

PROBLEMS OF CULTURAL CHANGE IN THE LATE AND FINAL JOMON

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ABSTRACT

The population decline and apparent cultural simplification which characterise the Late and Final Jomon sub-periods are examined using a model for the southeastern European early Neolithic. The emphasis is on internal social transformations of Jomon culture, rather than on external environmental pressures.

The traditional, dominant archaeological approach to the decline in cultural complexity which characterises the end of the Jomon period has emphasised the role played by environmental stress. Studies of the apparent population decline and relocation, the downturns in site density and decreases in cultural complexity which occurred during the Late and Final Jomon have commonly interpreted these phenomena as the results of resource pressure and decreased productivity. Progress, expansion and social elaboration have been viewed as expected internal developments within an evolving society; interruptions of this unilinear path to socioeconomic success have been seen as aberrations, rooted in ecological influences external to Jomon society.

In contrast, recent approaches to the study of social fissioning during the Eastern European Neolithic have suggested that population dispersal and apparent cultural simplification may represent smaller-scale internal evolutions within early agricultural societies (Tringham and Krstić 1990). This approach no longer assumes that sedentary, agricultural populations are on a certain trajectory to success and expansion, but holds that increases and decreases in complexity may both equally be the result of internal social developments and decisions. Therefore, external impetuses are no longer necessary to explain why cultures fail to progress in a traditional, expansive manner; internal events may be sufficient cause for any changes.

APPROACHES TO SOCIAL FISSIONING

By far the majority of existing scholarly writing describes the cultural shifts in the Late and Final Jomon as responses to a changing environment (cf. Ikawa-Smith 1992; Kaner 1990). Decreased population levels and settlement relocations are considered to be the results of a cooler climate and a receding seacoast. This model functions solely on a macroscale level, as ecological alterations affect populations *en masse*. In contrast to such external explanations, however, increasing numbers of archaeologists have begun to discuss causes for change which are internal to societies. Probably the most commonly used framework for explorations of internally caused change is the scalar stress model, which proposes that particular forms of social organisation are only functional for limited populations with finite requirements as to quantity of information flow. When populations grow beyond certain levels, or economic intensification and complication proceed beyond a certain point and require increased intrasocietal communication, then these social strategies are incapable of coping with the new burdens and must either reinvent themselves or fail under the pressure.

A relatively recent extension and elaboration of this model, designed for use with the supposed collapse of the complex Neolithic culture of Eastern Europe, argues that the changes which appear so dramatic in the archaeological record may represent a reworking of the domestic mode of production resulting from increasing sedentism, population growth, intensification of production, and a reworking of the social relations of production (Tringham and Krstić 1990). According to this model, as social complexity increased and differentiation of access to resources became more and more pronounced, the hoarding of power became increasingly intolerable, especially when it was aggravated by population overgrowth and during times of resource stress. Furthermore, the social *status quo* began to prove itself incapable of continued growth, as intragroup information flow, organ-

isation, and decision-making structures reached their cultural carrying capacity. The solution to these problems was social fissioning. Perhaps initially undertaken as a temporary solution, it nonetheless became a permanent new way of life (Tringham and Krstić 1990).

One very important implication of the Tringham and Krstić approach is that it is based on the idea that "transformations in the productive process are the result of transformations in the mode of social formation and not vice versa" (Tringham and Krstić 1990:578). In other words, the development of social organisation is responsible for economic change, rather than the more commonly held other way around.

In addition, the Tringham and Krstić model of change does not regard cultural transformations as taking the form of alternating periods of continuity/stability and discontinuity/instability, as traditional models do. According to these models, the overwhelming bulk of cultural change and innovation takes place during periods of discontinuity, whereas little of cultural import takes place during the intervening times of stability (Tringham and Krstić 1990:573). There is an implication that there must be some cause for the periods of change, as generally a culture will coast along in a relatively stable fashion until something propels it into an era of innovation. External factors such as migration or climatic change are most commonly held up as the catalysts for such change; in the case of the Jomon, environmental factors are held responsible.

