

Life Strategies of Hunter-Gatherers: A Comparative Social History of The Indigenous Peoples of Borneo and Jomon-Period Japan

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ABSTRACT

The characteristic of the Jomon period in Japan is that it lasted for a long time. Traditionally, this has been explained solely by the heteronomous factor that the transmission of agricultural culture from the continent was delayed, but in recent years we have come to appreciate the potential of Jomon society itself. This study compares the social history of the hunter-gatherers of Borneo with the Jomon-period people of the Japanese archipelago focusing on their life strategies, that is, their behavior in selecting livelihoods and lifestyles in order to survive as a group in response to changes in the natural or social environment. Both the Borneo and Jomon-period peoples aspired to a nomadic lifestyle with low population density in a rich natural environment. They are basically self-sufficient in food, and in the case of the Penan people they have been able to secure food from plants called the sago palms, and from tree nuts in the case of the Jomon people. A barter market called “Tamu” was a place of exchange that became established in nature and society, and at the same time it was a meeting place and a place of cultural celebration. Similarly, social networks between regional groups had already been formed during the Jomon period.

Keywords: *Comparative social history, hunter-gatherers, indigenous peoples, life-strategies, sustainable society*

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INTRODUCTION

In 2015, the Sustainable Development Goals (SDGs) were adopted with the participation of leaders from more than 150 United Nations member states around the world. Today, the call for a sustainable society can be heard from all sectors of society. However, if we are to achieve this goal, we must first acknowledge that modern society is ‘unsustainable’. Thus it is necessary to re-examine the relationship between people and the environment, and start by conducting a comprehensive review of the state of society. As a preparatory work, this study compares the social history of the hunter-gatherers of Borneo with the Jomon-period people of the Japanese archipelago, and considers the characteristics of societies that have coexisted in harmony with the natural environment for a long time.

By the end of 2021, Japan's ‘Jomon Prehistoric Sites in Northern Japan’ will be registered as a World Heritage Site by the United Nations Educational, Scientific and Cultural Organization (UNESCO). A pamphlet prepared by the proposing local governments of the Jomon Prehistoric Sites in Northern Japan introduces the site as follows:

Jomon Prehistoric Sites in Japan is a unique prehistoric culture that existed in the Japanese archipelago and lasted for over 10,000 years. People were able to lead a sustainable life in

harmony with the bountiful nature and managed to adapt adeptly to changes in climate and the natural environment. It is characterized by the earliest pottery-making in the world and the establishment of villages where the people were able to live a stable life.

The Earth periodically goes through cold glacial periods and warm interglacial periods. The Quaternary Era in geology is divided into the Pleistocene and Holocene epochs, the latter of which began around 11,000 years ago. The Pleistocene epoch, also known as the Ice Age, had several cold glacial periods, and the sea level was about 100 meters lower than it is today. Consequently, the Japanese archipelago was land-locked with Sakhalin in the north and the Korean Peninsula in the south. Around the time of the Holocene, the entire planet began to warm up, and the Japanese archipelago was separated from the continent and became what it is today. In the early Jomon period (approximately 6,000 to 5,000 years ago), climatic warming reached its peak, and deciduous broad-leaved forests of the beech/oak type replaced coniferous trees in eastern Japan. In the deciduous broad-leaved forest zone, there are many tree species that produce nuts, such as walnuts, horse chestnuts, and oak, which increased food production compared to coniferous trees that produce little food. In the division of world history, the period that roughly belongs to the Pleistocene is called the Paleolithic period (only chipped stone tools are used) and the Neolithic period, in which stone tools are polished and used. In Japan, there were many patterns in which a twisted string called “Jomon” was rolled on the surface of earthenware, so the name “Jomon period” has taken the place of the Neolithic period. The characteristic of the Jomon period in Japan is that it lasted for a long time. Traditionally, this has been explained solely by the heteronomous factor that the transmission of agricultural culture from the continent was delayed, but in recent years we have come to appreciate the potential of Jomon society itself (Inamura, 1996; Habu, 2004).

