

Chapter IX

DISCUSSION AND CONCLUSIONS

Subsistence Activities

Having outlined the physical properties of the stone and ceramic artifacts, it is possible to consider the subsistence activities that can be inferred from the existence, quantity, and context of these artifacts, and their relationships with other relevant data.

Hunting

The only tool for hunting that is found in the Middle Han Phase is a small slate projectile point. Such points are not found in any abundance. None were found in our soundings. According to published site reports, projectile points have been found at less than 25 per cent of Chulmun sites. From this it may be inferred that hunting, although present, was either not a major activity or was accomplished largely by means of traps or other perishable artifacts. Very little animal bone was found in the sites, although this can be explained by the decomposing properties of the Korean soil. Human bones in burials usually completely disappear in a few centuries. At Tongmak a few small scraps of burned bone were found in the flotation process. They seem to be from medium-sized mammals, perhaps deer, boar, or dog. One piece of possible deer antler was among the bone chips.

Fishing

Fairly intensive fishing is evidenced by the large numbers of net sinkers found at all the sites. Fish hooks are reported from some coastal and island sites, but not from the Han River sites. Net fishing was probably more efficient on the river, given the small

size of the fish. Since there are two sizes of sinker there were probably large- and small-meshed nets. Since most of the fish are very small, fine-meshed nets would have been necessary to catch them. Probably these nets were long and required many small sinkers along the edges. The larger sinkers may have been used in the deeper pools farther upstream, where larger fish are caught in the spring. If the size and quantity of fish in the river has not changed, no group of people could make fish their primary subsistence base here. Fish certainly provided a much needed source of storable protein, more easily obtained than wild game, but it was not available in abundance and must have been supplementary to other foods.

Gathering

No artifact has survived which was certainly used for gathering. With an abundance of fruits, nuts, roots, and herbs in the forest, it is very likely that a large number of edibles was simply gathered. There were probably baskets and nets in addition to the pottery.

Hoe-axes, as has been discussed, could have been tools for chopping or digging. Their physical properties tend toward an interpretation of digging. Their large number in the Middle Han sites implies that whatever they were used for, it was a relatively frequent activity.

Food Processing

Grinding slabs and oblong grinding stones indicate the use of some plant food that was ground to meal. There are two likely possibilities: seeds and nuts. Acorns are reported from several sites, including all three on the Han River. Koreans still make a kind of jelly from ground acorns. As for seeds, a single grass seed impression was found on a sherd at Tongmak, which indicates at least that grass seeds were brought into the settlement. Millet

grains have been reported at Chitamni in North Korea (Kim, J. H. 1967:637), found in a conical pot. If millet was gathered or cultivated, it may have been just another, although storable, source of food, and not the staff of life.

The rough knives with secondary retouch on one side from Amsari, as well as the denticulate tool from Tongmak, could also be food processing utensils.

Some of the pottery was probably used for food processing as well. Most of the wild greens eaten by Koreans now require soaking in several changes of water. Two- and four-liter pots would be about the right size for this process.

Cooking

Only one thing is obvious about the cooking processes, and that is that pots were not placed directly on the fire. No sherds show any trace of fire on the outside. From the very charred condition of the animal bone recovered, it can be supposed that meat was cooked on sticks above the fire or directly in it. The neighboring Ainu cook their meat, and fish as well, by the stick method (Hilger 1970:Plate 3).

In Lim's site plan of Amsari (unpublished), it can be seen that in seven cases two smallish stones are associated with entire (but broken) pots. This association may indicate stone boiling. Stone boiling is a very adequate method of cooking certain foods such as vegetables and fish, but it would be very cumbersome for foods that require long boiling, such as meat. Perhaps the Korean use of many kinds of soups dates back to this period. Munro (1911:54-55) suggests stone boiling for the Jomon period in Japan based on evidence from the shell mounds.

Storage

The large and very large pots, with capacities up to 90 liters, almost surely were used for storage. The one problem with such an interpretation is that there are no pottery lids. It is of course possible that lids were made of some other material, such as skins or matting, which were secured to the pots by means of the holes in the rim.

The ethnographic analogy that immediately springs to mind is that of the kimchi jar. Kimchi is a vegetable preserve, made primarily of large turnips in the fall and Chinese cabbage in the spring, although other vegetables, fish and sea food are also sometimes added. Turnip kimchi is prepared in November in quantities to last all winter, and it accompanies every meal. An average housewife prepares about 150 liters to last her family through the winter. In the cities the jars are set out on balconies for the winter, but in the countryside the jars are half-buried in the ground, which helps keep the contents cool. It is obvious that for jars that are to be sunk into the ground, a pointed base is at least as functional as a flat one.

