

みんなくりポジトリ

国立民族学博物館学術情報リポジトリ National Museum of Ethnology

The Last 10,000 Years in Japan and Eastern North America : Parallels in Environment, Economic Adaption, Growth of Societal Complexity, and the Adoption of Agriculture

メタデータ	言語: eng 出版者: 公開日: 2009-04-28 キーワード (Ja): キーワード (En): 作成者: Aikens, Melvin C. メールアドレス: 所属:
URL	https://doi.org/10.15021/00003403

The Last 10,000 Years in Japan and Eastern North America: Parallels in Environment, Economic Adaptation, Growth of Societal Complexity, and the Adoption of Agriculture

C. MELVIN AIKENS
University of Oregon

The aboriginal cultures of postglacial Japan and Eastern North America exhibit several significant parallels. In both areas forested environments of abundance fostered the growth of affluent foraging societies which developed sedentary lifeways, relatively dense populations, and the beginnings of social stratification.

It appears likely that in both areas a number of indigenous plant species came under human influence in the context of a stable and long-continued relationship between local societies and the economic species they depended upon. In both areas this dependable and productive forest economy supported societies of growing wealth and complexity. By the time of the Middle Jomon in Japan, and the Late Archaic/Early Woodland in North America, this woodland adaptation was at its zenith.

Exotic cultigens made their appearance in both regions at about this stage. Continental Asian rice appeared in Japan during the Final Jomon, and Meso-american maize appeared in the Eastern United States in final Archaic times. It is thought that the adoption of these (and other) foreign cultigens was made possible because native practices of cultivation were already well-advanced, providing a context in which the merits of the imported plants could be appreciated, and into which they could be readily adopted.

A central thesis of this paper is that these new species eventually achieved prominence as the bases of agricultural lifeways because societal complexity within the adopting cultures had previously reached a sufficiently advanced level, on the basis of the native forest economics, so that influential elites were in a position actively to demand increased production for social (and personal) purposes. The foreign cultigens—rice and maize in particular—lent themselves to mass production in a way that the native forest species did not, and they came to dominance in fueling the increasingly rapid economic and societal growth of the late prehistoric Yayoi and Kofun periods in Japan, and the Mississippian period in Eastern North America. In this argument, it is societal complexity that fosters the growth of agriculture, and not the reverse, as has usually been claimed. [Japan, Eastern North America, Affluent Foragers, Societal Complexity, Agricultural Adoption].

INTRODUCTION

Much attention has been given in recent years to the problem of agricultural origins, with inquiry focused mainly on the processes by which domestication advanced in certain primary nuclear areas of the world. Major parts of the world, however, came to be dominated in prehistory by crop complexes which were not native to them, and inquiry into the processes affecting agricultural expansion outside nuclear areas is clearly of importance to understanding the culture history of several major world regions. This essay addresses the question of agricultural expansion through a comparative examination of two regions which lay, respectively, at the edges of the great nuclear areas of China and Mexico: Japan and Eastern North America.

The existence of an agricultural economy has long been perceived as one of the fundamental preconditions for the growth of sociopolitical complexity. This paper explores the opposite thesis, that it is not necessarily the development or spread of agriculture which fosters increasing societal complexity, as has usually been argued, but rather that it is increasing societal complexity which creates a demand for expansion and control of the food supply, the response to which under certain conditions is the development of an agricultural economy.

The evidence from Japan and Eastern North America suggests that in both cases a two-stage process was involved in which exotic cultigens first diffused gradually and with little appreciable effect, in the context of affluent hunting-gathering societies that had already attained a quasi-agricultural level and were beginning to develop a significant degree of aggregation and complexity. Then, hundreds if not thousands of years later, these cultigens became incorporated into a process of sociopolitical expansion which resulted in their florescence as the economic base for the sociopolitical structure.

ENVIRONMENTS OF ABUNDANCE: JAPAN AND EASTERN NORTH AMERICA

Both Japan and Eastern North America are extremely rich in wild food resources. Forested mountains, rivers, coastal estuaries, and marine tidelands produced both variety and abundance. This was the situation in early historic times, and currently available information on paleoclimates suggests that the environments of both areas have been relatively stable for at least the past 8000 years. Earlier, between 8000 years ago and the end of the Pleistocene glacial age, about 10,000 BP, forests of northern type extended further southward in both regions than they do today, and there was glacial ice in the mountains of Japan and the Great Lakes areas of Eastern North

I thank the United States National Science Foundation for a fellowship grant which made possible a 12-month period of study in Japan during 1971-72, and the Japan Foundation for a grant which provided a 12-month study period in 1977-78. I especially thank Professor T. Higuchi of Kyoto University for his sponsorship, guidance, and aid of many kinds on both occasions.