In order to explore the fundamental question of why Jomon society remained stable for so long, it is necessary to construct a comparative history of environmental coexistence on the scale of world history, not just Japanese history. For this purpose, this study refers to data from observations and interviews with existing hunter-gatherer groups in the tropics. The author conducted his fieldwork in the Baram River basin in Sarawak, Malaysia. In particular, the upper reaches of the Baram River, known as Ulu Baram, is the only area in Sarawak where there is a large amount of primary forest except for national parks and nature reserves. This article focuses on the life strategies of hunter-gatherers in Borneo and Jomon Japan, that is, their behavior in selecting livelihoods and lifestyles in order to survive as a group in response to changes in the natural or social environment. As a result of contact with modern civilization, indigenous peoples of various parts of the world who made their living as hunter-gatherers were gradually transformed and absorbed, and today they remain only in some areas such as tropical rainforests, deserts, and the far north.

BORNEO’S PLANT FOOD: SAGO PALM

From Miri on the coast, it takes about an hour by twin otter to land at an airfield in a town in the mountains, and after a few hours of walking, tree trunks over eight meters in circumference appear one after another. It is the Penan people, who have lived with the forest of Ulu Baram.

The hunting tool is a blowpipe. The longest blowpipes are made of hardwood and are over two meters long. When shooting large wild animals, sap collected from plants in the Moraceae and Loganiaceae families is used as an arrow poison. There are also medicinal herbs for antidotes in case the arrow poison accidentally enters the human body. They also use spring traps. A cord made of tree bark is planted in the animal’s path. When an animal puts its foot in it, the cord tightens and the animal is suspended. All the tools used by the Penan people, including blowpipes and traps, are procured from the forest. The hunting targets are usually wild boars, deers, and monkeys. They were originally nomadic people

who did not settle in one place, but moved around repeatedly. Today, most Penan people have a home base, but they often migrate through the forest for days or weeks at a time. The reason for this is not for hunting, but for securing sago starch, which is a carbohydrate source. According to Tom Harrison of the Sarawak Museum, “After rice was introduced, the Penan did not move towards slash-and-burn, they have chosen to continue to rely on the abundance of the land to the present day.” (Harrison, 1949, p. 133). In the Philippine islands, Malay Peninsula, and Sumatra, yams are the main source of carbohydrates. However, rhizomes such as yams have low storability and need to be harvested frequently. In Borneo, on the other hand, the use of yams is limited, and starch obtained from palms is mainly used. Palms that accumulate starch in the pith of their trunks are called sago palms, and 14 genera are known (Society of Sago Palm Studies, 2015). Palm is a perennial tree that is not susceptible to climatic fluctuations or pests and diseases, and can be used stably all year round. Sago means ‘starch flour’. The Penan people are particularly fond of *Eugeissona utilis*, a type of sago palm that is widely distributed in the interior of Borneo and grows in clusters on steep slopes and ridges.

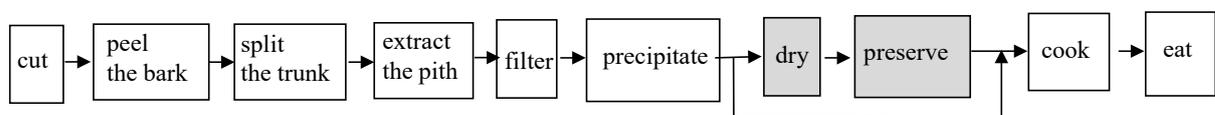


Figure 1: The treatment process of sago palm

Let's take a look at the production and processing of sago starch (Figure 1). It starts with the process of division of labor between men and women. The men cut down the sago palms with axes, separating each trunk into pieces around one meter long. Next, at the riverside, they use a machete and a stick to split the trunk in half lengthwise. Then, the sago that is stuck in the trunk is scraped out. Then the work of the women begins. They lay out thin pieces of wood by the riverbank to make a two-meter square base. They lay out a rattan rug and pour the scraped pith on it. While pouring water, they lightly step barefoot to push and wash the pith. This process continues for a few hours, waiting for a few more hours for the starch to settle on the underlying sheet. The starch that has finished settling is combined into a large mass. Sago starch, which contains moisture, may be boiled, baked, or fried and eaten immediately. However, most of them go through the process of drying and storage. In other words, the mass after precipitation is put on a long fire for 4-5 hours to slowly remove the water, and then crushed into powder. Once dried, it can be stored for a certain period of time and shared within the village. Thus, the processing and preserving sago includes a social maintenance function.