Such a simplistic model of externally inspired cultural punctuated equilibrium is not used in the Tringham and Krstić model. According to this approach, cultural evolution is actually a "process of significant and continuous transformations of society" (Tringham and Krstić 1990:575). Changes are not viewed as occurring in clumps during spurts of innovation, but as more gradual and progressive, as people are constantly remodeling their society in daily life. Therefore, this model not only allows but indeed requires consideration of data on a smaller scale than the ecological models do; the finer-grained the analysis, the more precise the interpretation can be.

THE MIDDLE, LATE AND FINAL JOMON CULTURES

The Jomon period of Japan (c. 13,000-2300 BP) lies between the Paleolithic and the Yayoi periods and is roughly analogous to the Western definitions of the Mesolithic and the Neolithic (Kaner 1990). Although the first scientific excavation of a Jomon site took place in 1879, under the direction of E.S. Morse, the first systematic, pottery-based chronological study of the period was not provided until Yamanouchi's work in 1937 (Kato 1987). Current scholars generally divide the Jomon into six-sub periods: Incipient

Jomon (c. 13,000-9500 BP), Initial Jomon (c. 9500-6100 BP), Early Jomon (c. 6100-4800 BP), Middle Jomon (c. 4800-4000 BP), Late Jomon (c. 4000-3000 BP) and Final Jomon (c. 3000-2300 BP) (Habu 1996). The Incipient, Initial and Early Jomon lie outside of the scope of this paper, which is concerned with the Middle, Late and Final Jomon periods, or approximately 4800-2300 BP.

The Jomon is widely considered to be the culture of complex hunter-gatherers in the Japanese archipelago. The Jomon economy relied primarily on hunting, gathering, fishing and collecting, and over 300 species of edible plants and animals have been recovered from Jomon sites, including nuts, seeds, fruits, birds, reptiles, land and sea mammals, fish and shellfish (Aikens and Higuchi 1982; Akazawa 1982, 1986, 1987; Bleed *et al.* 1989; Habu 1995; Hiraguchi 1992; Koike 1986; Suzuki 1986). Regional economic variations, such as the emphasis on marine resources in coastal areas, correspond roughly with environmental zones (Akazawa 1986; Crawford 1983). Chronological economic variations include the advent of dependence on sea mammals in the Late Jomon of northeastern Honshu (Crawford 1983).

In addition, beginning in at least the Late Jomon, some plant cultivation was also taking place (D'Andrea *et al.* 1995). Many scholars believe that cultivation was taking place considerably earlier, possibly even in the Early Jomon, due to such evidence as the presence of buckwheat pollen in an Early Jomon bog context (Crawford 1992; Kaner 1990), but there is no solid proof as yet. There is a general consensus, however, that some form of food production was gradually developing during the second half of the Jomon period, although foraging remained the dominant subsistence strategy throughout the period (Crawford 1992). More significant for studies of the effects of economy on culture are the variety of hunting-gathering adaptations which have been identified in different regions within Japan (Kaner 1990).

Jomon settlement systems as a whole are not yet well understood, and they appear to have varied considerably throughout both time and space (Habu 1996). Even sites within a single small area may display impressive variability (Kaner 1990). Along the coast, shell mound sites are quite common, as are village sites in inland areas (Kaner 1990). Exchange probably linked sites in these different areas. Within settlements, pithouses are characteristic, although again their form is quite variable, and they are not found in every site. Surface structures are also known, and hearths and storage facilities have been identified at many sites (Habu 1996; Kaner 1990).

The Jomon provides the earliest evidence for ceramics anywhere in the world, with pieces in the vicinity of 12,500 years old (Aikens and Higuchi 1982). Radiocarbon dates on

pottery from the Fukui rock shelter are as old as $12,700 \pm 500$ and $12,400 \pm 350$ bp, while another from Kamikuroiwa goes back to $12,165 \pm 600$ bp, and one from Iwashita is $11,300 \pm 130$ bp (Kato 1987). Other dating methods have confirmed the extreme age of Jomon pottery as well: fission-track dates on raised-band pieces from Sempukuji cave and the Fukui rock shelter are 10,800 and 9,800 BP respectively, while thermoluminescence dates from the same two sites place the Fukui rock shelter pottery at $13,970 \pm 1,850$ BP and the Sempukuji material at $12,170 \pm 1,170$ and $11,370 \pm 760$ BP (Aikens and Higuchi 1982; Kato 1987). The dates from the three different methods do not correspond precisely, but all confirm the antiquity of Jomon ceramics (Kato 1987).

