Timing of the Kofun Wave from Paekche

WHY THE LATE FOURTH CENTURY?

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“TIMING” OF THE KOFUN WAVE FROM PAEKCHE TO THE JAPANESE ISLANDS

I have tried to explain the timing of the “Yayoi wave” from the Korean peninsula by the abrupt commencement of a Little Ice Age ca. 400 BC that, with some time lag, induced the Pyun-han (Kaya) people to seek for a warmer and rainier place across the sea. Well then, how do I explain the timing of the “Kofun wave” from the Korean peninsula? What made the Paekche people suddenly cross the Korea Strait in the late fourth century? Was the appearance of conquerors (such as King Keun Chogo or Homuda) a purely historical accident or a product of a changed environment? Is it possible to establish a causality that looks more consistent with Korean history than that of Ledyard (1975)? I shall offer a motivation of sorts for the timing of the Paekche crossing, albeit this is a hypothesis impossible to test.

In the aftermath of the Little Ice Age, a series of plagues or some disastrous irregularities in climate such as frequent droughts could have occurred in the eastern extremity of the Eurasian continent.1 According to Lamb (1995: 168), the period of drought had two maxima, not only in the Mediterranean but also far to the east into Asia, around 300-400 AD and 800 AD, and such a drought could have

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1. Iron blades for wooden agricultural tools through the ages in the Japanese islands.
   Barnes (1993: 187)

2. Ruddiman (2003) contends that a Little Ice Age can be followed by an outbreak of plague.

2 Lamb (1995: 159) quotes Huntington: “it was the drying up of pastures used by the nomads in central Asia that set off a chain reaction of barbarian tribes and unsettled peoples migrating westwards into Europe, where they ultimately undermined the Roman empire.”

The timing immediately following the Little Ice Age of 400 BC-300
devastated the places where agriculture had been carried on with the aid of elaborate irrigation works. Such an abrupt change in climate may well have had a serious impact, also, on the Paekche farmers around the Han River basin.  

The following are the records of Samguk-sagi on droughts and famines in Paekche. There was a drought in the spring of 316, and crop damage due to desert locusts in July 321. In 331, severe droughts in spring and summer dried up the river, and the famine resulted in the practice of cannibalism. There was a spread of an epidemic in 380. In 382, there was a severe drought in spring, rain did not fall until June, and the starving people sold their own children. In 386, frost formed in July and damaged crops. A severe drought in summer 402 dried out rice sprouts, and the King of Paekche offered prayers for rain. The Annals of Silla also record droughts and famines in 302, 313, 317, 372, 381, 397 and 401, and also crop damage due to desert locusts in July 389 and in 399.

Due to the long spell of drought following the Little Ice Age, the Kaya farmers on the southern shore of the Korean peninsula could have renewed, by the turn of the 4th century, their emigration effort into the Japanese islands to join their distant cousins (commencing the Early Tomb culture, circa 300-375), while the more innovative farmers led by the martial rulers of the Paekche State at the Han River basin could have decided to conquer the Ma-han in the southwestern quarter of the peninsula (in 369), and then to branch off in the direction of the Japanese islands in the late fourth century (commencing the Late Tomb culture, circa 375-675). They could have anticipated, quite correctly, that their advanced agricultural technology would pay them better in the southern peninsula, but much more handsomely in the warmer and rainier Japanese islands.

BUILDING GIGANTIC TOMBS: THE LATE TOMB CULTURE

The Pyun-han (Kaya) people, who had crossed over the sea from the southern peninsula to the Japanese islands, had commenced the rice-farming Yayoi era (300 BC-300 AD) together with the Ainu and Malayo-Polynesian aborigines. By the turn of the fourth century, possibly coinciding with some fresh inflow of Kaya people, the Yayoi people began to AD coincided with the demise of the Han Chinese empires and the beginning of the era of Five Barbarians and Sixteen States (304-439) in the eastern world, and a chain reaction over the steppes culminating in the Hunnish invasion (in 375), causing Völkerwanderung and the ensuing split of the Roman empire (in 395) followed by the downfall of the Western Roman Empire (in 476) in the western world. Most parts of the northern hemisphere south of 35° N became warmer, but suffered drought because the equatorial rains had a restricted seasonal migration north at that time, coinciding with the blooming Mayan civilization in Central America. A curse for some peoples was a blessing for others.

Samguk-sagi posits intensified armed conflicts between the Mu-rong Xianbei and the Tungusic Koguryeo ca. 293-342, and hence Farris (1998: 77) notes that “the first Korean to use horse in combat were soldiers of Koguryeo doing battle with the Xianbei,” spreading the new technique of using stirrups.

In old Korean, “sickle” is called “nas” to which “nata” in old Japanese can be traced.
The National Research Institute of Cultural Properties (NRICP, 2001: 226-7) of Korea has summarized the recent research reports by the experts on Korea’s agricultural history (J. H. Kim, 2000; H. H. Lee, 1998; K. E. Kim, 1987; and K. K. Chee and S. M. Ahn, 1983).