When cooking sago powder, add hot water and stir, keeping an eye on the amount. This will complete the traditional staple food of the Penan people, called *na'o*. Using chopsticks with a broken tip called *atip*, roll the paste-like *na'o* and eat it. The texture is like gummy, with a slight metallic taste. Infectious diseases, such as malaria, reduce the amount of iron in the bloodstream. Iron is an essential nutrient for humans, but it can also be used for bacterial growth. In other words, the iron in sago is a double-edged sword against malaria, but at least it helps prevent the anemia caused by iron deficiency. Today, many Penan people eat hill rice produced by shifting cultivation, but the older the people are, the more they prefer to eat sago rather than rice. They may also eat a combination of sago foodstuffs for meat side dishes and rice foodstuffs for fish side dishes.

JOMON PLANT FOOD: NUTS

In the Jomon period, when the four seasons began to change to as they are today, wild plants sprouted in the fields in spring and nuts became abundant in autumn. Various animals such as deers, wild boars, bears, hares, and raccoons lived in the forest, while the sea was inhabited by marine animals such as fur seals and sea lions, as well as fish and shellfish.

From autumn to winter, salmon were in the river, and depending on the season, a variety of food was obtained through a combination of gathering, hunting, and fishing. Baskets to hold a lot of nuts and straw mats for drying food were woven. Bows and arrows were often used for hunting. Stone arrowheads are among the hunting tools found in archaeological excavations. The material of the stone arrowhead is obsidian, which has been excavated from every Jomon archaeological site. In addition, pitfall hunting was also used throughout almost the entire Jomon period. Pitfalls are often found on mountain ridges, around springs, and along valleys.

Based on the results of pollen analysis and tree species identification, the Jomon people often ate nuts such as acorns, walnuts, and horse chestnuts. The nuts, commonly referred to as acorns, are the general name for the fruits of the beech family. In addition, rhizomes such as yam, legumes, wild plants, mushrooms, and mountain grapes were also used for food. As digging sticks and stone axes were excavated, it is probable that rhizomes such as yam were dug up and collected. In addition, other species such as gourd and red beans have also been discovered. With a good quality natural environment, if one food item is in short supply, alternative foods can be found quickly. While forming a settlement, they showed a certain degree of mobility and shared food to ensure the stability of their lives, which helped them to be resistant to climate change and less likely to experience famine. In the middle of the early Jomon period, forests were found in which people systematically managed plants that they could use for their daily lives, such as chestnut, sumac, and horse chestnut. Among them, chestnuts were most often used as food and wood. It is probable that the horse chestnut forests spread along the edges of the lowland forests, and these forests were managed so that they could be easily used by humans to some extent (Noshiro and Sasaki, 2014; Noshiro et al., 2016). In addition to the theory that the increase in the number of horse chestnut trees is due to climate change, there is also the argument that people preferred horse chestnut trees (Kawashima, 2015).

The Jomon-period dwelling was a pit-house dwelling made by digging a shallow hole with a diameter of about 4 to 6 meters on a plateau. In addition to dwellings, many pits for storing nuts such as acorns, horse chestnuts, and chestnuts, have been found in Jomon ruins. There is little change in temperature and humidity in the soil throughout the year, making it suitable for storage. Some of them are flask-shaped, with a narrow entrance and a wider hole inside. It is probable that they covered the holes with branches or clay to prevent direct contact with the outside air or sunlight as much as possible, and preserved nuts and other materials. Acorns were ground into a powder on stone plates or polished stones to make them easier to cook and digest when eaten. These tools were made of andesite, and are thought to have served the same purpose as today's mortar, mortarboard, millstone, and cutting board.

