Regional Variation in Jomon Hunting-Fishing-Gathering Societies

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The Jomon Period

The available data suggest that Jomon subsistence economy was primarily based on wild resources, even though it was regionally diversified. Since the Jomon Period saw the development of extremely sophisticated pottery techniques and various polished stone implements, it is called neolithic by name. But unlike the neolithic subsistence patterns in Europe and West Asia, however, the Jomon people should be defined as collecting/foraging hunter-fisher-gatherers who practiced intensive collection of a wide variety of natural resources, with a possible use of cultivated plants in some areas in later periods.

The succeeding Yayoi Period witnessed the appearance of a settled life of rice agriculture. However, the initial appearance of rice cultivation in Japan is regarded as the product of diffusion from the continent during the final stage of the Jomon Period, around 3000 bp.

In this study, I intend to demonstrate that there was regional variation in Jomon hunting-fishing-gathering societies, and also a differential preadjustment for receptivity to rice agriculture among Jomon societies, spanning the period from about 2500 to 300 bc, the time immediately preceding the transition from Jomon hunting-fishing-gathering to Yayoi rice cultivation.

Regional Diversity in Jomon Hunter-Fisher-Gatherers

A number of significant differences characterize Jomon groups, in the areas of population density (S. Koyama 1978), tool-kits (T. Akazawa and K. Maeyama 1986; T. Akazawa 1988), and dietary patterns (Z. Roksandic et al. 1988; M. Minagawa and T. Akazawa 1993).

This study investigates the question of why these phenomena arose in Japanese prehistory, through an examination of several Jomon hunter-fisher-gatherer subsistence strategies. It is concluded that regional variation in procurement systems of the Jomon hunter-fisher-gatherers gives us a reliable perspective from which to explain divergent paths to the regional diversity in Jomon culture.

First, the literature on three major subjects: (a) Jomon population, (b) Jo-

mon tool-kits, and (c) Jomon dietary patterns is reviewed. These are closely related to the problem of cultural change from hunting-fishing-gathering to rice agriculture in Japanese prehistory.

Jomon Population

Among the differences noted, the most significant is regional variation in Jomon population density (5: Koyama 1978). The differing distribution and density of Jomon population between the lightly peopled western Japan and the more densely populated eastern Japan has often been explained as stemming from differences between the eastern and western forest zones in the amount and nature of available foods. Certainly, the Jomon people might be expected to exploit terrestrial plants with a high nutritional value (e.g., K. Suzuki 1979; M. Nishida 1980, 1983); however, most potential resources could only be exploited seasonally. In particular, all of the vegetable resources identified in Jomon deposits are seasonally specific.

Population size and density are closely related to the environmental productivities exploited by hunter-gatherers (e.g., D. Clarke 1976; S. Perlman 1980; D. Yesner 1980; F. Hassan 1981). However, the crucially important fact is that productivities should be measured in terms of a seasonal productivity year round and the procurement system associated with it (T. Akazawa 1986).

A higher population density in the coastal Jomon societies of eastern Japan can be explained by the existence there of a procurement system characterized by the year-round continuation of the broad spectrum subsistence strategy based upon several major foodstuffs, as developed in the transitional zones between two major ecosystems: forest and estuarine/Pacific shelf littoral (T. Akazawa 1980, 1981, 1982, 1986, 1988). By contrast, western Japan was less densely populated because the procurement system there was maintained by forest edible-plant productivity of various nuts and acorns which were highly concentrated only in autumn; western Japan lacked the overlapping functional combination of maritime and terrestrial productivities that operated in the eastern coastal regions (T. Akazawa 1986).

In other words, the higher population density along eastern Pacific coastlines (S. Koyama 1978), rather than being a consequence of high edible-plant productivity, was a function of the manner in which terrestrial resources were incorporated into the marine resource exploitation system; conversely, population density in the west was directly supported by terrestrial plant use. Thus, the differing distribution and density of Jomon populations between western and eastern Japan is explainable as resulting from variation in seasonal combinations of major productivities between the two areas.