See also Farris (1998: 81-82).

Spades and hoes with these edges, together with the greatly improved versions of other farming tools that appeared during the time of Unified Silla, have been extensively used by Korean farmers until the mid-20th century.

See (Barnes, 1993: 187).

亦新羅人參渡來 是以. . .命引 率 為役之堤而作 百濟池 (K: 248)

應神七年 高麗人百濟人任那人新羅人並來朝 時命…領諸韓人等作池 因以名池號 韓人池 (NI: 367)

應神十一年 作劍池 輕池 鹿垣池 廬坂池 (NI:369)

仁德十一年 掙宮北之郊原引南水以入西海 因以號其水曰壩江又將防北河之湧 以築萊田堤 是

construct the up-to-date Kaya-style tombs on hilltops, looking down on rice paddies. The Paekche conquerors, who arrived at the Japanese islands by the end of the fourth century, were duly impressed by the native burial practices. The new rulers started to build dramatically exaggerated gigantic tombs on level plains, surrounding them with moats, earth embankments, and small repository tombs for funeral artifacts. But how did they manage to build on such a scale?

The Little Ice Age (that began at around 400 BC) had induced the Kaya people to seek a warmer and rainier place across the sea. While the southern peninsular wet-rice farmers had tried to resolve the sudden climate change by moving south to Kyūshū, the middle peninsular farmers cultivating rice (around the Han River basin) below the millet-barley line seem to have tried to resolve the problem by time-consuming methods of developing rice strains for the changed climate, constructing large irrigation ponds, digging deep and long canals to divert river water, and clearing the heavy soil with iron-edged (in U-shape) wooden hoes and spades to expand the irrigated paddies.

The Yayoi farmers in the Japanese islands, just like their peninsular Kaya cousins, had been cultivating rice either on a natural marshland, digging canals for drainage, or on a low terrace of dry land above the swampy lowland, supplying water by canal from the natural swampy fields which rainfall submerged under water throughout the year. The Paekche farmers, however, brought in more advanced agricultural techniques that systematically utilized the large man-made reservoirs and deep canals, and extensively used the sharpened iron sickles, plows, and wooden spade and hoes armed with U-shaped iron edges.

With the beginning of the Iron Age (ca. 400 BC), the entire Liao-dong area and the Korean peninsula north of Cheong-cheon River started to use iron farming tools. In the southern peninsula, however, wooden agricultural tools dominated even until the first century BC, and the iron sickles started to appear only by the beginning of the first century AD.

The U-shaped iron edges for wooden hoes and spades appeared in the Chu State during the last years of the Spring
and Autumn Period (722-481 BC), and then spread into North China and eventually to the Korean peninsula. The U-shaped iron edges appeared in the northern peninsula by the early first century, and began to appear in the south by the third century, first in the Paekche area of middle peninsula and then eventually in the Silla and Kaya area further south. It was during the third and fourth centuries that the middle peninsular farmers began to utilize various new iron implements and also irrigation ponds, drastically changing the agricultural technology. There followed some native innovations in farming tools around the Han River basin. The U-shaped iron shovel fittings (as well as iron plowshares) are recovered from the fourth century sites of Paekche. Silla was a little bit late in plowing.

In the Japanese islands, hoes and spades with U-shaped iron edges are discovered only from the Late Tomb Period (5th–8th century) sites, and never from the Yayoi or the Early Tomb Period sites. It was the “fourth century” Paekche people who brought the idea of iron shoes folding around wooden blades into the Japanese islands. The U-shaped iron edges for wooden hoes and spades could bite more deeply into the earth, dig deeper irrigation ponds and ditches (piling up more earth for dams), enable the clearance of land with heavy soil, and hence enable more land (far from the naturally swampy fields) to be brought into rice cultivation. On the other hand, the large irrigation ponds enabled access to fertile soils at higher elevations.

Kojiki and Nihongi conspicuously record extensive construction of dikes, ponds and irrigation canals, particularly during the reign of Homuda and his son, Nintoku. According to Nihongi, Ōjin let the people who came from the Korean peninsula construct an irrigation pond (ca. 396), and named it, according to Kojiki, the “Paekche Reservoir.” Nihongi records that four more reservoirs were constructed in the eleventh year of Ōjin’s reign (ca. 400). According to Nihongi, an extensive canal system and a large dikes named Mamuta were constructed in the eleventh year of Nintoku’s reign, overcoming enormous technical difficulties. According to Kojiki, Nintoku let the Hata people from Paekche construct another canal and two more reservoirs.