In the laurel forest zone of western Japan, some nuts can be exposed to water or eaten as is, like sweet acorn and oak, but acorns and horse chestnuts from eastern Japan, where deciduous broad-leaved trees are predominant, need to be processed for eating. Among them, horse chestnut has a strong astringency even among nuts, so it must be soaked in water to kill insects, and after being shelled, it is combined with ash, exposed to boiling or running water, and it takes a lot of time and effort to remove the astringency. In fact, at the Kuribayashi Site in Nagano, a wooden lye removal facility for collecting spring water (water bleaching facility) has been excavated. There, in order to work with clear water, stones were first laid on the bottom of the dug valley floor. Stakes were driven into the corners of a 2-meter square, and a board was laid on the bottom. Since there are carbonization traces in some parts of the material, the wood was pre-processed to prevent corrosion. In this way, the spring water flowed into the bleaching area, and removed the acorn lye in the woven baskets. The time and effort required to remove the lye should have been greatly reduced.

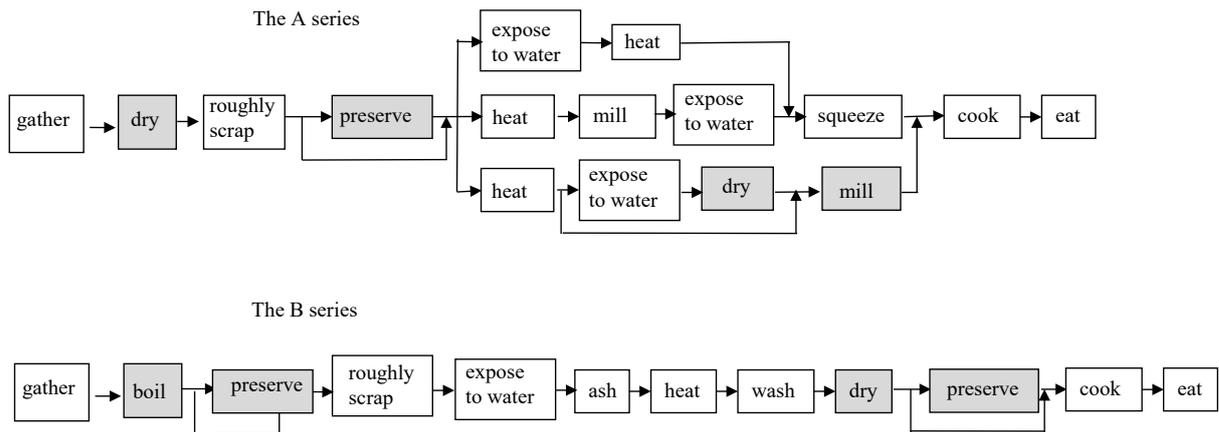


Figure 2: The treatment process of Japanese oak (modified and redrawn from M. Watanabe 1975, p.104)

Let us look at the record of the interview surveys on the removal of lye from nuts (Watanabe, 1975). Figure 2 shows the treatment process of Japanese oak in Niigata and Nagano. The A series involves heat treatment in addition to water exposure. Japanese oak contains a lot of tannins, but because it is soluble in water, it can be removed to some extent by heating or exposure to water. The A line is divided into three categories according to the pre- and post-processes of heating, water exposure, and milling processes. The B series is unique in that it uses ashes. Alkaline ash is necessary to neutralize the components of water-insoluble lye such as saponin. The time required to remove the lye is two days for the B series. As in the case of these folk examples, the Jomon people may have milled the flour and preserved it. The B series does not have a milling process, but after removing the lye, it is completely dried in the sun. If it is sufficiently dry, it can be stored for several years without any change in flavor. In addition to the A and B series, there have been cases where it took about a week or so to soak the lye and remove it.

At the Okinohara site in Tsunan, Niigata, there are three rectangular house ruins in addition to the remains of a pit-house, which is thought to be a collaborative work facility for lye removal (Watanabe, 1975, p.163). During periods of heavy snowfall, it is probable that the entire community worked together to dry and mill flour, and shellfish and fish were dried and smoked. The food obtained through communal work should have been evenly distributed. The necessary food had to be secured in case of low yields and emergencies, and such communal work and distribution would have served as a kind of social security.