America. Even then, however, a rich woodland biota was characteristic of both regions, although in a geographical distribution somewhat different from that of recent times. For the purposes of this discussion, it is legitimate, and sufficient, to consider that for the last 10,000 years the biotic settings of Japan and Eastern North America have been very similar to the environments of historic times in the same regions.

The forests of the Japanese Islands produced such large game animals as bear, deer, and boar, and such small animals as rabbit, badger, ermine, and fox, among many others. Many species of fish lived in the rivers, with the anadromous salmon common in the northern parts of the country. Estuaries and tidal flats along the coasts produced clams, oysters, and mussels of a number of different species, and sea birds also congregated in such areas. The bays and open sea yielded marine fish of many kinds, and seals and small whales as well. All these statements are equally true of Eastern North America.

Plant foods occur in enormous abundance and variety in the forests and along the coasts of Japan. Oak, walnut, chestnut, and other trees produce huge quantities of nutritious and eminently storable nuts. A listing of wild plants that provide edible seeds, fruits, roots, or greens would fill at least a page, and it does not seem necessary to labor this point further [see KOYAMA, this volume]. Again, it should be emphasized that these statements are equally true of Eastern North America.

The parallels in these two cases are not limited simply to the occurrence of the same or similar species in both Japan and Eastern North America. Patterns of species distribution tend also to be similar. Northern Japan is snow country, covered by mixed forests of conifers and deciduous hardwoods, whereas southern Japan is semitropical, dominated by broadleaf evergreen forests. Salmon ascend, or have ascended in historic times, all the major rivers of the north, and on the Japan Sea side of the country, their distribution once extended quite far to the south [see AKIMICHI, this volume]. Once again, it can be said that the same sort of environmental gradient occurs from north to south in the Eastern Woodlands of North America.

AFFLUENT FORAGERS: THE JOMON AND ARCHAIC TRADITIONS

The aboriginal cultures which developed in Japan and Eastern North America in postglacial times were remarkably similar in certain fundamental respects. In part this may be attributed to the historical fact that the immediate antecedents of both peoples were Palaeolithic or Palaeo-Indian hunters who belonged to an expansive Late Pleistocene tradition, which is attested across Eurasia, from the Atlantic to the Pacific, and which spilled into North America across the Bering Land Bridge in Late or Terminal Pleistocene times. More important, however, would seem to be the fact, outlined above, that the natural environments to which the early Japanese and Eastern American peoples adapted in postglacial times were so much alike.

The Jomon tradition may be said to begin with the advent of pottery, which appeared in Japan between about 12,000 and 13,000 years ago. This pottery occurs,

Between about 10,000 and 3000 years ago, Japan was dominated by a cultural tradition which seems to have adjusted quickly to the environmental changes attendant on the end of the Pleistocene period, rapidly achieving an essential maturity and stability in its adjustment to the natural environment, which it then retained for over 7000 years. Many archaeologists refer to the Jomon as a "stagnant" or "arrested" culture, but it can with greater justice be put in a much more positive light, as a particularly successful, balanced, and stable way of life, well-adapted to the conditions of the Japanese archipelago.

Hunting was an important aspect of the Jomon economy, as clearly indicated by the abundance of arrowheads found in Jomon sites. Flaked stone scrapers, knives and choppers are other indicators, and in those sites where bone is preserved, the hunting of deer, boar, bear, and various smaller animals is attested.

Fishing is represented by net floats of bark or pumice stone, girdled or notched stone net weights, and fishhooks, harpoon points, and leister prongs of bone or antler. Fish bones have been found in many midden sites, indicating that many species of both shallow and deep waters were taken. The remains of dugout wooden canoes are known from waterlogged Initial and Early Jomon sites, and a well-developed woodworking technology of axes, adzes, drills, and scrapers, which probably served in the manufacture of such craft, is represented everywhere. No special technology is identified for the collecting of shellfish, whose remains constitute the bulk of most coastal Jomon sites, but no doubt the ubiquitous Jomon pots served in the cooking and storing of shellfish, as of many other items.