Jomon pottery reveals both regional patterns of variation and pan-Japanese trends through time (Kobayashi 1992). In broad terms, the Middle Jomon is characterised by deep vessels ornamented with cord-marked and elaborate sculptured motifs, the Late Jomon by a wider range of vessels decorated with zoned cord-marking, and the Final Jomon by still a wider variety of forms adorned with zoned cord-marking, broad-line incision and plain polished surfaces (Aikens and Higuchi 1982). Throughout the period clay figurines were made, although the styles changed (Nagamine 1986). Potsherds were often remade into notched sinkers for fishing, although stones were also commonly shaped for this purpose (Aikens and Higuchi 1982).

Lithics of the Jomon period include small, triangular projectile points in the Middle Jomon and stemmed and leaf-shaped points in the Final Jomon, as well as both simple and hafted scrapers, knives, and roughly flaked celts which are widely termed "axeheads" but which probably functioned as digging tools (Aikens and Higuchi 1982). Common ground stone tools include grinding slabs, mortars, and battered and abraded stones which probably acted as handstones for grinding, hammers, and general utility tools (Aikens and Higuchi 1982). Pumice was used for net floats, while, as mentioned above, both ceramic sherds and stones were used to make notched net sinkers. Sandstone slabs with grooves worn into their surfaces were involved in bead manufacture (Aikens and Higuchi 1982). At the very end of the Jomon, reaping knives like those of the following Yayoi period became common (Aikens and Higuchi 1982).

Artefactually, the Jomon is characterised by not only ceramics and lithics, but also by worked wood, bone, antler and shell, as the excavation of waterlogged sites has revealed (Kaner 1990). Bone and antler harpoon heads are particularly common (Groot 1951). In addition, Jomon lacquer objects are deservedly famous, and range from pottery to bows to ornaments. Overall, Jomon toolkits appear to have been regionally functionally differentiated (Kaner 1990).

The Middle Jomon sub-period, identified at such sites as Yosukeone, Togariishi, Idojiri, Fudodo, Mizukamidami and Kasori (Aikens and Higuchi 1982), is characterised by sites with rectangular houses with an average floor space of around 16 m^2 and square and round dwellings of about 12 m^2 . Such houses are estimated to have sheltered between four and eight people each. Deep post-holes and central fireplaces characterise the dwellings (Kenrick 1995). It is estimated that the large Middle Jomon villages may have held from 60 to 80 people at a time (Aikens and Higuchi 1982; Kaner 1990). This sub period is considered by many scholars to have represented the height of the Jomon culture, as settlement size and population reached their peaks during this time, while declines from this peak are perceived both earlier and later (Kaner 1990). Koyama estimated that only 21,900 people lived in Japan during the Initial Jomon, but he believes that in the Middle Jomon there might have been around 262,500 inhabitants in the islands (Koyama 1976, 1978). This translates to an impressive Middle Jomon population density of around 1 person per km^2 , in contrast to around 7 people per 100 km^2 for the Initial Jomon (Kato 1987).

The Middle Jomon population was heavily concentrated in eastern Japan, where site numbers had increased dramatically from the Early Jomon. Approximately 96% of the population is thought to have lived in the east: 250,000 people, in contrast to the 10,000 in the west (Kato 1987). In the Kanto and Chubu regions, population density may even have reached 2-3 people per km^2 , an extraordinary figure for a hunter-gatherer society (Kato 1987). This extreme density of site distribution in the middle of Japan suggests continuous communication between the mountains and the coasts, as well as between the Pacific coast and the Japan Sea regions (Kato 1987).

Population levels within Japan fell during the Late Jomon, and settlements became smaller, although the quantity of monumental construction rose. In northeastern Japan, large stone constructions and stone-marked cemeteries became relatively common; several hundred have been identified in the Yoichi area of Hokkaido alone (Crawford 1992). Late Jomon earthworks have also been found (Crawford 1992). On the domestic level, houses were generally built according to a reasonably uniform pattern of size and shape (Crawford 1992). Generally, less pottery per dwelling has been found than had been the case in the Middle Jomon, although there were still clusters of medium density. Pottery vessels from throughout Japan began to resemble each other more closely, which may indicate that there was an increasing standardisation not only of form but also of function. Kenrick (1995) considers the Late Jomon to have been the first sub period in which pottery may have been made by specialists.