EXCHANGE IN BORNEO: FOREST PRODUCTS

In the Baram river basin on the island of Borneo, until the 1970s there were barter markets called *tamu* between the Penan people, who are gatherers, and farmers. It was held between the Penan and a very limited number of neighboring farmers who were acquainted with each other. In addition to agarwood and borneol, which are the raw ingredients for braided products such as rattan and for incense, what the Penan brought to the *tamu* were illipe nuts as a substitute for candles and lubricants, and resins such as dammar and gutta-percha for adhesives. Sometimes they would take animal stomach stones, beeswax, blowguns, which are the basis of medicine. In contrast, the Penan obtained daily commodities and luxury items from the farmers, such as pots, kettles, clothing, salt, tobacco, and beads, which they could not get from the forest. No groceries were brought to the *tamu*.

Fifty years ago, the Kenyah and Berawan middlemen, who had always bought agarwood from the Penans, complained to the government officials (Harrison, 1949). The cause of the complaint was that the Penan people were distributing agarwood to other buyers. When the

nomadic Penan are treated poorly by neighboring ethnic groups, they refuse to provide them with forest products and move elsewhere. Although the Penan people were taken care of by neighboring ethnic groups, they did not pledge unconditional loyalty to them, but sought mutual trust and reasonable compensation. Through the *tamu*, gatherers and farmers exchanged information on their ecological knowledge, tools, and techniques to maintain and develop their respective livelihoods and lives.

In 1839, James Brooke, a British explorer, arrived in Sarawak. Sarawak would later be ruled by the Brooke family from 1841 to 1946. The Brooke government launched a system to hold and oversee the *tamu* on a regular basis. It may have been a means of control to bring the indigenous peoples under their rule. The Penan were free to participate in the *tamu*, but the farmers were limited to those whom the Penan knew face to face. The Penan people gathered forest products in the forest and wove wicker baskets and rugs. Farmers went to the town to buy daily necessities to trade with the Penan people. The government officials weighed the forest products that the Penan people brought with them and estimated the price. In addition, they also checked to see if the prices of the town's goods brought by the farmers were fair. The officials imposed taxes in the form of forest products on the spot (Brosius, 1999). From the government, the district officers, the medical bureau, the agricultural bureau, and other related organizations went to the site. The government acted as a supervisor, coordinating the interests of the gatherers and the farmers and promoting consensus building. In the *tamu*, which lasted for several days, communication between government officials, the Penan people, and the farmers took place. *Tamu* was the only opportunity for the Penan people to communicate their problems to the government. The government could also get information on residents in the backcountry. The Penan were said to have welcomed the presence of a supervisor (Langub, 1984). At the end of each *tamu*, the participating groups would perform a dance to entertain all the participants. *Tamu* were places of exchange that became established in nature and society, and at the same time they were meeting places and places of cultural celebration.



Figure 3: Agarwood



Figure 4: A villager checking there are resins by putting a small cut in the agarwood-producing tree bark



Figure 6: Obsidian from Shimosuwa, Nagano



Figure 7: Obsidian as a kitchen knife

Since the 1970s, there have been no government-sponsored *tamu*, but trade is still conducted on a daily basis. In one of the village of farming neighbors Penan come to sell meat and wild plants. They carry meat with rattan-knitted baskets. They enter the farmer's house and sit on stairs. In trading meat the farmer measures the weight with the scale and then pays the price on the spot. On that occasion, the farmer pat the Penan on the back, while the Penan do not thank for the rewards. Penan accept the money as a matter of course. This kind of attitude of the Penan is accepted by the farmers. The Penan language is used exclusively in their conversations. The farmers seem to see the Penan as equivalent to children (Janowski, 2003). Although Penan are physically smaller than farming neighbors, but the neighbors acknowledge that the Penan are excellent in terms of physical strength and agility. It is widely known that Penan people are experts in harvesting forest products (Kanazawa, 2017).

