

Progress in Land Transportation System as a Factor of the State Formation in Japan

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(translated by SASAKI Ken'ichi²)

ABSTRACT

This paper is an approach to the state formation in Japan from the standpoint of transportation. Until the fourth century A.D. Japan lacked wheel transport. People had to depend on water transportation. Although standardized keyhole-shaped mounded tombs appeared in the middle third century, a network symbolized by sharing the keyhole-shape for elite burial was still weak. In the fifth century, horses were introduced to Japan, which made land transportation easy. The impact of the introduction was considerable in mountainous regions in eastern Japan. This also affected the selection of a site for building a giant elite mounded tomb. Furthermore, regional differences in pottery styles disappeared in the fifth century. This progress in the fifth century contributed to the social evolution at that time greatly.

KEYWORDS: State formation, Japan, Kofun Period, transportation system

1. Introduction

Late prehistoric and protohistoric Japan presents a very interesting case of a change in transportation system as a factor of early state formation. This must be understood in the context of interactions between human activities and environment. In the third century A.D. or a transitional phase from the Yayoi to Kofun Periods,¹⁾ local communities came to be tied into a single network, encompassing 1000 kilometers from west to east. This happened within a century or maybe within fifty years. Such a tie that formed in a short time period is considered weak, but in Japan this tie has never collapsed since the third century.

2. Premise

The Japanese islands in the third century were characterized by a very neat balance between environmental conditions and cultural conditions. The environmental conditions

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included a geographical position of the Japanese islands within East Asia, oceanic tides, arrangement of the Japanese islands, minor topography, flora and fauna. The cultural conditions included technology, tools, architectural structures, populations, knowledge, personal ties, and organization. These natural and cultural conditions interplayed with one another, and this interplay influenced human activities, and the human activities also influenced the interplay.

My approach to history from the standpoint of interaction among human activities, environmental conditions and cultural conditions is somewhat close to systems theory and ecological approach to archaeology (e.g. Flannery 1968; Ford 1979). I believe that analyses of environmental differences and changes that may facilitate or trigger changes social evolution will lead us to dynamic understanding of human history.

It is taken for granted that a street, bridge, and port are consequences of human actions that modified or changed the natural and environmental conditions. The new environment as a result of human activities also influences human activities. An aspect that I pay particular attention to is that, although a change in the natural environment is not obvious, the change in the natural environment by human activities considerably influences human activities. It is important to note that minute modification in the cultural and natural conditions may result in drastic change.

A good example is the invention of a boat. Prior to the invention, people had to swim to cross water. At that time, a river, swamp, lake and ocean were a natural condition that acted as a barrier against transportation of goods. Once the invention occurred, a gentle stream and still swamp and lake were transformed into an effective mean of transportation. When a dug-out canoe was only available, a major river with rapid current and ocean with strong tide still remained as a barrier against transportation.²⁾ These examples vividly illustrate that, while the natural environment remains unchanged, a change in cultural conditions can considerably transform what the natural environment means to people.

When we look into the detail of this interplay between a boat and water, numerous factors must be taken into consideration. Cultural factors include people's accumulated knowledge about tide level, ocean current, topography and the locations of other groups of people, as well as personal ties with other groups with which people exchange commodities and means to check the activities of groups in competition. Natural factors include the width, depth and the speed of current of a river, topography of coast lines, ocean current, tide level, and climate. A complex interplay of these factors constitutes to the water transportation system.

In consideration of the social evolution during the Kofun Period, additional cultural and natural factors should be considered. Such cultural factors are geographical positions of communities in relation to iron sources in the Korean peninsula and transportation

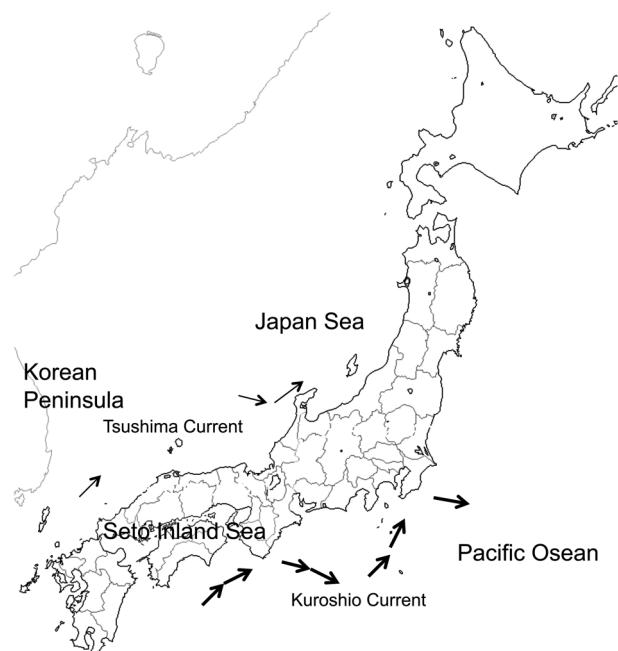


Figure 1. Japanese Islands

systems available at that time, and natural factors are a geographical position of the Japanese islands within East Asia, and arrangement of the Japanese islands (Figure 1).