Furthermore, the increasing standardisation beyond the local level suggests that the level of contact between communities remained constant or increased. Sites at which the Late Jomon has been identified include Omori Shell Mound, Manza, Nonakado, Taigi, Kurobo, Ko, Nakura, Sogaito, Satogi, Kokura, Ota, Tsugumo, Minogahama, Osagata, Shinpukuji Shell Mound, Horinouchi Shell Mound and Todor Shell Mound (Aikens and Higuchi 1982; Groot 1951).

In the Late Jomon, in eastern Japan, and particularly on the mountainsides, sites decreased and became increasingly scattered. In the west, however, sites increased, forming a number of groups in the Setouchi and San'in regions. Kyushu as a whole was again densely covered by large-scale sites which formed two main centers, one southern and one northern (Kato 1987). Population decrease occurred especially rapidly in the Kanto and Chubu regions, while in the Tohoku area, the population shrank more slowly.

By the time of the Final Jomon, 52% of the entire Jomon population was centered in Tohoku, which suggests that the center of Jomon culture had shifted from the middle part of Honshu up to Tohoku (Kato 1987). The Final Jomon, known at sites including Kamegaoka, Obora, Sarugai, Shinpukuji, Wakudoishi, Tsuko, Harayama, Nakazuma Shell Mound, Amataki, Shigasato and Oishi (Aikens and Higuchi 1982), is characterised by a flourishing, increasingly regionally unified material culture of villages with large quantities of debris, elaborate, thin-walled pottery and pottery masks, and polished stone batons (Crawford 1992). Many Final Jomon artefacts and styles also reveal continually strengthening contact with the Asian continent. Cist-graves, jar burials, spindle whorls, stone reaping-knives, and possibly rice, appeared in Japan at this time (Aikens and Higuchi 1982). Continental influences were strongest and earliest in Kyushu, the only area which showed much influence from the mainland during the Jomon. Jomon pottery remained entirely indigenously in style throughout the rest of Japan during the Jomon. Also in the Final Jomon, some western Japanese pottery may be related to a style from the Chinese Shandong peninsula. Chinese-like ritual weapons were transmitted, and although none has yet been found, bronze mirrors and pedestalled bowls may have arrived as early as this as well (Imamura 1996).

The Final Jomon was also characterised by a further decline in population (Aikens and Higuchi 1982; Kato 1987). During this period, the Japanese population continued to fall until it was perhaps less than two-thirds of what it had been at its peak in the Middle Jomon, around 161,500 down from 262,500 (Koyama 1978). Since people were living in villages which had population densities higher than those

of earlier periods (Crawford 1992), site numbers plummeted everywhere except in the Tohoku region, which along with the Kanto and Chubu regions constituted the primary population centers of the period (Kato 1987; Kenrick 1995).

APPLICATION OF THE MODELS TO THE JOMON

Considerable study of the ecological context of the Jomon has been undertaken by several scholars (Tsukada 1986; Yasuda 1978). Marine and terrestrial environments have been reconstructed, climate, topography, vegetation, fauna, and sea levels have all been studied, and patterns of food resources been analysed. The resulting information indicates that the inland Jomon people occupied a mostly stable, mountainous landscape. Volcanic eruptions may have affected population levels from time to time, as may have earthquakes, and heavy precipitation and frost may have caused periodic flooding and landslides (Kaner 1990). Yet the environmental alterations which are credited with having had drastic effects on the Jomon population are not volcanoes or floods, but rather a series of marine transgressions related to tectonic activity and climatic change. These transgressions, together with changing sea temperatures, may have altered the patterning of environments suitable for marine-oriented subsistence. Shellfish and marine fish populations may have shifted, forcing the coastal Jomon people to move as well (Habu 1995; Kaner 1990). Beginning in the Moroiso phase of the Early Jomon, it was no longer possible to place the same emphasis on marine resource utilisation, so stressed coastal dwellers shifted to inland sites, thereby creating a situation of population pressure and stress in inland areas as well (Habu 1995).