Among the forest products, agarwood in particular is a valuable source of income for the Penan people. Agarwood, which is found only in the rainforests of Southeast Asia, is derived from trees of the genus *Aquilaria* of the family Thymelaeaceae. On rare occasions, resin oozes from part of the trunk of the tree and forms a black mass. The black mass is agarwood (Figure 3), and when it is lit and made to produce smoke, it gives off a clear and ethereal fragrance. The Penan people have practiced a sustainable harvesting method where only the resinous parts are cut off and the standing trees remain (Figure 4).

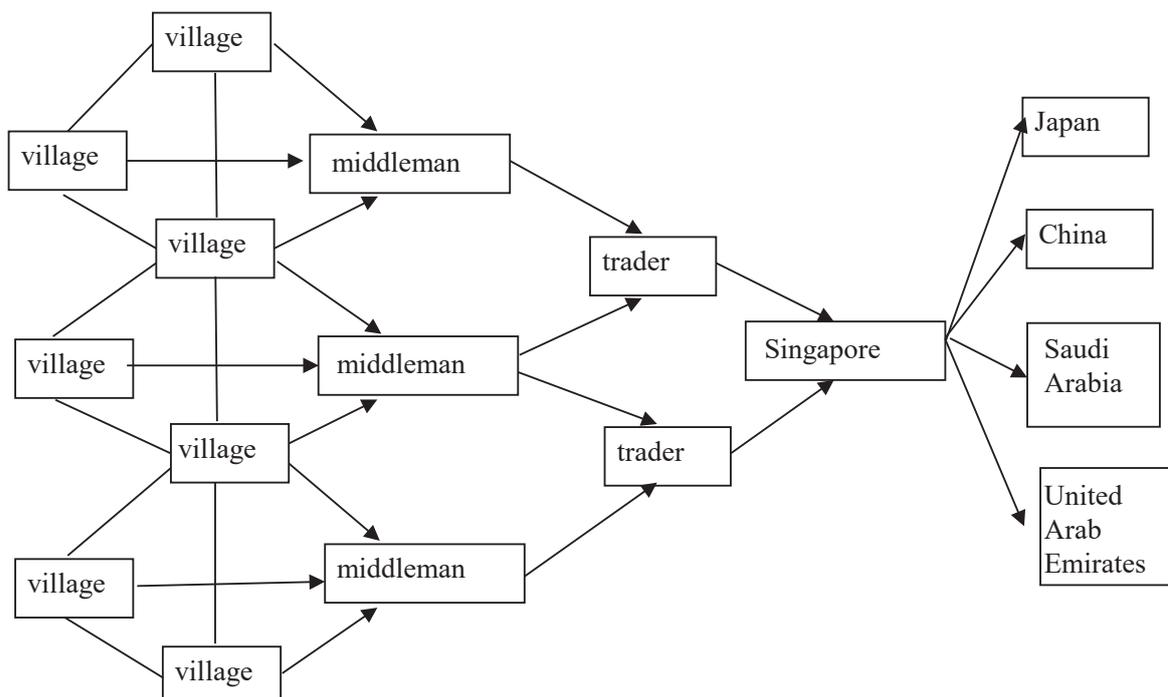


Figure 5: Agarwood distribution system

Agarwood is deeply related to Asian society, culture and religion, and its market value is extremely high. Natural agarwood is a forest product obtained only from the primary forests of tropical Asia. In other words, if good forest condition are maintained, their cash income opportunities are guaranteed. The author once witnessed the purchase of agarwood. Often a familiar farmer-broker from the neighborhood will come, but there are several other brokers as well. In places with easy access, such as near an airfield, Chinese merchants from distant towns sometimes come directly to the village. The middleman picks up the actual product, assesses the grade (quality) on the spot, and buys it in cash. The Penan people remember the buying price of each middleman and, in some cases, have the initiative to choose a middleman. A middleman who has been visiting Penan villages regularly for the past 30 years told that without a relationship of trust with the Penan people, business would not continue. Information is routinely shared among the Penan communities, and the reputation of the middlemen is also a topic of discussion. Agarwood is exported to Middle Eastern countries, China, Japan via Singapore through the town's traders (Figure 5). Compared to timber, forest products such as agarwood have a history of being traded at far more reasonable prices without damaging the forest ecosystem, and the profits have been returned to those involved in the forest for many years. One of the main reasons why the distribution system for non-timber forest products has been in place for so long is that the parties involved have shared certain standards that must be adhered to environmentally, economically, and socially. However, in recent years, there have been concerns about the excessive harvesting of agarwood by outside intruders, resulting in over-cutting and quality deterioration (Kanazawa, 2017).