3. Water transportation network before the fourth century

The Kofun Period started in the middle third century, when the standardized keyhole-shaped burial tombs appeared in numerous regions in western Japan. This was a marked departure from the Yayoi Period when mortuary customs were regionally distinctive. By “standardization of the mound form,” Kofun Period specialists in Japan mean that a ratios among the diameter and height of circular rear mound, width and height of trapezoidal frontal mound, and width and height of the joint between the rear and frontal mounds are shared by several keyhole-shaped mounded tombs built in different regions. Japanese archaeologists assume that the highest- and higher-ranking chiefs in the central polity distributed the construction-plan of a mound to local elites as a sign of alliance or friendship (Wada 1981; Hōjō 1986). Within one hundred or maybe fifty years, keyhole-shaped mounded tombs were distributed all over the Japanese islands, except for the Ryukyu Islands and Hokkaido, spatially extending more than 1000 km.

Despite this drastic change, the transportation system at the beginning of the Kofun

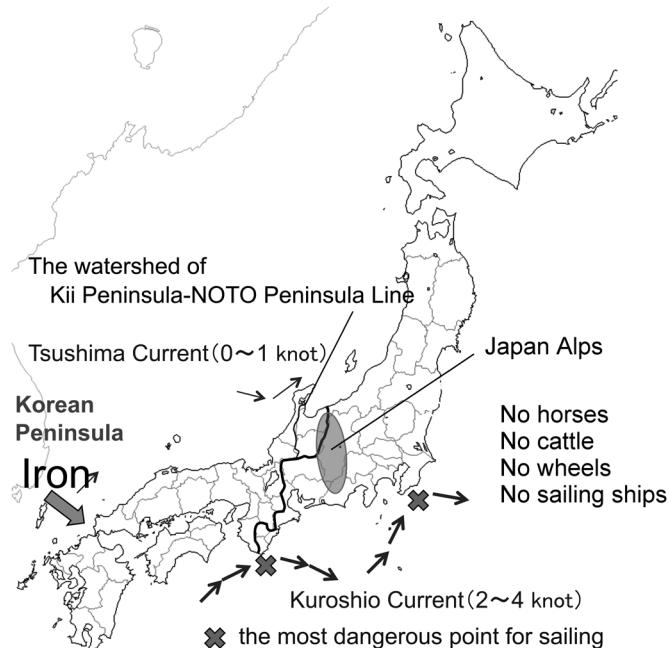


Figure 2. Cultural condition in 3rd century Japan

Period was very limited. Japan at that time lacked horses and cattle, as recorded in the *Wei-Zhi* [the official history of Wei China]. Recent accumulation of archaeological evidence dated to the third and fourth century gives support for this description of written source (Tamura 2005). Third century Japan also lacked wheel transportation and sailing ships. The oldest evidence for wheels in Japan was excavated beside the Kodachi Mounded Tomb in Nara Prefecture. While the tomb is dated to the fifth century, the wheel was discovered in a stratum dated to the seventh century when the Abe-Yamada ancient highway running beside the tomb was in use.

Let me first review the situation before the third century (Figure 2). In the first century, stone tools were replaced by iron. Since local production of iron started in Japan in the sixth century, iron ingots had to be imported from the Korean peninsula. This means that it was important for local communities to secure transportation routes in order to constantly obtain iron transported for a long distance. It is easy to imagine that people in the first and second centuries or the Late Yayoi Period chose water transportation because carrying or dragging iron ingots overland within Japan was far less efficient. This choice of water transportation greatly influenced the geographical locations of settlements.

In the Kanto plain in eastern Japan where the Tokyo Metropolitan Prefecture is situated in its southern one third, small tablelands of 20 to 50 meters in height and

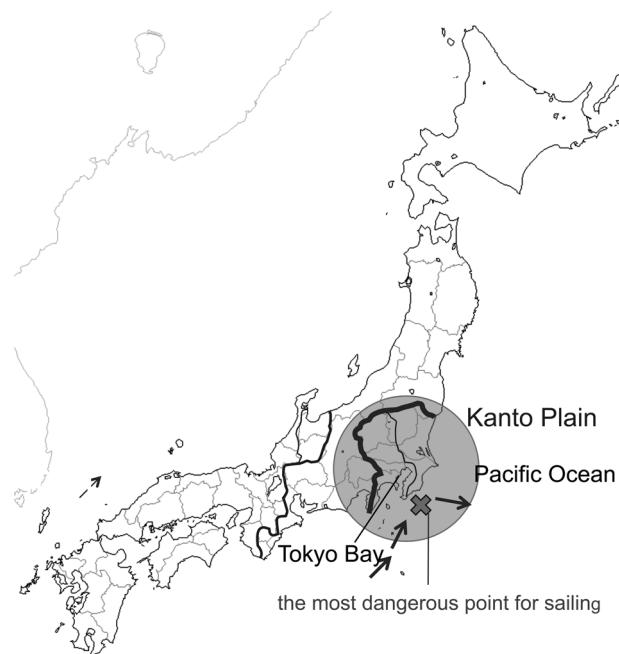


Figure 3. *Kanto plain*

streams are located side by side (Figure 3). These streams are divided into the western tributary system that flows into the Tokyo Bay and the eastern tributary system that flows into the Pacific Ocean. These two tributary systems were separated by a divide or watershed running north-south, but the divide is a height of only 20 meters in height.

In second century Japan, however, this watershed functioned as a cultural boundary. Not only was this a boundary of regional characteristics of pottery use, but also this boundary marked the eastern frontier of the typical Yayoi material culture that diffused from the west, including moated burial precincts, moated settlements, and iron daggers (Figure 4). Although the watershed was a height of only 20 meters in height, it was the major obstacle of transportation for people who had to acquire the daily necessities from outside and to whom horses and cattle were not available. In other words, people depended exclusively on water transportation, fully utilizing boats of various sizes. Land transportation played the minimum role.

