time to cool down and await the kiln to be opened.

After listening, Xiulote mentally simulated the specific burning process. Generally, the charcoal near the flame vent should be overburned, with the best quality in the middle, and the areas near the ventilation holes likely underburned.

A moment later, he looked at the anxious charcoal maker leader and calmly inquired.

"How much charcoal is produced from this pile of wood? Can high-quality charcoal make up half of it?"

The charcoal maker leader paused briefly. Then, he quickly ordered the craftsmen to weigh the charcoal on a simple large balance. While glancing around and taking advantage of the prince's inattention, he kicked a few stones into the charcoal on the large balance. After a while, the charcoal maker leader respectfully reported.

"Your Highness, eighty units of wood can yield fifteen units of charcoal."

Xiulote did some mental calculations for a few seconds, 15 divided by 80, about 19%, the deceiving base twenty system. This efficiency was much lower than what he remembered.

"Is it dry wood?" the youth pressed on.

The charcoal maker leader nodded, of course it was dry wood, green wood would only produce a little.

"How much of the high-quality charcoal you just picked out?"

To Xiulote, only this high-quality charcoal was suitable for making gunpowder. Saltpeter was hard to obtain, and its production limited and purity not guaranteed. If the quality of the charcoal powder wasn't good enough, then one can imagine the potency of the gunpowder.

"Five... no, seven units," the charcoal maker leader said through gritted teeth.

Hmm, five units. Xiulote nodded understandingly; the first number he mentioned was more credible. Then he shook his head again, a 6-7% yield of acceptable charcoal. The efficiency of the charcoal burning was much too low; technical improvements were necessary.

The youth recalled familiar memories once again. His thoughts flew back to distant ages, to the future of the Celestial Empire. Building kilns for charcoal, building kilns for bricks—both raw construction methods were fading memories in the countryside, glimpsed only in the fantastical dreams of his childhood.

Xiulote became immersed in long and difficult reflection. Bertade, having prepared in advance, presented charcoal pencils and a wide wooden board for the prince to use. Etalik sat down with joy on the warm earth, legs crossed, paying close attention to the prince's "Divine Revelation."

Xiulote focused undistractedly. He first drew an enlarged version of an earth kiln, doubling the dimensions and changing the shape to a square. Eventually, it would be four meters long, with both width and height two meters each. The youth roughly calculated, 16 cubic meters, estimating that it could hold 2-3 tons of dry wood. Considering the difficulty of logging in this era, he shook his head again and modified the dimensions to two meters in length, and one meter in width and height, for a trial of the specific design effects.

Next, considering the ventilation holes and flame vents, Xiulote recalled two key terms: flue and fire passage.

The youth first drew a fire passage along the bottom of the kiln on each the length and width, then erased one, leaving only the two-meter-long fire passage along the center of the length. The fire passage, connecting both ends, functioned similarly to the flame vent and was used to insert dry sticks to ignite the fire, thus turning wood into charcoal.

He wasn't sure about the width and height of the fire passage, merely guessing and marking a size close to two handspans in width and height. Then he thought it out; the fire should rise from the ignition point, rising from bottom to top, so the ignition end of the fire passage should be lower than the other—by how much? Well, also by two handspans.

Next came the flue. According to the youth's analysis, the flue should be opened in the outer earthen walls on all four sides. The top of the flame is the hottest, so as the timber in the kiln carbonizes from top to bottom, the flue would do the opposite, running from bottom to top, starting at the very bottom with a width of two handspans. Then, the smoke would travel up the flue in the exterior wall and disperse through the smokeholes at the top, which are narrower above and wider below, facilitating sealing from the top. Hmm, the smokeholes would be roughly the size of one handspan.

At this point, Xiulote had exhausted his scholarly knowledge. He thought seriously for a moment longer, the logic of fire heating and smoke channeling seemed sound.

Continuing to ponder, he marked on the wooden board a few drawings of smoke: thick smoke, add wood and fire; lots of blue smoke, seal the opening and the fire; all blue smoke, extinguish the fire and cool down. In fact, these were the charcoal-burning secrets that the leader of the charcoal workers had just told him. In the end, the young man drew the vertical arrangement of the wood, but as for how exactly to place them, he left it to charcoal workers to figure out.

The Samurai and craftsmen stood quietly around, in solemn silence. After a while, His Highness finished his Divine Revelation.

Xiulote gestured to the leader of the charcoal workers, who came forward with a respectful smile.

"Your name?"

"Revered Highness, I am Koskachi from the Lake Capital City."

Koskachi's face was covered in Huitu, making it impossible to guess his age. The only thing visible was his brilliant smile. His voice was deep and hoarse, most likely from being smoked over time.

Xiulote nodded, the charcoal-making profession overlooked by the Alliance, of commoner descent, flexible in tasks, with a rough understanding of numbers.

"Koskachi, I'm entrusting you with a military task!"

Hearing that it was a military task, Koskachi trembled all over. He bowed his head to hide his face, which turned bitter.

"Lift your head, look here! This wooden board contains the design for a new-style charcoal kiln that I've designed. You must build according to the arrangement shown here, especially pay attention to the fire and smoke channels! As for the specific measurements and details, I leave you to figure them out..."

At this point, Koskachi's eyelids twitched. His Highness had only been here for an hour, and already presented a new design! He himself had worked for a full twenty years and didn't dare to change things rashly!

Xiulote observed the leader of the charcoal workers' expression, sensing his disbelief in the hard-worked designs, and with that thought, the young man spoke with renewed authority.

"Koskachi, the Alliance requires you to build five new-style charcoal kilns within a week, and then light them in sequence. The general structure remains the same, you adjust the technical details. No matter what method you use, your charcoal production rate must reach forty percent of the dry wood mass within a month! Quality charcoal must make up half!

If you meet the standard, I will promote you to a senior craftsman at the Divine Revelation Place; exceed it and you become a Master Craftsman! One lash for each portion of wood missed, and if it's only thirty percent, then you may as well end yourself!"

In Xiulote's view, the standard was not strict. Modern kilns could turn out a fifty to seventy-five percent yield from dry wood, same as the Ming Dynasty charcoal workers who could reliably produce around fifty percent. With his own era-transcending design guidance, all the charcoal workers' leader had to realize was the detail operation.

Hearing His Highness's stern order, Koskachi first shook violently, then his whole body started to tremble. His Highness, however, heartlessly stuffed the wooden board with the task objectives into his hands and turned away coldly, heading towards the adjacent brick kiln workshop.

The old Samurai, Etalik, showed Koskachi a fierce and profound smile. Then, he reached out his strong hand, patted the charcoal leader's shoulder, and lightly brushed his fragile neck, continuing to smile as he walked away.

The top of the mound was still emitting blue smoke, but Koskachi felt icy cold. His neck skin shivered as it was scraped by the calloused fingers, giving him goosebumps all over.

The leader of the charcoal workers stood trembling slightly, motionless, like a crow stunned by a hawk. Only after the figures of His Highness and the Samurais had receded into the distance did he suddenly turn and leap up, bellowing at the charcoal workers around him.

"You bunch of lazy blackbirds! From today on, you all sleep on the kiln! If we don't meet the goals set by His Highness within a month, I'll be the first to pluck your feathers!"

In the sky, a clever crow, lured by the column of smoke from the ground, swooped in joyously, circling above the bustling charcoal workers, echoing their cries with its own "caw caw".