Modern kimchi jars, however, have flat bases. They are barrel shaped and have matching pie-pan shaped lids which sit loosely atop the jars. They are made of a porous red-brown clay, thinly glazed in brown. One persistent find by the survey team was a lid of the same shape and size, but made of the typical grey Paekche ware. It appears that kimchi jars in their present form date back at least to the Paekche period.

Another possible link of the kimchi jar with the past is the pottery-making village. These villages are located where there is good clay, water, a source of fuel (trees), and a hill slope facing in a direction to take advantage of the wind. River valleys, with brisk breezes frequently blowing, are favored locations. The kilns

are constructed as long and narrow wind tunnels rising up the slope of the hill. With the wind to fan the fire, less fuel is needed, and a hotter fire is produced.

These village kilns produce nothing but kimchi jars in a variety of sizes, ranging from 2 to 40 liters. Until this century, other ceramic kilns were state-owned and produced a fine pottery for the nobility in a wide variety of shapes and sizes. Peasants, however, used little pottery other than kimchi jars. Gourds were grown on the roofs of houses; dried and halved the gourds made entirely serviceable bowls, cups, and dippers. This usage accords with the fact that no vessels are found of bowl or cup shape in the Middle Han Phase and few are even small enough to have been used as individual serving dishes.

Alternatives of Subsistence and Settlement

We have presented the data of geography, resources, settlements, pottery, and other artifacts of the Chulmun Period as far as they are now known or can be inferred. It is appropriate now to return to the alternatives of subsistence and settlement proposed in the introduction, to see which of these can incorporate all the data in the simplest and most logical manner.

Settlement

First, the question of year-round versus seasonal settlements will be considered. Because so little organic matter has been preserved in the Middle Han sites, there is no direct evidence of seasonality. Inferences must be made from the resources, the pottery types, and the dwellings.

There are three broad resource areas in west-central Korea: the forest, rivers and river banks, and coasts and the sea. The forest resources include mammals such as deer and boar, and products

of deciduous trees such as fruits and nuts. The forests of aboriginal Korea are thought to have been more widespread than at present, clothing those hills which are now bare and extending into areas now cultivated. Even at present, however, forest covers 30 per cent of the land, and it is a rare village whose dwellings do not have steep hills covered with trees rising behind them. The forest and its resources were thus within easy reach from any settlement, whether on the coast or inland.

If the forest resources can be taken as a constant in any given locality, the only seasonal movement that would make sense for the use of different resources would be alternation between the rivers and the coast. There is, however, no time of unusual abundance in either the river-and-riverbank or coast-and-sea habitat. Throughout the year there are fish in the rivers and seafood on the coast. The open habitat on the river banks where leafy plants and berries could grow produced edibles from spring through fall. The only clue in terms of resources near the Middle Han sites is that there is a season of scarcity, and this season is the cold, dry winter. On the basis of resources, logic leads to the conclusion that if the sites were occupied seasonally, they would not be occupied in the winter when resources were scarcest.

Pottery Types

Analysis of pottery attributes has shown that the Chulmun pottery of the Middle Han has close affinities among the sites and is only distantly related to the island sites. If all or part of the population of each river site had indeed migrated to the coast for part of each year, we would expect to find a one-to-one correspondence of each inland site with a coastal or island site. It is, of course, unlikely that the entire set of matching sites would have been discovered; nevertheless, if such were the underlying pattern, it should be reflected in a general similarity of

both attributes and types rather than a marked divergence.

It might be argued that coastal collecting stations would contain no pottery and cannot therefore be ruled out, but no such aceramic sites are known. Furthermore, the presence of Chulmun pottery in coastal sites indicates that the niche was being exploited by other groups.

Dwellings

The semi-subterranean dwellings found at Amsari have all the characteristics of winter occupation. They are dug into the ground for better insulation against the cold arctic winds, rather than being made of the wood and brush which was plentiful and readily available. Each pithouse contains a central hearth, the warmth from which would have been as welcome in winter as uncomfortable in the heat of the summer. Evidence of the dwellings seems to point to winter occupation of the Middle Han sites.

In sum, resources are only scarce in winter, but the dwellings indicate winter occupation of the site. This leads to the conclusion that the sites were essentially permanent, year-round settlements, a conclusion which is bolstered by the evidence of pottery types on the Middle Han which are different from any known coastal or island sites.