Jomon Tool-kits

I summarize the results of site clustering by discriminant function analysis of two kinds of Jomon tool-kits, lithic (T. Akazawa 1982, 1986; T. Akazawa and K. Maeyama 1986) and fishing (T. Akazawa 1986). Approximately 200 sites representing the later Jomon Period, ca. 2500 to 300 bc., can be discriminated into four homogeneous groups using weighted combinations of the original variables. Figure 1 shows the synoptic chart illustrating the major geographical boundary of the later Jomon sites and the combination of artifacts demonstrating the results of the two discriminant function analysis (A, above timber line; B, coniferous forest zone; C, deciduous forest zone; D, laurel forest zone). Each group of sites discriminated by the same pattern of hunting-fishing-gathering equipment also displays a similar geographical distribution, that is, a geographical clustering.

Western Jomon sites are distinguished from other site groups by a weighted combination of six artifact types: stone querns, grinding slabs, grinding stones, chipped stone axes, and two types of stone sinkers. The analysis particularly stressed the discriminatory power of the chipped stone axes and stone sinkers. The frequency of these tools shows a high positive correlation within the site

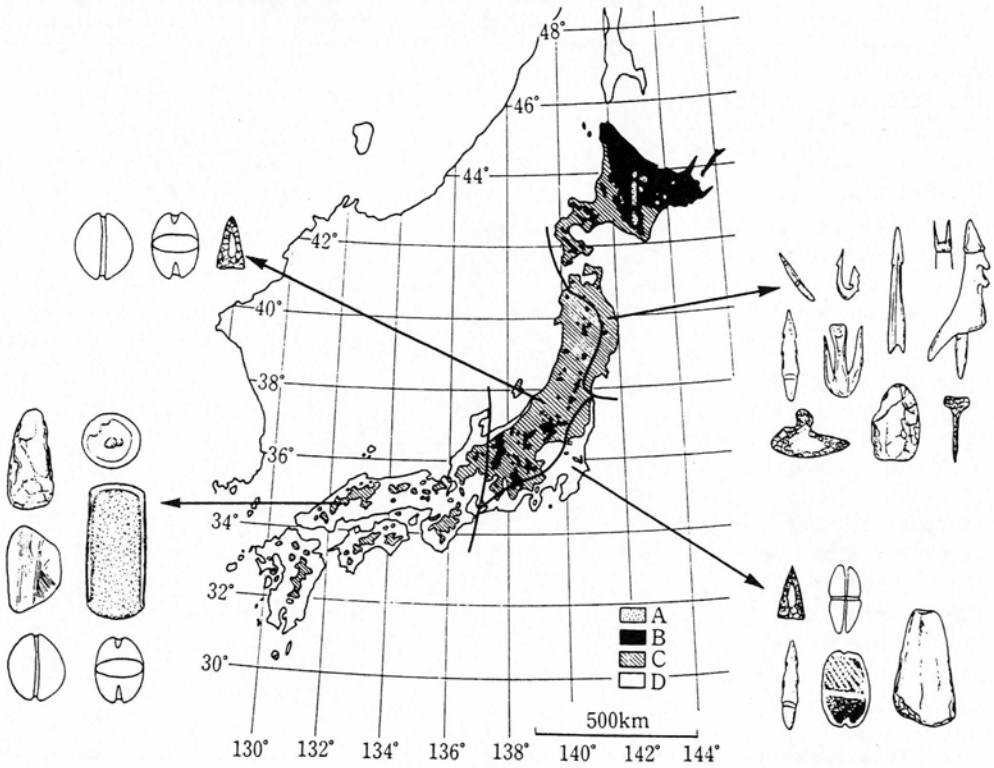

Fig. 1

group, while a series of fishing equipment made from bone and antler material shows a high negative correlation.

Eastern Jomon sites are divided into three geographical clusters based upon the well-defined discriminations (see also Table 1). The most distinctive characteristic of the coastal site cluster from northern Japan—that is from Hokkaido and Pacific coast of the Tohoku District—is a tool-kit composed of a great variety of artifact types. The site cluster is separated from others by the discriminatory power of stemmed scrapers, stone awls, flake scrapers, open and closed toggle harpoon heads, and one-piece anchor and composite fishhooks. In particular, the analysis stressed the discriminating variable of the toggle harpoon heads.