At that time, an ideal water transportation route that connected the coastal area of the Tokyo Bay and the eastern Kanto plain, crossing the watershed, was a short-cut route that connected the northern coastal area of the Tokyo Bay and the Imba swamp. They could not yet sail around the Bōsō peninsula, which was a dangerous journey. Settlements dated to the second to fourth centuries in this region are not situated in land

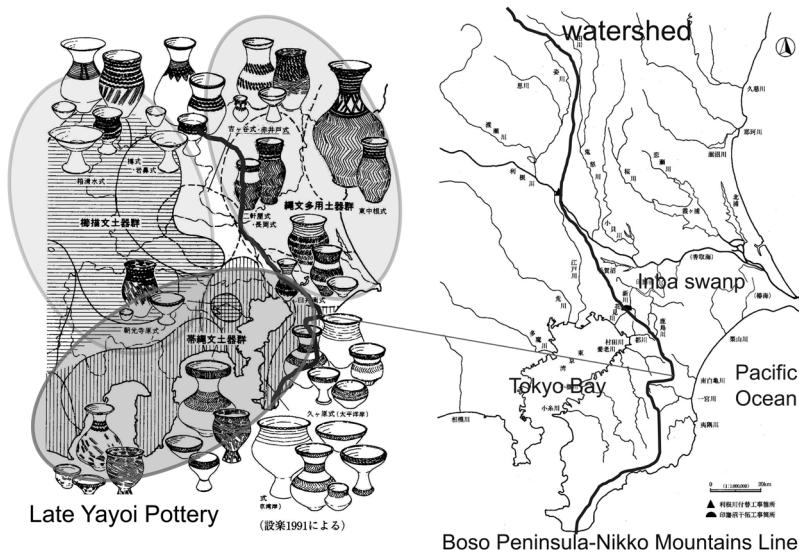


Figure 4. Cultural boundary in 2nd Century Kanto

suitable for wet rice cultivation but along the ideal water transportation route. Indeed, coastal/riverine areas were not particularly good for rice cultivation. At a locality where land transportation was unavoidable, a site of iron smith was located. These lines of evidence clearly indicate that people depended on iron transported for a long distance and were very conscientious about water transportation.

After the Kofun Period started in the middle third century, keyhole-shaped mounded tombs were built at many different regions of Japan. These keyhole-shaped mounded tombs were built according to fixed standards, such as ratios between the length, width, and height, and were marked by clear differences in scales. This indicates that leaders of local polities were incorporated into a network that also symbolized the different ranks of the local leaders in relations to one another within the network.

Keyhole-shaped mounded tombs in the late third and fourth centuries are located along relatively narrow and easy rivers, especially confluences or a point where a valley meets a plain. These locations should be considered as a “point of change-over in transportation means.” Among these keyhole-shaped mounded tombs, those presumed to be the burial of the highest-ranking chief in a region tend to be located at upper but easy streams. For example, giant keyhole-shaped mounded tombs of around 300 meters in length, presumed to be the burials of the highest-ranking chiefs of the central polity, are located in the southeastern corner of the Nara basin, where the Yamato River flowing out of a mountain reaches the basin. At the border of the Nara basin and Osaka plain where other streams flow into the Yamato River, smaller mounded tombs are distributed (Figures 5, 6).