In addition, and also affecting both inland and coastal populations, there was a climatic deterioration beginning during the Middle Jomon, easing somewhat during the Late Jomon, and returning during the Final Jomon (Sakaguchi 1983; Yasuda 1982). The climate in Japan cooled between 5,000 and 4,000 BP, and although conditions were warmer and moister from approximately 4,000-2,000 BP, they cooled again after that. These climatic changes affected the floral populations of Japan, as can be seen in pollen diagrams (Igarashi 1988). The altered floral environment would have affected Jomon subsistence both directly and through its effects on animal populations.

There is, therefore, evidence in the archaeological record for environmental change in the second half of the Jomon period, change to which the Jomon people must have reacted. Dispersion into smaller groups and shifts in settlement locations might well have been adaptive responses to the altered environment (Ikawa-Smith 1992). Yet then why didn't

these innovations occur simultaneously throughout Japan? Why did patterns of change vary from place to place? What were the actual intrasocietal effects of ecological pressure that forced people to choose new modes of life? These questions show that although ecological models for Jomon change are supported by data, they cannot stand by themselves, for they provide only partial explanations for what occurred. They do not allow consideration of macro-scale change as made up of smaller-scale social developments created, perceived and practiced by the Jomon people.

This gap is filled by the Tringham and Krstić (1990) model of change, which chooses to emphasise the role of social organisational developments over environmental ones in the cultural shift. Population growth, which is clear throughout the first half of the Jomon, is very important to the model, as is the possibility of increasing social differentiation in larger and larger groups. This model fits the Jomon data quite well. The Tringham and Krstić model looks at several elements which probably played significant roles in the cultural transformation: increasing sedentariness, population growth, production intensification, and change in the social relations of production. The prime mover among these various cultural sponsors of change is "difficult, and perhaps meaningless, to determine, especially with archaeological data" (Tringham and Krstić 1990:578). Evidence for each of these elements exists in the Jomon. The impressive degree of population growth in the earlier Jomon phases has already been noted; rising sedentism, subsistence intensification and changing social relations will now be addressed.

Perhaps the weakest element in this list of possible motivators for change is that of increasing sedentism. Although settlement data do suggest that levels of sedentism rose throughout the first half of the Jomon, the degree of change is not impressive. It is clear that some mobility persisted throughout the entire period, to the point that Habu (1996) has noted that settlement patterns from the Early, Middle, and Late periods in the Kanto and Chubu regions resemble those of the Early Jomon Moroiso phase. Evidence for increasing sedentism does exist, though. For instance, in the earliest phases of the Jomon, sites tended to be small, and only during the middle portion of the Early Jomon did larger sites begin to appear (Kobayashi 1992). During this time the first large pit-buildings and longhouses were also constructed. Some scholars have even argued that by the Middle Jomon, people "dwelt in substantial, comfortable homes arranged in stable, long-occupied villages" (Aikens and Higuchi 1982:185). The archaeological data do therefore suggest that there was an overall rise in sedentism up through the Middle Jomon, but further evidence is needed in order to determine whether these

changes were significant enough to have played an important role in the greater socioeconomic change of the Late and Final Jomon.

The evidence is much stronger for intensification of production within the Jomon. There is a scholarly consensus that the beginnings of Japanese plant cultivation took place during the Jomon, as was mentioned above, and intensification of foraging may also have occurred. Several scholars have argued that hunting intensified as the Jomon progressed (Ikawa-Smith 1992), and some have even proposed that hunting pressures grew severe enough to have had an environmental impact during the Late and Final Jomon (Koike 1986). However, as faunal remains do not preserve well in Japan's acidic soil, much discussion about them is hypothetical. As for development within the social relations of production, several scholars have discussed the possibility of arising occupational differentiation in the later phases of the Jomon (Aikens 1981; Akazawa 1986; Ikawa-Smith 1992; Keally 1984; Kobayashi 1992; Koike 1992; Watanabe 1983, 1986). Aikens (1981) has proffered a model for the development of a managerial elite as a part of the development of social complexity in the Jomon, along with population increase, increased sedentariness, and subsistence intensification. Watanabe (1983) has suggested that there was status differentiation linked to occupational differentiation, as possibly reflected archaeologically in shifting labour divisions and occupational specialisation. This idea is supported by Kenrick's (1995) proposal that the first ceramic specialists appeared in the Late Jomon. Watanabe (1986) has also put forth the idea that age groups may have been the basis of the division of authority and labour.