A second cluster of eastern Japan sites is distributed in the coastal lowlands of the Kanto and Tokai Districts of central Japan. The cluster is separated from the other clusters by the discriminatory power of stone projectile points, polished stone axes, and reused potsherd and grooved pottery sinkers. The frequencies of

	Western Jomon	Eastern Jomon		
		Inland and coastal area of Japan Sea	Coastal area Tokai and Kanto Districts	Coastal area Tohoku and Hokkaido Districts
Lithic assemblage				
Projectile point	+	++	++	+
Stemmed scraper	−	+	+	++
Awl	−	+	+	++
Flake scraper	+	+	+	++
Stone quern	++	+	+	+
Grinding stone	++	+	+	+
Grinding slb	++	+	+	+
Chipped stone axe	++	+	+	+
Polished syone axe	+	+	++	+
Fishing gear assemblage				
Toggle harpoon head of open socket type	−	−	−	++
Toggle harpoon head of closed socket type	−	−	−	++
One-piece fishhook	−	−	+	++
Fishhook of anchor type	−	−	−	++
Composite fishhook	−	−	−	++
Spear point	+	+	++	++
Reused potsherd sinker	−	−	++	+
Grooved pottery sinker	+	+	++	−
Grooved stone sinker	++	++	−	−
Notched stone sinker	++	++	−	−

Table 1

reused potsherd sinkers and projectile points show a particularly positive correlation in this site cluster. In addition, the tool-kit of this site group, as inferred from the archaeological research to date (e.g., H. Kaneko 1971; M. Watanabe 1973), includes bone and antler spear heads in significant proportions.

The final cluster of eastern Jomon sites, which is distributed in the interior and along the Japan Sea coast of eastern Japan, is distinguished by an intermediate combination of variables from the western and eastern clusters. Indeed, this group is discriminated by projectile points and two types of stone sinkers, which are discriminators for the eastern coastal sites of the Kanto and Tokai Districts and the western sites, respectively.

Based upon the well-defined discriminations of Jomon assemblages, there is a strong possibility that specific tool-kits were developed in different areas. Furthermore, if intersite artifact variability was due to differences in activity in different environments, it seems probable that all sites in a cluster defined by identical tool-kits underwent a similar process of adaptation to the environment.

In order to evaluate this postulate about the significance of area-specific interassemblage variabilities in Jomon societies, it is necessary to learn about the environmental conditions of the exploited areas in which these tool-kits were utilized. In delineating different territorial models for these four site clusters, it should be mentioned that geographical analysis of the Jomon sites discussed here shows that they were located in transitional zones between two or more diverse environments, for example, between mountainous forests and maritime settings. Based upon location patterns of this kind as well as deposits at the sites, the three exploitational territories are discernible; a combined forest-freshwater ecosystem, a combined forest-estuary ecosystem, and a combined forest-Pacific littoral ecosystem (T. Akazawa 1986).

Jomon Dietary Pattern

Here, I review the studies of dietary differences among Jomon hunter-fisher-gatherers, as demonstrated by the carbon and nitrogen stable isotope compositions of fossil human bone samples (Z. Roksandic et al. 1988; M. Minagawa and T. Akazawa 1993).

Numerous food materials were utilized by Jomon peoples, but the major items which supplied energy/protein can probably be compiled into the following groups: plant, meat of terrestrial animals, shellfish, fish, and marine mammal. The carbon and nitrogen isotope ratios of these resources were reconstructed by analyzing comparable modern and ancient samples. Based upon these analytical results, carbon and nitrogen values of bone collagen of fossil human remains can be evaluated.

Fossil human bone samples (ca. 100 individuals) were derived from archaeological sites of coastal shell midden, except for the inland Kitamura and Yosekura sites in Honshu. For comparison with the Jomon data, several individuals of historic Ainu ethnicity from Sapporo and Susuya are also analyzed.