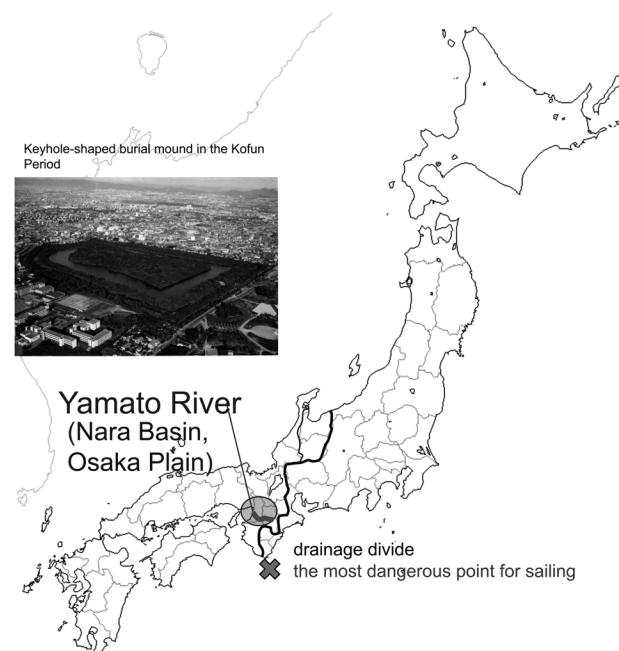


Figure 5. Yamato river

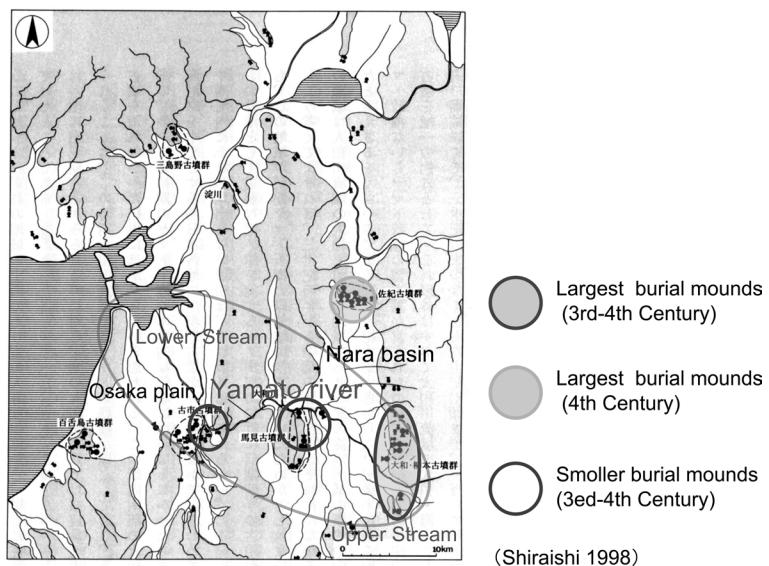


Figure 6. Giant burial mounds in 3rd–4th Century Nara Basin



Figure 7. Chikuma River and Sakura River

This is also the case in eastern Japan (Figure 7). Along the Chikuma River that flows through the Zenkōji basin in the northern Nagano Prefecture of the central highlands of Japan, fourth century mounded tombs are located at the upstream and downstream of the basin as well as where the Sai River meets the Chikuma River. The largest keyhole-shaped mounded tomb in the basin is located at the upstream on the Chikuma River in the basin (Figure 8). In Ibaraki Prefecture in northern Kanto, large keyhole-shaped mounded tombs are located at the upstreams of middle-class rivers (Figure 9).

These examples suggest to me that elite mounded tombs were located at “points of change-over in transportation means,” and the location of the largest keyhole-shaped mounded tomb in a region at the upper but easy stream symbolized the upper limit of the maximum utilization of water transportation by river.

Yet, the situation in western Japan should be distinguished from eastern Japan for several reasons. First, western Japan was closer to the Korean peninsula. Second, the Inland Sea functioned as *the* major transportation route of importing iron. Indeed, late third century keyhole-shaped mounded tombs were located on the coastal regions of the Inland Sea (Figure 10). This suggests to me that the early Yamato polity with the center in Nara (Yamato) was a confederacy in nature of regional polities in the coastal regions of the Inland Sea in order to secure and stabilize the Inland Sea transportation. This

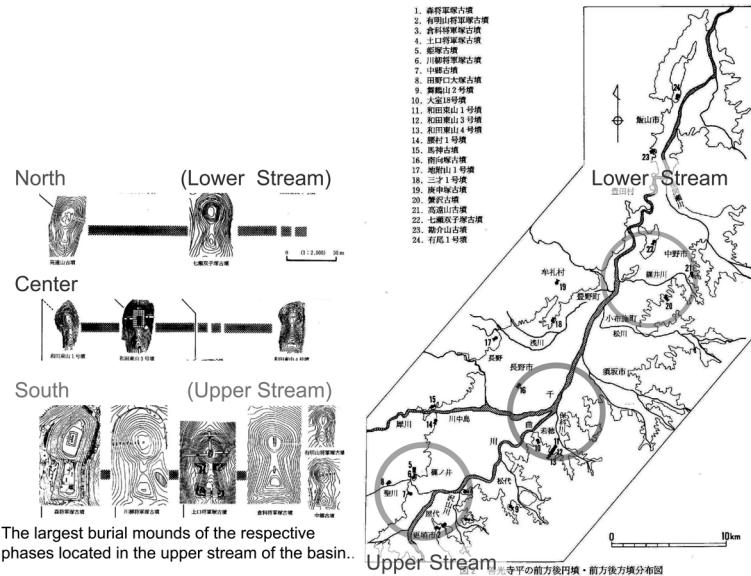


Figure 8. Burial mounds in 4th Century Middle Chikuma River

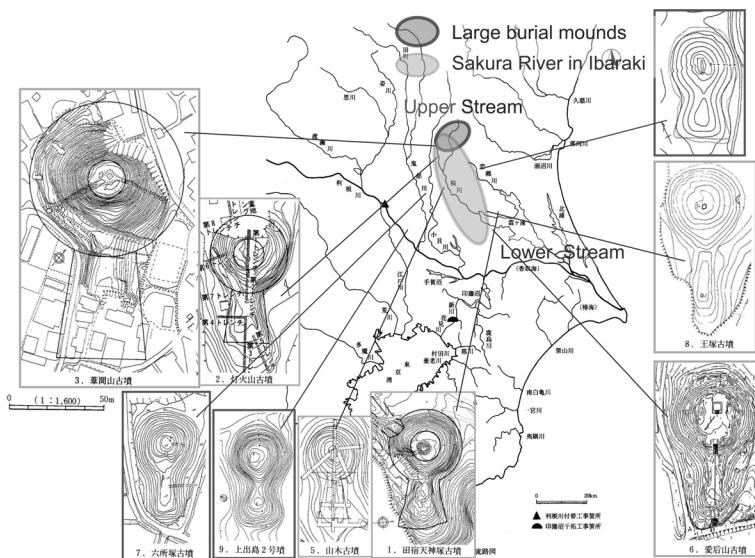


Figure 9. Burial mounds in 4th Century Sakura River

linear network based on water transportation that tied regions somewhat distant from one another resulted in a rather uneven spatial distribution of the late third century keyhole-shaped mounded tombs in the Inland Sea regions. The eastern end of the Inland Sea is