The processing of nuts, seeds, fruits, and roots is suggested by the occurrence of mortars, pestles, milling stones, and mullers, although except for nutshells few archaeological traces of actual plant foods have been recovered so far. This situation is now changing, however, as researchers turn increasingly to flotation and water screening of archaeological sediments.

The Jomon settlement pattern centered around small hamlets or villages of substantial, circular or rectilinear, semisubterranean, single-family pithouses. The archaeological sites which represent these settlements typically reveal many house floors. Reliable estimates of settlement size are difficult to make, but in a few cases as many as 30 or 40 pithouse structures have been excavated at a single site, with surface indications suggesting that many more still lie buried.

Despite these numbers, however, it does not appear that Jomon villages, as they existed at any one time, were particularly large. In sites where numerous dwellings have been found, the structures often overlap one another, or are stratigraphically of different age. This evidence, complemented by evidence of differing pottery types, suggests that Jomon settlements were usually relatively small, but were occupied over long periods. Villages that were probably occupied over periods of several hundred years have been found in the mountains of central Honshu. At certain locations in the Inland Sea region there are even sites that were apparently occupied and reoccupied over periods of several thousand years.

Research so far has revealed little evidence of small auxiliary work sites or activity

stations located away from the main settlements. Quarry sites are one exception and small shell middens, apparently without dwelling remains, and which may have been only temporary gathering sites, have also been found. But by and large the evidence consists of villages, and in archaeologically well-surveyed areas, these occur at no great distances from one another. Thus it may be that the Jomon people were able to derive all their essential subsistence needs from within a rather small radius around their villages, so that no extensive supporting network of specialized activity sites was employed [see AKAZAWA, this volume].

Throughout Jomon times there is evidence of a gradual growth in societal complexity. One form this evidence takes is that of a general increase over time in numbers of ceremonial objects and artifacts reflective of personal status. More specifically ceremonial items also became increasingly numerous. A climax was reached during the Middle Jomon period in central Honshu, for which there is much evidence of a female figurine cult, and of ceremonialism oriented around household altars featuring phallic symbols of ground and polished stone. Stone jewelry, shell bracelets and other such items also became increasingly common at this time.

Architecturally, this growth in the social order is reflected by recent discoveries in Toyama Prefecture, on the Japan Sea side of central Honshu, of some very large structures which seem to occur at the center of settlements otherwise composed of standard single-family pithouses. The most impressive of these large Middle Jomon buildings is one at Fudodo, which measured 17 m in length and 8 m in width, and had a superstructure supported by 16 massive pillars ranged in two parallel rows down the length of the floor. The specific social implications of these large buildings will no doubt be discussed and debated for a long time but at the very least it is clear that they represent a concentration of energy and a level of organization of Jomon villagers' efforts not previously attested by the archaeological record.

The Archaic culture of North America's Eastern Woodlands developed along much the same lines as did the Jomon, after emerging out of the Palaeo-Indian tradition, between about 10,000 and 8000 years ago [DRAGOO 1976; TRIGGER 1978]. This time also saw the transition from environmental conditions characteristic of the Pleistocene glacial age to conditions roughly like those of the present. Few sites of the Early Archaic period have been fully investigated as yet, but such tools as flaked stone projectile points, knives, and scrapers suggest that hunting was important, while abrading stones and stone mortars indicate the processing of vegetal foods. Chipped and ground stone adzes, probably used in the making of wooden containers, dugout canoes, and dwelling structures, also appeared.

A more mature Archaic tradition appeared throughout the Eastern Woodlands by about 8000 years ago, and persisted thereafter to the beginning of the Woodland period, which began with the first appearance of pottery between about 4000 and 3000 years ago. Caldwell [1958] characterized the Archaic period as one of a highly effective adaptation to the abundant natural resources of the eastern forests, during which a high degree of cultural stability and (in some locations) sedentism was achieved. He referred to this phenomenon as the development of "primary forest efficiency."