These sites are divided into two geographical groups: northern group in Hokkaido, and a Honshu group. The Hokkaido group is composed of Kitakogane (ca. 6000 bp, Usu (ca. 2000 bp), and Ainu (ca. A.D. 1500). The Honshu site group consists of two site groups: four coastal sites at Sanganji (5000 to 2500 bp), Kosaku (ca. 4000 bp), Tsugumo (ca. 4000 bp), and Todoroki (ca. 5000 bp), and two inland sites at Kitamura (ca. 4000 bp) and Yosekura (ca. 4000 bp). The depositional dichotomy in the Honshu site group is clear: the coastal sites are characterized by extensive shell midden deposit, whereas the inland sites of Kitamura and Yosekura are not distinguished by this type of deposit.

On the basis of the result of isotope analysis of nine individuals from the Kitakogane Jomon site (ca. 6000 bp) in Hokkaido, every individual locates very close to the marine mammals and large fish. The inhabitants seem to have developed a heavy dependence on marine resources. The two other sites in the Hokkaido group, Usu (ca. 2000 bp) and historic Ainu (A.D. 1599), show almost the same isotope features, suggesting a similar dependence on marine resources.

Samples from the Honshu Jomon sites of Sanganji and Kosaku (ca. 4000 bp) show similar isotope ratios among groups, although each site exhibited intrasite variation in individual bone measurements. The diet proportions of the Kosaku Jomon people generated by the Monte Carlo simulation showed the proportional mixing of several main isotope sources representing terrestrial and marine resources. Both of these human groups lived close to the Pacific coastline. At the time of the Jomon Transgression when the sea level stood higher than at present, it appears that both the Sanganji and Kosaku shell midden sites were located along the embayment conditions.

On the other hand, the isotope data of the inland sites at Kitamura and Yosekura showed the lowest carbon and nitrogen content observed in all examinations. The nitrogen isotope ratios of these samples were almost at the same level as those of herbivores such as wild boar and deer. The result of Monte Carlo simulation studies for the Kitamura people suggests heavy dependence on plant resources.

Clearly distinguishable differences between the two Hokkaido sites and the Honshu site seem to correlate with the geographic location, which also distinguish the flora and fauna of Hokkaido and Honshu, separated by the Tsugaru Straight. Protein sources for Honshu Jomon peoples and Hokkaido hunter-fisher-gatherers were obviously different. The Kosaku and Sanganji groups had a similar

dietary pattern, one comprised of plant, meat and marine foods. On the other hand, Hokkaido groups seem to have depended heavily on marine resources, especially large marine animals such as seal, dolphin, and tuna. This dietary habit agrees well with the archaeological evidence, which includes the bones of seals and dolphins as well as game fish.

Prehistoric hunter-fisher-gatherers in Hokkaido showed almost the same isotope features as do mammals, suggesting that humans and marine mammals shared a similar dependence on marine resources. Isotope similarity was also found between prehistoric Hokkaido groups and historic Ainu. These results indicate that a similar dietary pattern continued in Hokkaido throughout the last 6000 years.

Recent anthropological studies using morphological data have claimed that the historic Ainu show close similarity with the Honshu Jomon, including the Tohoku Jomon series (B. Yamaguchi 1982). If Jomon and Ainu peoples shared a common ancestor as these studies indicate (C.G. Turner 1976; L. Brace and M. Nagai 1982; B. Yamaguchi 1982; K. Hanihara 1983), then the differentiation of dietary habits found between northeast Honshu Jomon and Hokkaido hunter-fisher-gatherers suggests that their dietary habits were different since at least 6000 years ago. This hypothesis premises that the historic Ainu originated from a people who were the same as prehistoric Hokkaido hunter-fisher-gatherers such as Kitakogane and Usu groups. The dietary patterns appear to support this assumption. If the separation of dietary patterns occurred in the early period when people were originating from Honshu to Hokkaido, the following question arises: what moved these people to develop their food ecosystems in different directions? Did the regional differentiation of subsequent developments result from adaptations to different natural environments? These questions should be considered in future researches.

In modern Japan, many hundreds of reports on salvage archaeology projects are published every year. But most of these are strictly raw data reports, lacking in any extensive analysis. It is most important to develop new methods for the analysis and synthesis of this great body of data, in order that it may become accessible for scientific discussion. It is hoped that my presentation today will prove useful in stimulating further research along increasingly sophisticated methodological lines.

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