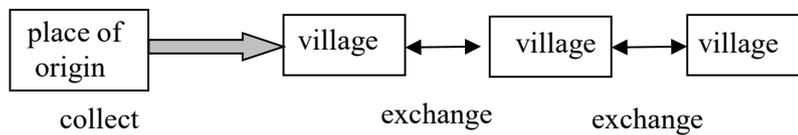
JOMON EXCHANGE: OBSIDIAN

From the Paleolithic to the Jomon period, people used stone to capture animals for food, to cook, and to perform various tasks. Typical stone materials include obsidian, siliceous shale, sanukite, andesite, and gero stones. Obsidian is a naturally occurring glassy rock that is formed when magma cools rapidly (Figure 6). It is easy to use as a sharp blade (Figure 7). A spear mounted with obsidian was used as a hunting tool in the Paleolithic period. By the Jomon period, the main hunting tool was the bow and arrow, and stone arrowheads were attached to the tip of the arrow. Obsidian was useful because the edges of the flakes were sharp and the fine processing adjustments required for the arrowheads were possible. In recent years, advances in physicochemical methods have made it possible to estimate the origin of obsidian with a certain degree of accuracy. By combining physical and chemical evidence of origin and distribution, the movement and distribution of stone materials and stone tools became clear, providing a clue to the history of Jomon society without written records (Kuzmin, 2010; 2020).

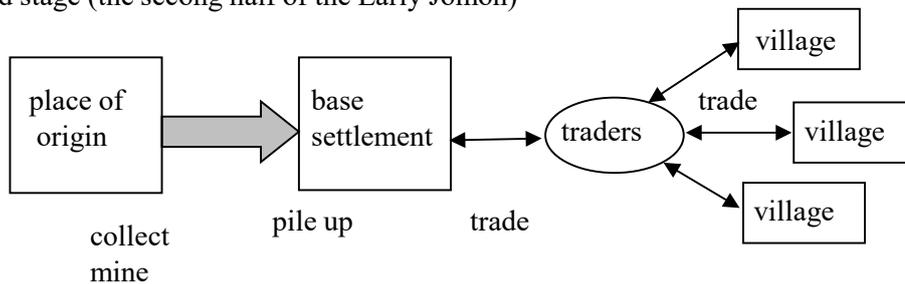
Before the early Jomon period, hunter-gatherers were self-sufficient in procuring stone, but they gradually came to regard stone as an object of trade. Let us take the trade route of obsidian from Nagano as an example (Daikuhara, 2002; 2007) (Figure 8). Obsidian was concentrated in settlements at the foot of the mountains and then dispersed to various places. Going by the numbers of obsidian unpolished stones, stone nuclei, and flakes, large settlements tend to have more obsidian and smaller settlements to have less. When Nagano obsidian was distributed to the Kanto region, the relay routes were Gunma and Yamanashi. Focusing on the chain of stone tool manufacturing processes, the early Jomon period can be roughly divided into three stages. The exchange system of the first stage (the first half of the Early Jomon) is considered to be a reciprocal exchange system or a reciprocal chain exchange system in which multiple groups repeatedly exchange goods. In the second stage (the second half of the Early Jomon), the shape of the stone arrowheads changed from slender to wide, and the production techniques also changed. In the western part of Gunma, large-scale circular settlements such as the Nakanotani Matsubara site emerged as relay hubs for distribution. It can be inferred that trade was no longer conducted through reciprocal exchange, but through the active intervention of traders in the hub villages. In the third stage