Construction of a reservoir or a canal could not have been a simple matter. A monument erected by the Silla people on the occasion of the repair of a reservoir in Yung-cheon, called Luxuriant Dike, sheds light on the magnitude of works involved in such irrigation projects. The Silla dike was built in 536 and repaired in 798. The repair work lasted from the twelfth day of the second month to the thirteenth day of the fourth month, and 136 ax men and 14,140 soldiers from the Dharma Banner, and the recruits from the districts of Jeol-wha (Yung-cheon) and Ap-ryang (Kyung-san) were mobilized during that period.

A rapid increase in rice production implies a rapid increase in population also.
Farris (1998: 82) states that “Archaeological evidence suggests that beginning in the early to mid-fifth century, inhabitants of the Japanese archipelago began to adapt all these new ideas to their environment. Most iron hoes and spades have appeared in tombs in northern Kyūshū, Okayama, and especially the Kinai and are nearly indistinguishable from southern Korean prototypes.” According to Farris (1998: 82), “Scholars have also noted signs of canal digging at the Furuichi site in Osaka on a scale unimaginable to Yayoi tillers.”

With greatly improved productivity, a large labor force on the Japanese islands could be released from the traditional rice farming activities and mobilized for the construction of gigantic tombs.11 The skills acquired from digging deep ponds and canals, and piling up a large amount of earth for dams were in no time applied to the construction of large tomb mounds surrounded by moats. The new agricultural technology produced a sufficient surplus to feed a large number of new rulers, administrators, soldiers, craftsmen, and ditch-diggers, and their activities are collectively thought of as “tomb culture.”

IRON-MAKING TECHNOLOGY BROUGHT FROM PAEKCHE

Iron had been imported from Pyun-han of the Korean peninsula during the Yayoi period, but iron tools and weapons were most conspicuously used in large quantities only after the late fourth century. Peter Bleed (KEJ, 1983: 3.332), however, notes that iron-working itself did not become well established in Japan until the 6th century.

The early form of tatara-buki technology was introduced when iron sand was discovered in the Japanese islands in the late sixth century.12 Although iron ore is scarce in the Japanese islands, iron sand is found in abundance. Prior to the late sixth century, iron ingots had been imported from Paekche and Kaya which was fashioned into weapons and implements in the Japanese islands. Leonard Lynn (KEJ, 1983: 7.348) notes that the idea of using hand bellows in iron-making was brought from Korea.

Seven iron furnace sites dated to the third and fourth centuries were discovered at Seok-jang-ri (Jin-cheon, Chungbuk) in the 1990s.13 The fact that furnaces for smelting,
refining, melting, and forging are all found at those sites suggests that a sort of proto-integrated-steel-mills existed there, and that the iron making and processing were well established in Paekche as early as the third and fourth centuries. Furthermore, the remains show that the (so-called “unique” tatara-buki) iron-making technology adopted later in the Japanese islands was in fact identical to the old Paekche method discovered at these sites. The iron-making process in the Japanese islands was not “introduced from China, by way of Korea (--the Japanese scholars’ most favorable phrase),” but was brought from Paekche.

In the Japanese islands, there seems to have been no domestic production of gold ore before 698 or 701, copper ore before 697 or 707, and iron ore before the late sixth century. The refining of gold ore is mentioned in Shoku-Nihongi in the year of 698, and the Taihō-gwannen which commemorates the discovery of gold is 701, the year Shoku-Nihongi records that the island of Tsushima presented gold. Production of copper ore is mentioned for the first time in Shoku-Nihongi in the year 697, and the first year of Wado which commemorates the discovery of naturally produced soft copper (niki-akagane) in Musashi is recorded as 708. Although iron sand was discovered only by the late sixth century, Nihongi records that 20 bars of iron were presented by the Great Minister Soga to a prince of Paekche in 642. As Farris (1998: 73) has called our attention in relation with iron-making in the Japanese islands, the implications of early Japan’s near-total reliance on Paekche and Kaya states for iron, copper, and gold must be very profound.

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"fuki" means air blowing (吹き). A mixture of iron sand and charcoal fuel was placed inside a clay furnace, and was heated by means of blasts of air from a bellow in order to melt iron sand into sponge-like solid iron. Slag would occasionally be tapped. The furnace would be broken up and the main mass of iron would be removed. Makino Noboru (KEJ, 1983: 3.332-3) notes that variations of the tatara process were widely used until the end of the 19th century.

13 Initially, a (6.4 meters long and 6.0 meters wide) hole was dug underground, the bottom was layered with clay and charcoal, and then two furnaces (the large one for iron-making and the small one for processing) were installed on top of the layers. The round-shaped clay furnace measures about one meter in diameter, and a tap to deliver slag was installed at the lower side. Both iron ore and iron sand were used in iron-making, and limestone (or calcific materials such as animal bones and clamshell) was used as a solvent to reduce melting point or carbon. Either iron ax-head mold pieces or minimal remains of slag were found from a melting furnace, while forged iron pieces were found from a forging furnace.