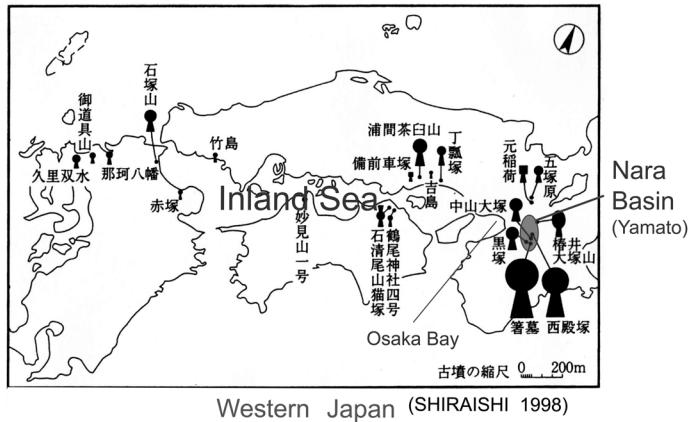


Figure 10. Earliest type of Keyhole-shaped burial mounds (3rd Century)

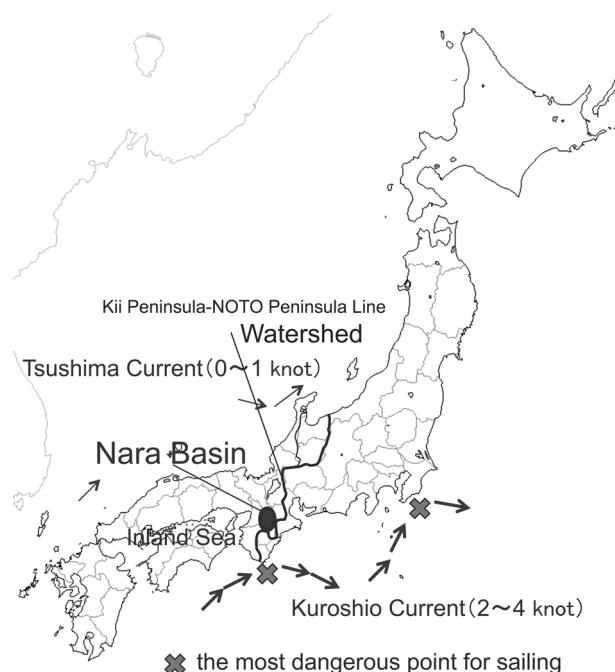


Figure 11. Nara Basin and the Watershed

the Osaka Bay, and the Nara basin is located behind the Osaka Bay.

As aforementioned, the burial of the highest-ranking chief of the central Yamato polity was located in the southeastern corner of the Nara basin, at the foot of watershed that separated spheres of transportation between western and eastern Japan (Figure 11). In

other words, the burial of the highest-ranking chief was located at the eastern end of western Japan advantageous in water transportation and at the entrance to eastern Japan disadvantageous in water transportation. A factor that had put the central Yamato polity in a more advantageous position than other polities was its geographical position under the condition of heavy dependence on water transportation and with an expectation for control over transportation in eastern Japan.³⁾

4. Land transportation as an epoch in the network system in the fifth century

From the end of the fourth century to middle fifth century, horses were introduced to Japan from the Korean peninsula, probably for military purpose. Once horses were introduced in the fifth century, horses were quickly adopted in Kyushu closest to the Korean peninsula and the Osaka-Nara region where the central polity existed, as well as eastern Japan far away from the central polity (Momosaki 1993). This widespread adoption suggests to me that horses were not only the elite status symbol but also means of carrying goods.

Because horses were not native to Japan, along with horses imported from the Korean peninsula, equestrian specialists of breeding and raising horses had to be invited. Moreover, horse gears had to be produced in Japan, and local people must become familiar with the horse gear. A considerable change in production and distribution system must have taken place in the fifth century.

This change in the fifth century is particularly pronounced in eastern Japan where transportation was difficult, and inter-regional network in the third and fourth centuries was very limited, weak, and indirect because of more mountainous topography characterized by larger land mass. I will refer to an example of the upstream region of the Tenryū River, southern Nagano Prefecture, central Japan (Figure 12).

In the upstream region, the current of the Tenryū River is rapid. It is a valley between two high mountain ridges. Water transportation by the Tenryū River between the upstream area and downstream area near the Pacific coast of central Japan has never developed to date. This region was not incorporated into an interregional network dependent on water transportation. Because of the lack of water transportation, which must have prevented the acquisition of iron, people in the fourth century the upstream Tenryū River region still continued using stone hoes for dry land farming (Matsushima [Kamimura] 1964; Yamashita 2005). These phenomena were a possible background to the lack of third- and fourth-century keyhole-shaped mounded tombs in this region (Figure 13).