That hunting remained an important aspect of the mature Archaic economy is shown by the common occurrence of projectile points in Archaic sites throughout the Eastern Woodlands. Flaked stone scrapers of various forms, flake knives, bifacial knives, and antler flaking tools were also common. The bones of bear, deer, elk, squirrel, otter, fox, and various other small mammals, found in many archaeological sites, indicate that both large and small game were hunted.

Fishing is directly attested by the bones of fish, and by such artifacts as girdled stone net sinkers, bone fishhooks, bone fish gorges, barbed bone or antler harpoon points, and leister prongs of bone or antler. A complex of adzes, wedges, gouges, chisels, drills, and other woodworking tools may have served for, among other things, the making of canoes, but to date no canoe remains have been recovered from Archaic contexts.

Middens composed almost entirely of shellfish remains are abundant all along the coasts of Eastern North America, and middens composed of freshwater mussel shells are perhaps equally common along the banks of many interior rivers. The Archaic people of Eastern North America were virtually without ceramics, but evidence suggests that they had developed a tradition of wooden and bark containers, and of basketry, to serve them in the carrying, storage, and cookery of the wild foods which they collected.

That the gathering and processing of plant foods was also a vital part of the Archaic economy is shown by the common occurrence of stone mortars, nut-cracking stones, and milling stones. The employment of flotation and water-screening techniques in archaeological investigations in the Eastern United States has also produced, in recent years, an abundance of direct evidence of vegetal food harvesting in the form of nutshells, seed coats, and other parts of a wide variety of plants preserved by charring and other circumstances.

The Archaic settlement pattern is not yet well-documented, but it is evident that many large sites with abundant remains, such as Lamoka Lake and Frontenac Island in New York State, or Indian Knoll in Kentucky, were major residential locations that were long used. In addition to such large, impressive sites are many more that are much smaller in size and variety of archaeological remains. It is believed that the general Archaic settlement pattern was one in which centrally located base camps or villages served as the main residential centers from which groups departed for brief periods in different seasons to carry out specific hunting, fishing, or other harvesting or work tasks. A number of sites interpreted as short-term fishing, hunting, and quarrying stations are known, for example.

The dwellings of eastern North America's Archaic people are so far clearly known from only a few examples. Though a number of sites give evidence of postholes, firepits, storage pits, and other features that represent the elements of houses, the precise forms of individual structures have been obscured by repeated rebuilding on the same sites until there developed such a profusion of features that often no pattern can now be discerned.

One of the first places where readily interpretable structural remains were found

is the Wapanucket No. 6 site, in Massachusetts [ROBBINS 1959]. At this site there were excavated six circular patterns 9–14 m in diameter that are believed to represent domestic dwellings. They were outlined by pairs of postholes, were built on the then-existing ground surface, and contained firehearths. Also present at Wapanucket No. 6 was a single, much larger structure some 20 m in diameter, which is thought to have been used for group social and ceremonial activities.

A trend in the direction of increasing societal complexity is evident throughout the Archaic period. One facet of this trend is shown by a gradual increase in indicators of personal status, such as bone pins and combs, polished stone pendants, shell gorgets, and other ornaments. There was also a growing tradition of increasingly elaborate burial ceremonialism, culminating in the Late Archaic with evidence of certain burials richly supplied with charms, amulets, and ornaments, some of which had been made of exotic types of stone and shell traded over long distances. Another indicator of growing societal complexity, or at least growing centralization of social functions, is the evidence just mentioned, of the large ceremonial structure at the Wapanucket No. 6 site, which is dated to about the beginning of Late Archaic times.

THE QUESTION OF INDIGENOUS AGRICULTURAL ORIGINS IN JAPAN AND THE EASTERN WOODLANDS

It is of great interest that in both Japan and Eastern North America there has arisen independently among modern scholars the thesis that the forest cultures of these two regions each gave rise to a native, indigenous agriculture which predated the importation of cultigens from China and Mexico, respectively. These ideas, which in both countries were first enunciated decades ago, have been pursued most seriously by Fujimori [1971] in Japan, and by Yarnell [1976] in the U.S.A.

The cultural facts which led both Japanese and American scholars to advance these interpretations are those which have emerged from the preceding review of the Jomon and Archaic cultures. In both cases the archaeological record shows a long history of a stable and essentially, if not fully, sedentary way of life, lived by a people who were intimately involved with, and no doubt intimately knowledgeable about, the natural biota of the territories they occupied. In both cases the archaeological record shows a growing richness in this way of life, which climaxed in the development of a rich ceremonialism and architectural indications of increasing societal centralization and organization.

