Ancient History of Iron Smelting Furnaces in Japan

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The stages of development of iron production in Japan during the Ancient period can broadly be divided into eight stages. The following five stages are the more important eras in iron production. In the first century, ironware and iron materials introduced to Japan were used in foundries, whose remains date back to this period. In the sixth century, the refining of iron ore began through the use of the box furnace and there was a shift to using iron sand as a raw material. From the end of the 7th century through to the 8th century, the widespread use of the box furnace and the introduction of a vertical furnace technique gave rise to varying forms of iron production, and this period was marked by development of the Ritsuryo state. In the 12th century, there was an increase in furnace capacity mainly in connection with the box furnace and reforms occurred in refining techniques. And lastly, in the 18th century, the final development of the box furnace resulted in the establishment of a technique for manufacturing iron using the tatara furnace.

In other words, it has been estimated that iron production in the Japanese Archipelago took root more than 1,000 years later than in China and about 500 years later than in Korea. Nonetheless, the long tradition of iron making that began in the Yayoi period is characterized by stages of development that contain elements not seen in any other regions and are unique to the Japanese Archipelago.

Materials excavated from various sites in China, Korea and Japan related mainly to basic iron furnace techniques that have been used for the purposes of comparing ancient iron making techniques have shown that on the continent, where many advances had been made in iron furnaces even before the Christian era, large vertical furnaces that were cylindrical in shape were used, for which iron ore was traditionally used as the raw material. In Korea, materials from the SEKICHORI (石巻里) site in Cheongju dating from the latter part of the 4th century and vertical furnaces found in remains at SHASON (沙村) in Miryang dating from around the middle of the 6th century indicate that the refining techniques that were used were more or less the same as those used in China. It is quite likely that there is a progressive reduction in the size of furnaces the further east one goes.

Iron refining is believed to have started in the Japanese Archipelago in the early stages of
the 6th century, using a box furnace technique (low vertical furnace) indicating a development process that was unique to Japan. At the time of its introduction, iron ore was used as the raw material, as was the case in China and Korea at the time. This was soon followed by a shift to the use of iron sand, which is found exclusively in volcanic regions, as the raw material. There was also specialization in the area of techniques. From this time through to the Middle Ages there were two types of techniques in use: the box furnace technique and the vertical furnace technique, which entailed a tall furnace that was accompanied by bellows and is thought to have been introduced to Japan from the Korean Peninsula some time in the first half of the 8th century. In this way, these two iron manufacturing techniques which derive from totally different origins came to form the basis of iron production in western and eastern Japan during the Nara and Heian periods.

This process of development of iron production techniques has become evident from the distribution and contents of iron manufacturing remains that have been excavated in various parts of the Japanese Archipelago over the past 40 years.