In the fifth century, the construction of keyhole-shaped mounded tombs started in

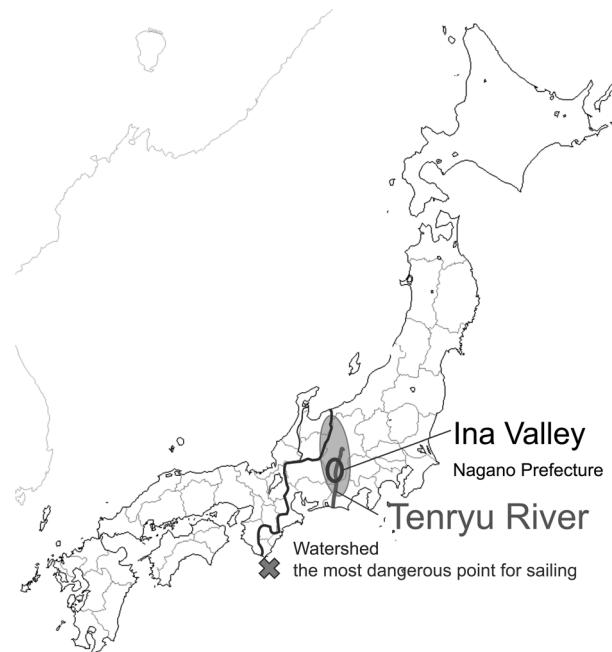


Figure 12. Central Highland of Japan (Ina Valley)

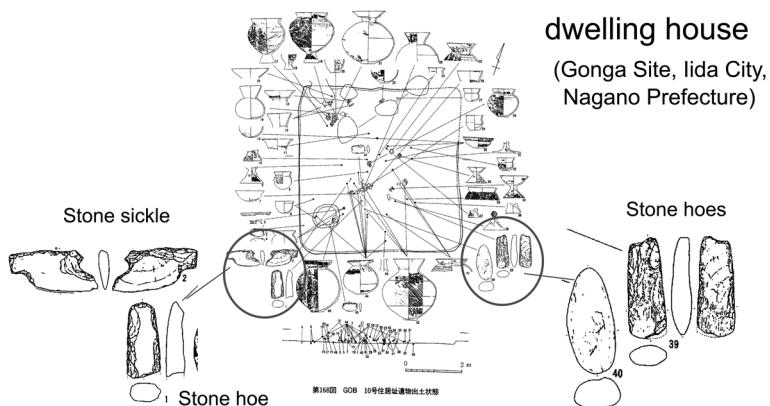


Figure 13. Chipped stone tools were still in use in Ina Valley in the 4th Century AD

this region suddenly (Figure 14). Large quantities of iron objects were deposited with the dead in these mounded tombs. Moreover, a larger number of horses were buried at the foot of these keyhole-shaped mounded tombs, than Kyushu and Kinai where the central Yamato polity was located (Figure 15). Stone hoes disappeared at the same time (Figure 16). A factor that led to this drastic change in the fifth century was a political

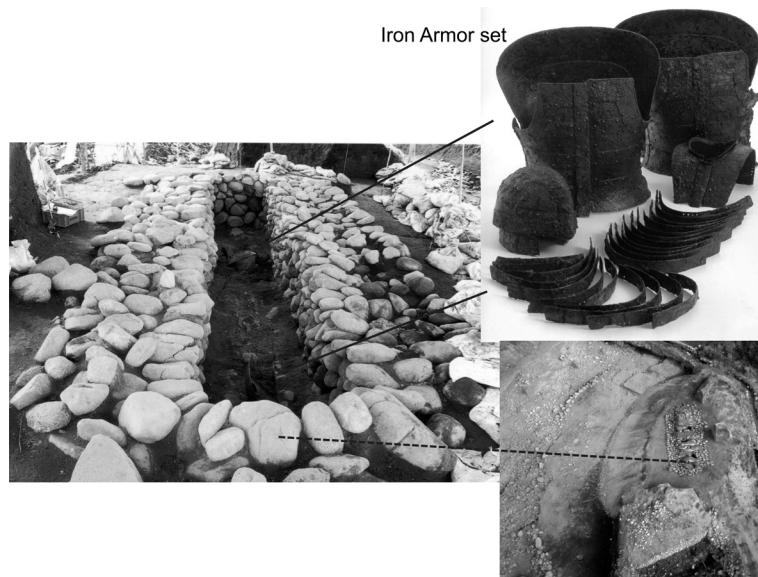


Figure 14. Keyhole-shaped Burial mound appeared in Ina Valley in the 5th Century: Mizoguchinotuka Tumulus, Iida City, Nagano Prefecture

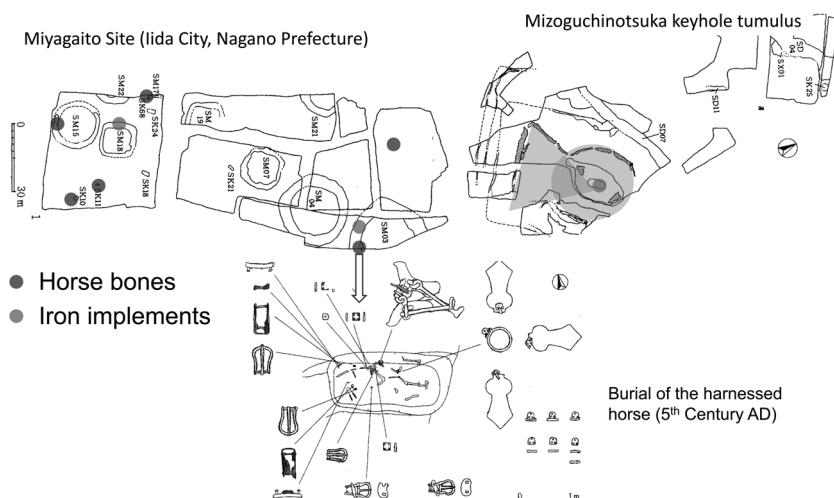


Figure 15. Keyhole-shaped burial mound appeared in the Ina region with horses and iron implements in the 5th Century

introduction of horses, which initiated a new means of land transportation. This led to a drastic increase in the use of iron, and local communities came to be organized rapidly. The largest keyhole-shaped mounded tomb in this region was built at the foot of pass that

