

## I. Dynasty 150

### Chapter 150: Trial Production of Cannons

Unlike the usual quiet, the atmosphere around the machinery department in Qingzhou City had grown tense in recent days.

Residents noticed a sharp increase in guards. The number of soldiers had multiplied, and each one wore full silver armor, exuding an air of cold authority. Anyone who even slightly approached the machinery department was immediately driven away.

Every person entering the department had to show a special pass and undergo inspection. Someone once tried to sneak in without a pass—and was severely beaten and thrown into jail on the spot.

All these strange changes made people wonder: What on earth is going on inside the machinery department?

Only Xiao Ming knew the full truth. That morning, he arrived at the gates of the department, handed his horse to the guard, and entered at just the right moment.

Inside, Chen Qi and his craftsmen were preparing to pour molten iron into a cannon mold.

While Qingzhou could now produce high-quality steel, not all steel was suitable for casting cannons.

In fact, even in modern times, until Krupp cannon steel was developed, cannon casting was limited to three main materials: copper, bronze, and iron.

Copper was the most straightforward—but also the most expensive. Given the limited mining output in Great Yu, using copper for cannons was like making golden toilets.

Bronze was an alloy that required several metals, including tin and lead—both of which were scarce in Qingzhou. That left only cast iron as a viable option.

Though cast iron had its drawbacks, it was the main material for cannon production from the 15th to 18th centuries due to one key factor: cost-efficiency. And in any age, cost mattered.

“Your Highness, we’re almost ready to pour,” Chen Qi said.

The cannon mold was set up right next to the blast furnace. Once the furnace’s gate was opened, the glowing molten iron would flow into the mold.

But first, many careful preparations were needed. Casting cannons was delicate work—one mistake could ruin the entire mold and cause delays.

Under Xiao Ming’s supervision, the craftsmen began painting the inside of the mold with a special mixture of finely ground rice husks and clean sand. These materials had been processed with extreme care—crushed and sifted over thirty times to ensure uniform texture.

This coating prevented uneven pitting and made sure the cannon wouldn’t fuse with the mold. Without it, both mold and cannon could be ruined.

Next came a second layer—this time using powdered coal dust.

The purpose? Carburization. Everyone knew that the higher the carbon content in iron, the harder it became. When molten iron came into contact with the coal-coated surface, the cannon's exterior would absorb carbon and harden—making it less likely to explode during use.

Both layers had to be applied evenly and meticulously.

Once finished, Xiao Ming inspected everything. Any flawed sections were reworked before the mold was clamped shut with iron hoops.

Meanwhile, other craftsmen began heating the mold. This would prevent the outer iron from cooling too quickly when it came into contact with the mold, which would affect carburization.

After that, they inserted the ceramic core, which Chen Qi had specially made under Xiao Ming's instructions.

Usually, cannon molds used a clay core, but Xiao Ming, applying knowledge from the technology crystal, knew that a ceramic core allowed for better internal cooling. This would strengthen the cannon's inner walls—a technique known as tight-water cooling.

"Begin," Xiao Ming ordered once everything was ready.

Chen Qi, clearly emotional after a month of hard work, nodded. He felt like an expectant father about to witness a birth.

With trembling lips, Chen Qi shouted, "Pour the iron!"

A craftsman opened the furnace gate, and molten iron, glowing red, poured out of the chute with a roar.

Even five meters away, Xiao Ming could feel the scorching heat on his face.

Those standing close were drenched in sweat, but every pair of eyes was filled with anticipation.

Chen Qi had promised: if the casting succeeded, each worker would receive 100 taels of silver. For ordinary craftsmen, that was a huge reward and an incredible motivation.

The glowing iron slowly flowed into the mold. As it reached the top, a craftsman lightly tapped the mold with a hammer to help the metal settle evenly.

Once the molten iron reached the rim, the cooling team began pouring well water into the ceramic core.

At the same time, a length of dried pig intestine was inserted into the core.

The water inside the core had to be constantly replaced until the interior fully cooled. Since Xiao Ming couldn't get rubber tubes in this era, he used dried pig intestines as a substitute.

In fact, even in modern times, sausage casings still used pig intestines. Their flexibility made them a decent alternative to rubber hoses.

Above, craftsmen busily replaced the cooling water again and again.

After some time, once the metal had cooled and solidified, Xiao Ming gave the command to remove the mold.

The cannon's surface was still glowing red, with many sharp burrs visible. Craftsmen immediately got to work smoothing and polishing the surface to make the cannon barrel even.

When all this was done, Xiao Ming finally let out a deep breath of relief. Now, they just had to wait for the cannon to cool completely.

Chen Qi asked, "Your Highness, is this cannon really as powerful as you say? When can we test it? I want to see how it compares to Great Yu's standard fire lances."

"There's no need to test it to know—it's like night and day," Xiao Ming said confidently.

The so-called fire lances of Great Yu were poorly made. While they resembled cannons in shape, they were nowhere near the real thing.

In fact, the trebuchet the barbarians stole from the West might even be more effective than Great Yu's fire lances.