In addition, ritual can be interpreted as an institutionalised mechanism developed in order to integrate increasingly internally differentiated communities (Bar-Yosef and Belfer-Cohen 1989; Kuijt 1996). This is important in light of the fact that "increasing ritual is seen as one aspect of the increasing complexity evident in the Jomon period" (Kaner 1990: 46). Archaeologically, ritual practices are especially prominent in Middle Jomon villages in the Chubu mountains and Kanto, where supposed stone altars have been identified, along with elaborate burials and pottery, which, like much of the pottery of the Jomon period, is held to have a ritual aspect to it. However, ritual is thought to have become even more elaborated in the Late and Final Jomon (Ikawa-Smith 1992; Kaner 1990). If indeed religion does act as an integrative force within differentiated societies, then its increasingly visible position within the Jomon may support the idea that Jomon society was becoming more and more complex.

It is important to note, however, that as the Tringham and Krstić model views social development as a local, patchwork process, it is only to be expected that the pattern of rising stratification varied considerably between regions in both pace and nature. In the Jomon, an analysis of assemblages from several sites has suggested that there was significant variability in social differentiation patterns within the period (Keally 1984). Furthermore, Harunari (1986) has noted important differences in social organisation between eastern and western Japan and, more significantly here, between the earlier and the later Jomon. The evidence therefore indicates that there were multiple regionally and temporally varying patterns of social development within the Jomon, which is as predicted by the Tringham and Krstić model (Kaner 1990).

This paper, and indeed the Tringham and Krstić model, emphasise diachronic change over regional variability (Tringham and Krstić 1990). The importance of localised variation within the Jomon is not meant to be discounted, though. The Jomon was, after all, far from a unitary phenomenon. Yet although this fact lies largely outside of the scope of the approach taken in this paper, it does merge well with it when considered. As a matter of fact, the primacy accorded to internal developments in the Tringham and Krstić model provides a natural explanation for different patterns and paces of change in different areas of Japan during the Middle, Late and Final Jomon sub periods. No longer must regionally varied responses be explained away; rather, they are only to be expected, as different local expressions of the greater Jomon cultural pattern continue along their different trajectories.

CONCLUSIONS

Environmental approaches to the changes between the Middle and Late and Final Jomon sub periods are both appropriate and valuable. There was climatic change at the relevant time in Japan, and it is only to be expected that that change would have had some effect on the local population. In addition, environmental approaches have a great advantage over more historically contextualised approaches to the topic, because whereas the temporal and regional variability within the Jomon makes it very difficult to address internal societal causes for change shared throughout the many Jomon subcultures, the broad impact of external ecological forces throughout Japan is clear. Nonetheless, environmental approaches are necessarily limited in what they can address, inasmuch as they allow consideration of change only on a macroscale level, and also assume that humans act primarily in a reactive manner, making lifestyle changes only in response to prods external to society. Models which emphasise human decision-making capabilities are more true-

to-life, and require attention on a more microscale level. Therefore, the ideal framework for any discussion of cultural change will involve both the choices made by rational people and the effect that external stimuli might have had upon these choices. In the case of the Late and Final Jomon, such a framework reveals that environmental change probably interacted with scalar stress and with rising social differentiation to encourage social fissioning.

To conclude, it is interesting to note that a phenomenon similar to what took place towards the end of the Jomon period may have occurred in other simple sedentary societies elsewhere in the world. Population decreases and settlement shifts characterised the latter portions of both the European and the Near Eastern Neolithic, after middle Neolithic periods of cultural complexity and flourishing. Is it possible that early complex societies are peculiarly prone to such drastic rearrangements, and that the first occasion of a cultural peak may even trigger them? This makes sense if one uses the Tringham and Krstić model, which suggests that new levels of complexity can create problems in societies unprepared for dramatic growth and elaboration, resulting in cultural downshifts.

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