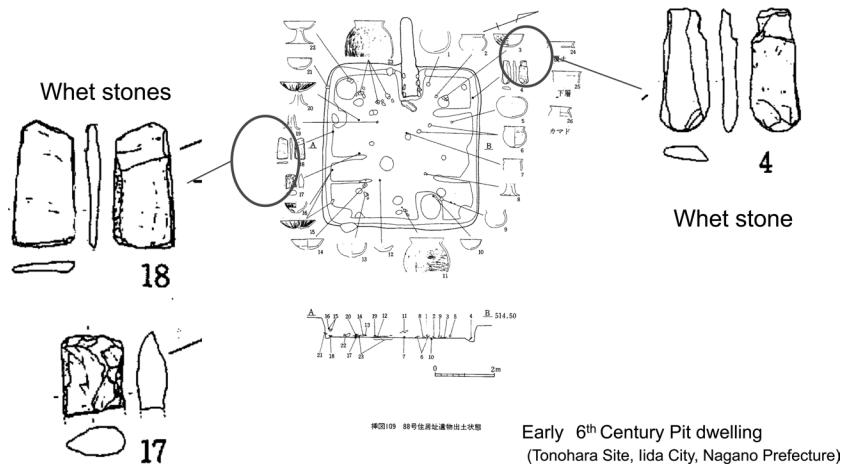


Figure 16. Disappearance of stone hoes in Ina Valley (the 5th and early 6th Century A.D.)

crossed a mountain ridge. This pass remained to be a strategically important location that connected western and eastern Japan in later historic times.

A change illustrated by the case of the upstream Tenryū River region occurred within half a century since the practice of raising horses started in the Kinai region. This indicates that the central Yamato polity did not intend to monopolize horses for military purposes. Rather, it is probable that the central polity encouraged regional polities to start raising and schooling horses, thereby creating a new, land-based interregional network. Eastern Japan was greatly benefitted from this new network, especially in terms of the acquisition of iron. A few regional communities in eastern Japan were active in adopting horses and welcomed this new change. The aforementioned phenomena in the upstream Tenryū River region were a reflection of this new change.

The introduction of horses to Japan also resulted a small but fundamental shift—a shift in the location of a “point of change-over in transportation means.” A low watershed in a plain became no obstacle of transportation once people rode on horses. People no longer had to go to upstream area in order to cross small rivers. Consequently, points of change-over in transportation means came to be formed in downstream areas and coastal regions.

This shift is clearly reflected in a shift in the locations of largest keyhole-shaped mounded tombs in regions. Large keyhole-shaped mounded tombs of the central Yamato polity in the fourth century were located in the Nara basin or the upstream on the Yamato River. In the fifth century, however, large keyhole-shaped mounded tombs of the central polity were located in the Osaka plain, the downstream on the Yamato River, facing the Osaka Bay (Figure 17). In Kanto of eastern Japan, similarly, the locations of

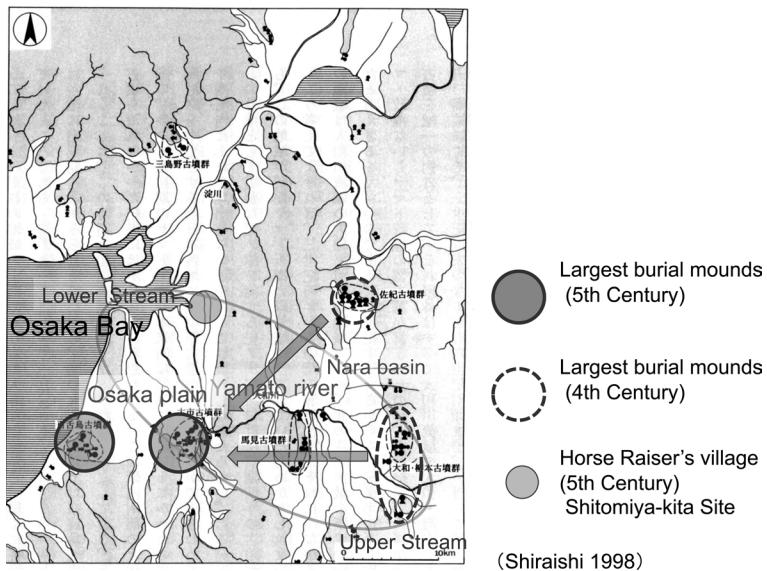


Figure 17. Shifting distribution of the cluster of the largest burial mounds in the 5th century A.D. Note that the clusters were now in the Osaka plain