One major reason for believing that the Jomon and Archaic traditions gave rise to agriculture is that the people who bore these traditions lived in the stable, secure, sedentary manner that by students of human cultures have long considered a definitive characteristic of agricultural societies. A second important reason for this belief is the growing recognition of archaeologists that the development of an agricultural way of life was a long-term process, which proceeded from a long-continued association with, and manipulation of, the plants and animals of the natural environment.

Over time, the gathering of the best of nature's products, and the nurturing of the wild populations that produced them, could lead to a quasi-agricultural relationship between people and the wild foods that sustained them. Given a stable, sedentary existence, it might then be only a short step, easily made by many local societies, to the planting and nurturing of those wild products in places selected or even prepared by the people involved. With that step, what we now recognize as agriculture would have come into being.

The argument has an appealingly simple, straightforward logic, and takes on added force when one considers the number of independent agricultural complexes known from around the world. To name only the most obvious and least controversial, these include crop complexes from the Middle East, Sudanic Africa, North China, Southeast Asia, Mexico, Peru, and the tropical lowlands of South America. Given so many worldwide inventions of agriculture, surely some general processes have been at work, and it is not implausible that they were at work in Japan and the Eastern Woodlands of North America, as well as elsewhere.

Unequivocal biotic evidence of the postulated Japanese and North American agricultural developments has, however, proven very difficult to obtain [ESAKA *et al.* 1972]. It is speculated, but remains to be fully demonstrated, that Middle Jomon people cultivated root crops and perhaps other items by slash-and-burn farming. From Middle Jomon sites have come a number of starchy cakes preserved by accidental charring, but they have defied all efforts to determine the original plant substance. Other indications of cultivation, although highly suggestive, are not enough to resolve the issue either [PEARSON and PEARSON 1978].

From a few Archaic and more immediately post-Archaic archaeological sites in the Eastern United States have come sunflower seeds (*Helianthus*), marsh elder (*Iva*), lamb's quarter (*Chenopodium*), and other species which many believe to have been native cultigens [STREUVER and VICKERY 1973]. The marsh elder seeds found in certain archaeological sites are larger than average when compared to present-day wild populations, and moreover they occur in some archaeological sites beyond the range where marsh elder grows wild today. Yarnell [1976] feels that these are good reasons for believing that marsh elder was cultivated by human populations. By association the other plants might be considered as cultivated species as well. The evidence is perhaps stronger than that for the Japanese case, but again it is not conclusive.

THE SPREAD OF EXOTIC CULTIGENS IN JAPAN AND EASTERN NORTH AMERICA

The question of native agricultural origins is further complicated because cultigens of clearly foreign source began to appear in Japan and in the Eastern Woodlands at about same time or very soon after the period during which the achievement of indigenous agriculture has been postulated for each area.

The Yayoi period succeeded the Jomon in Japan, and the Woodland period suc-

ceeded the Archaic in Eastern North America. The Yayoi was, of course, the age during which rice (*Oryza*), wheat (*Triticum*), millet (*Setaria*), and other plants of Chinese and Southeast Asian origin became the economic mainstays of Japan. The Woodland period saw the introduction, ultimately from Mexico, of squash (*Cucurbita*) gourd (*Lagenaria*), maize (*Zea*), and beans (*Phaseolus*) into the eastern United States.

By the end of the Final Jomon period, rice of continental origin was being cultivated in Japan. This is attested by the finding of carbonized rice grains in Jomon sites from Kyushu, and the rice was accompanied by a distinctive type of semilunar ground stone reaping knife that is widely associated with earlier rice-producing cultures on the continent. A reported identification of a single grain of non-native buckwheat (*Fagopyrum*) from an Early Jomon site of about 6000 years ago in Hokkaido should be treated with caution [CRAWFORD, HURLEY, and YOSHIZAKI 1978], but other claims for the presence of buckwheat and millet in Late Jomon times seem more plausible, and future evidence may validate them.

In the Eastern Woodland case, archaeological evidence has not yet established unequivocally that the postulated indigenous cultigens, especially marsh elder for, which the strongest case for domestication can be made, are any earlier than the earliest of the imported Mexican cultigens.