(the beginning of the Middle Jomon), large-scale relay centers such as the Tenjin site appeared at the southern foot of Mt. Yatsugatake. In addition, relay sites such as the Hanadoriyama site in the Kofu Basin and the Matsubara site in the Nagano Basin were established, and their respective distribution routes were developed. Since there are many examples of Yamanashi earthenware being brought into remote areas during this period, it is possible that trading groups from Yamanashi traveled to various areas to operate temporary markets. It is believed that there was the existence of large exchange network between the central highlands of Nagano and the Tokyo area (Tsutsumi, 2010). There is also a hypothesis that there were “Jomon merchants” who dealt in jade, amber, asphalt, etc. in addition to obsidian (Koyama and Okada, 2000). As trading groups came and went more frequently, and as multiple trading groups competed with each other, the place of origin and base settlements would have sought more reasonable compensation from their trading partners. Like the evaluation of the grade (quality) of agarwood, obsidian was also sorted and managed according to size and quality. As trade became more active, not only exchange of information on the places of origin, distribution, stone tool production, etc. but also human interaction must have progressed.

1st stage (the first half of the Early Jomon)



2nd stage (the second half of the Early Jomon)



3rd stage (the beginning of the Middle Jomon)

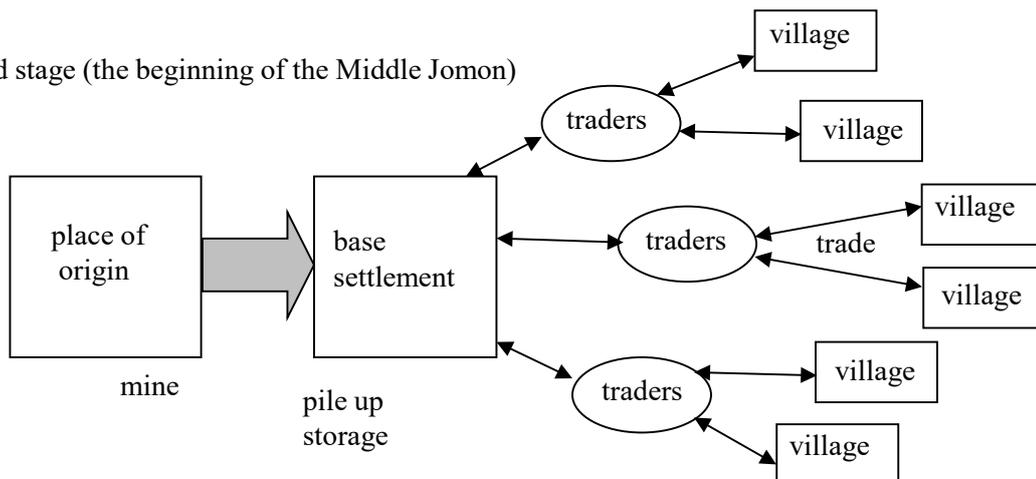


Figure 8: Obsidian distribution system (modified and redrawn from Y. Daikuhara 2002: 120-121)

CONCLUSION

Both the Borneo and Jomon-period peoples aspired to a nomadic lifestyle with low population density in a rich natural environment. They are basically self-sufficient in food, and in the case of the Penan people they have been able to secure food from plants called the sago palms, and from tree nuts in the case of the Jomon people. In each case, starch is extracted by using a clear stream of water or by making a structure that is solid to some extent on the water's edge. In addition, processing work to preserve starch, such as drying and milling, is carried out jointly. They truly have been societies that guaranteed the distribution of resources with 'no one left behind.'

When multiple people live together and a framework for the village is established, interaction begins not only within the village but also with the outside world. The older Penan people still remember the custom of the *tamu*. For these forest product gatherers, the *tamu* was a valuable source of income and information. On the other hand, once it became possible to estimate the place of origin of obsidian, it became possible to clarify the relevant distribution routes, trading groups, and stone tool making techniques. It is probable that obsidian was exchanged for an appropriate price under a certain quality control. In addition, trade was a place for exchanging information with face-to-face contact, and it was also a pattern of exchanges that was repeated through goods. In the Jomon period, social networks between regional groups had already been formed. What was the relationship between people and the environment like in the past? And what kind of state is it currently in? As seen in the social history of indigenous peoples, in the performance of buying and selling things, it is necessary to include the wisdom and imagination to know the flow of where things originally come from and where they go in the whole process.

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