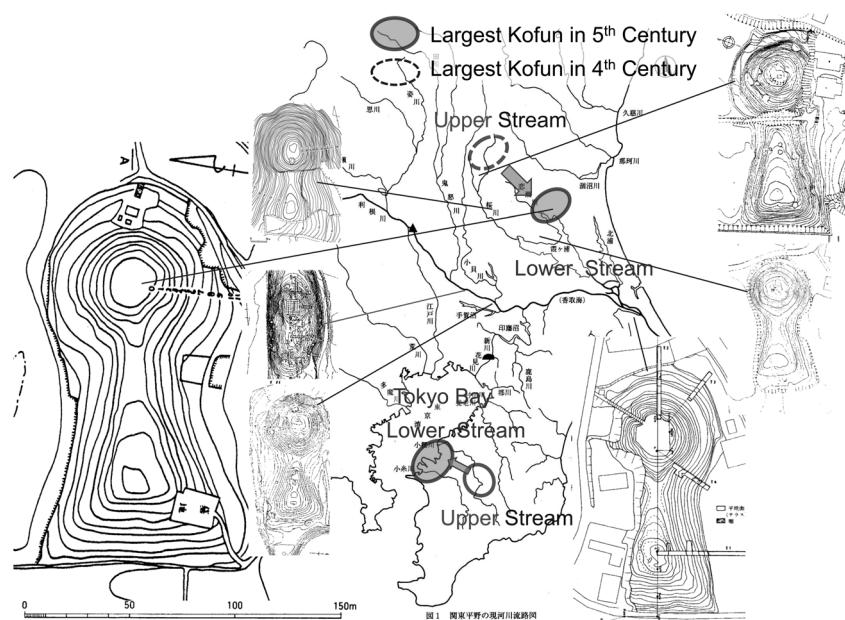


Figure 18. 5th Century keyhole tumuli distribution in Kanto

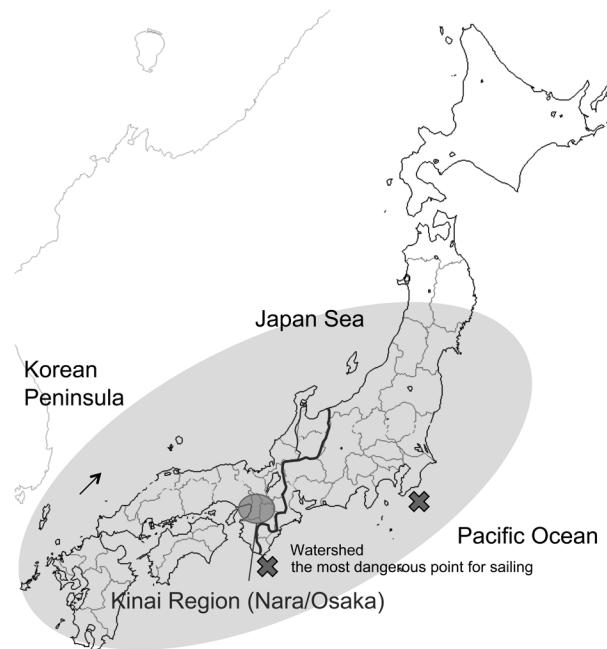


Figure 19. Locational characteristic of the central Yamato polity

the largest keyhole-shaped mounded tombs in regions shifted from the upstream areas of relatively narrow rivers of gentle stream in the fourth century to the coastal regions of the Tokyo Bay and plains facing major rivers in the fifth century (Figure 18). A change in the environment of transportation seems to have influenced the selections of seats of the chiefly authority and their locations.

In sum, the introduction of horses and subsequent spread of the practice of horse riding, initiated by the central Yamato polity, had a revolutionarily positive impact on the land transportation in the fifth century, which used to limit the transportation of goods until the fourth century. This also encouraged a drastic change in local societies that used to heavily depend on water transportation. In particular, this brought local communities in mountainous areas and those used to be separated by watershed much closer to each other. All in all, a liner interregional network evolved to spatial network.

The fifth century was also the time when regional differences in pottery styles disappeared. This disappearance was particularly significant in eastern Japan where regional difference in pottery styles used to be very clear in the fourth century. This suggests to me that local polities and communities in eastern Japan willingly accepted a change, rather than maintaining regionally distinctive traditions. The central Yamato polity that succeeded in the revolutionizing the transportation system on land must

have gained enthusiastic support from eastern Japan, especially inland regions and regions far away from Yamato. Owing to this widespread support from local polities and communities, the central Yamato polity gained the sole position in Japan that tied regional polities from western Japan to eastern Japan, 1000 kilometers apart (Figure 19).

Notes

- 1) The Yayoi Period lasted from the seventh century B.C. or so to middle third century A.D., and the Kofun Period from the middle third to early seventh centuries A.D.
- 2) In this paper, the author focuses on the case of crossing the ocean where strong tide flows and there are few islands to make stop-over. A good example is the ocean off the coast of the Bōsō peninsula (Pacific coast of Chiba prefecture). In the third or the fourth century, A.D. Japan did not achieve the level of technology that allowed people to cross the ocean. On the contrary, when people accumulated detailed knowledge about the tide and several islands between the mainland and the destination, it was possible to cross the ocean. This is evidenced by obsidian quarried in the Kōzu Island off the coast of the Izu peninsula and transported to the mainland during the Jomon Period. Although relatively deep sea fish are found at Jomon sites, these fish sometimes travel to shallow water, and Jomon fishermen probably had knowledge to catch these fish in shallow water.
- 3) In this sense, it may also be necessary to pay attention to the Tsubai-Ōtsukayama Mounded Tomb in southern Yamashiro, northern neighbor of Yamato. More than 33 Wei Chinese bronze mirrors were discovered in the burial chamber of this tomb, which suggest a very high social status of the buried. The Tsubai-Ōtsukayama Mounded Tomb is situated by the Kizu River whose upstream flows in the Iga Province, another gateway to eastern Japan. I would speculate that the central polity of Yamato gained the paramount position owing to the cooperation of influential local chiefs, including the one buried in the Tsubai-Ōtsukayama Mounded Tomb.

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