To restate and re-emphasize the crucial points developed so far in this discussion, it is believed that in both Japan and Eastern North America the achievement of a native agriculture either just barely preceded or overlapped in time the introduction of exotic cultigens from foreign sources, ultimately China or Mexico. And in both cases, the exotic food plants were adopted into cultural traditions which had long been characterized by a sedentary way of life that depended heavily on plant foods. In neither case, the evidence suggests, was the introduction of the foreign cultigens accompanied by any major immigration of new peoples, or by any sudden change in the way of life. One of the main points I want to stress is that the Japanese and North American societies which adopted the imported cultigens were clearly preadapted to make use of them by long histories of quasi-agricultural or even incipiently agricultural existence, and that their adoption was not revolutionary in any sense.

Initially, it seems, the new elements were just so many more new food items simply incorporated into the traditional broad-spectrum forest economy. The archaeological evidence from Eastern North America seems to show that throughout the Early and Middle Woodland periods the new foreign cultigens did not greatly affect the overall food economy. By Late Woodland times it appears that they were becoming more important, but they become archaeologically attested in abundance only in sites of the succeeding Mississippian period.

The evidence from Japan is parallel, although the interval between initial adoption and heavy utilization seems much shorter. Foreign cultigens were introduced at the end of Jomon times and subsequently became widespread and heavily depended upon during the Yayoi period. In the North American instance, the apparent interval between the introduction of foreign plants and their becoming the basis of the

human economy was on the order of a thousand years or more. In the Japanese case it appears to have been only several hundred years.

I believe, however, that this difference in rate may be more apparent than real. It is quite possible that the Early Yayoi period, during which rice cultivation was becoming established, was much longer than has been conventionally assumed. In a recently published symposium on the Yayoi culture, in which a number of noted scholars participated, a generally acceptable beginning date for the Yayoi period of about 2300 years ago, or 300 B.C., was mentioned [OTSUKA *et al.* 1973]. But published in that same volume is a table of C-14 dates which suggested that Yayoi origins could lie as far back as 2800 years ago, or 800 B.C. [cf. KOTANI, this volume].

Another possible consideration is that evidence recently published by Koyama [1978] shows southwestern Japan, the area that came to be dominated by the rice-producing economy in Yayoi times, to have a rather low density of Jomon sites. The Jomon way of life apparently did not flourish in the semitropical and warm-temperate broadleaf evergreen forests of the south quite as well as it did in the temperate deciduous forests farther north. Thus the new foreign cultigens, adapted to the semitropical environment of southwestern Japan, and offering a subsistence base perhaps markedly superior to that which had previously been utilized, perforce may have spread with relative rapidity there.

However this matter of relative rates of spread is resolved, I believe the crucial factor in the ultimate rise to dominance of the agricultural economy in both the Japanese and Eastern American cases to be not in the realm of environmental conditions, but fundamentally in the realm of societal organization.

The summary review of Jomon and Archaic cultural developments presented earlier illustrated a long-evolving pattern of gradually increasing societal complexity. By the time of Middle Jomon in Japan, and the Late Archaic in the Eastern United States, a settled existence and a significant degree of societal centralization had been achieved. This means, among other things, that elite groups with at least some managerial functions had developed. By the later part of Middle Jomon times in Japan, and by mature Middle Woodland times in the Eastern United States, there had emerged societies in which certain individuals or groups were able to organize and expend contributions from the general populace. It should be stressed that this was all accomplished on the basis of the native forest economics.

The power of social elites grew rapidly during the Yayoi and Kofun periods in Japan. Bronze mirrors, spears, and other costly status items were brought from the continent. Earthworks were constructed for the burial of the elite dead. Weapons of war and fortified sites appeared. The growing power of a wealthy aristocracy could scarcely be more clearly attested. In the Middle Woodland, and especially in Mississippian times, great burial mounds and even larger temple mounds, rich imported grave goods, and the appearance of fortified towns, indicate a generally similar course of development for Eastern North America.

Significantly, it is only in the context of these later politically organized societies that we see the florescence of agriculture in both regions. The conventional inter-

pretation of societal evolution has been that the rise of agriculture somehow "pushed along" the growth of society toward higher levels of organization. I believe that the sequence of development in both Japan and the Eastern Woodlands of North America shows rather that it was the energy demands of increasingly organized political society that *pulled along* the expansion of agriculture. By requiring ever greater expenditures of energy, the expanding sociopolitical structures created demands which eventually the primary producers could only supply by specializing in the production of those few sources of food which could be most efficiently and profitably managed. In the Japanese and North American cases these turned out to be imported foreign high-yield cereals of ultimately Chinese and Mexican origin.

In conclusion, to restate the suggested causal connections simply and explicitly, I believe that the primary incentive for the changeover from a broad-spectrum forest economy to an agricultural one was an increasingly enforceable demand by an increasingly organized and powerful elite upper stratum of society for energy inputs beyond those which an unspecialized forest economy could provide. These elite groups were not in the first instance fostered by the establishment of an agricultural economy capable of supporting them, as evolutionary formulations have usually had it. Rather, the record shows that influential elites existed prior to the achievement of any significant agricultural base, and that they came increasingly to occupy positions that enabled them to directly demand increased production for their own purposes. This finally led the general populace into the kind of economic specialization that we call agriculture.

BIBLIOGRAPHY

- AIKENS, C. Melvin and Takayasu HIGUCHI
1982 *Prehistory of Japan*. New York: Academic Press.
- CALDWELL, Joseph R.
1958 Trend and Tradition in the Prehistory of the Eastern United States. *American Anthropological Association Memoir* No. 88.
- CRAWFORD, Gary W., W. M. HURLEY and M. YOSHIZAKI
1978 Implications of Plant Remains from the Early Jomon Hamanasuno Site. *Asian Perspectives* 19: 145-155.
- DRAGOO, Don W.
1976 Some Aspects of Eastern North American Prehistory: A Review 1975. *American Antiquity* 41(1): 3-27.
- ESAKA, Teruya, Takashi OKAZAKI, Mitsuo KAGAWA, Yoshimasa KAMAKI, Chosuke SERIZAWA and Eiichi FUJIMORI (江坂輝弥・岡崎 敬・賀川光夫・鎌木義昌・芹沢長介・藤森栄一)
1972 『シンポジウム縄文時代の考古学』学生社. (*Symposium: Archaeology of the Jomon Period*. Tokyo: Gakuseisha.)
- FUJIMORI, Eiichi (藤森栄一)
1971 『縄文農耕』学生社. (*Jomon Agriculture*. Tokyo: Gakuseisha.)
- KAMAKI, Yoshimasa (ed.) (鎌木義昌編)
1965 『日本の考古学Ⅱ：縄文時代』河出書房新社. (*Japanese Archaeology II*. Tokyo: Kawade Shobo Shinsha.)

KOYAMA, Shuzo

1978 Jomon Subsistence and Population. *Senri Ethnological Studies* 2: 1-65. Osaka: National Museum of Ethnology.

OTSUKA, Hatsushige, Fujio ODA, Hiroshi SHIOMI, Sosuke SUGIHARA, SHOZO TANABE and Hitoshi FUJITA (大塚初重・小田富士夫・潮見 浩・杉原荘介・田辺昭三・藤田 等)

1973 『シンポジウム弥生時代の考古学』学生社. (*Symposium Archaeology of the Yayoi Period*. Tokyo: Gakuseisha.)

PEARSON, Richard J. and Kazue PEARSON

1978 Some Problems in the Study of Jomon Subsistence. *Antiquity* 52(204): 21-27.

ROBBINS, Maurice

1959 *Wapanucket No. 6, an Archaic Village in Middleboro, Massachusetts*. Attleboro: Massachusetts Archaeological Society, Inc.

STREUVER, Stuart and Kent D. VICKERY

1973 The Beginnings of Cultivation in the Midwest-Riverine Area of the United States. *American Anthropologist* 75(5): 1197-1220.

TRIGGER, Bruce G. (ed.)

1978 *Northeast (Handbook of the Indians of North America, Vol. 15)*. Washington, D.C.: Smithsonian Institution.

YARNELL, Richard A.

1976 Early Plant Husbandry in Eastern North America. In Charles E. Cleland (ed.), *Cultural Change and Continuity: Essays in Honor of James Bennett Griffin*. New York: Academic Press, pp. 265-273.