Subsistence

Fishing as the essential subsistence activity of the Chulmun Period is traditionally accepted in Korea. This interpretation has in its favor the consistent location of sites where fishing and/or shellfish collecting is possible, the large number of coastal sites which consist of shell mounds, and the large number of net sinkers and/or fishhooks in the assemblages. The intensive use of fish as a basic resource, however, becomes less likely for the Middle Han

sites. The fish are too few and too small to have supported even one village of 100 inhabitants year-round, much less several such villages within a few kilometers of each other. That these fishing conditions are not due to modern conditions such as industrial pollution in the river can be seen by the fact that pre-industrial fishing was also disappointing; a single English traveler in 1894 could not feed herself and her entourage of three on fish from the Han River (Bishop 1905:77ff).

It might also be argued that overpopulation leading to overuse and therefore extinction of larger fish could have occurred. There is no way to rule out this possibility, but it can be shown that it is unlikely. The size and quantity of fish are related to the character of the rivers they inhabit. Deep pools are required to support larger fish. Because of the precipitation pattern, pools deep enough for large fish are very rare in the Han River. Neither the large volumes of rapidly running water in summer, nor the wide and shallow river of the rest of the year, will support fish in great size or quantities. There is no reason to suppose the climate has changed in the last 5000 years, therefore the characteristics of the river should be the same.

Deforestation has been suggested as a possible cause of a change in run-off patterns and, therefore, in the character of the river. However, severe deforestation took place only in this century, and erosion was checked before the hills lost their soil. Bare granite hills are exceptional and tend to occur only in the steepest and highest locations. Furthermore, whole trees are usually not chopped down for firewood; rather, the lower branches are removed, leaving the roots to retain the soil. Only the parts of hills near streams which can be terraced for crops have been altered by centuries of cultivation, leaving the greater part of the countryside unaltered. On balance, it seems that agriculture and deforestation have had little effect on river flow. The existence of large cobbles in

lower strata is further evidence that the river flow patterns have not changed (Pak 1968).

It follows that substantial amounts of fish were probably not available during the Middle Han Phase and could not, therefore, have been the essential subsistence base.

Generalized Collecting

The possibility of a broad-spectrum subsistence base, exploiting resources that were seasonally available locally, will be considered next. Certainly there is abundant evidence of fishing, with two sizes of net sinkers implying two sizes of fish. The small projectile points and the burned mammal bone broth show that some hunting of wild animals (probably at least deer) occurred. Intensive use of wild plant resources, even in a country where rice agriculture has been practiced for two millennia, argues for a very great antiquity for the utilization of these varieties of plants. Since there is no firm evidence that any one resource made up a large proportion of the diet, the broad spectrum model seems to fit these data very well.

Looking at the seasonality of the resources, however, it becomes clear that in winter very little food would have been available in its natural state. This fact points to the likelihood of some method of food storage, and the large number of pots which appear to be storage jars tend to corroborate this inference. Therefore, the collection and preparation of foods to store through the winter can be added to the model.

Neither fish nor wild animals appear to have been abundant enough to provide a storable surplus for winter food. No method of meat preservation is known ethnographically, although dried marine fish are common in Korea. It is most probable that plant food was stored in the pots. Among the many possibilities are: millet,

which was found in a (later) Chulmun Period pot further north; acorns, which have been found in all three of the excavated Middle Han sites; turnips and cabbage, which are preserved in water and salt in a large pot by the present day Koreans; fruits, which could be dried; and dried wild greens, which are also used by the present inhabitants.

There is no logical way to choose among these, and indeed all of them may have been stored. Analysis of the pot capacity has shown that at least three different sizes of pots were utilized, which may indicate three different kinds of food being stored. However, baskets are as useful for dry storage as pottery and, if not easier to construct, probably longer lasting and more convenient to use. Why would there be so many large pots if something wet were not being stored? The porosity of the pottery has been pointed out as an argument against such an interpretation (Kim Won-Yong, personal communication), but ceramic ware of similar porosity is used elsewhere (Spain, e.g.) to contain liquids. In the case of liquid storage, it is possible that some form of prehistoric kimchi was being made, using turnips and/or cabbage since they can be preserved easily and are highly nutritious.

This brings us to the final possibility, that of broad-spectrum utilization of available resources and planting of those resources which had proven most useful for winter storage. Clearly, if winter storage was a requirement, surpluses to last through the winter had to be collected or grown. Ethnographically, only exceptionally favored locations with abundant resources available all year long can support settled villages without domesticated plants or animals. Such abundant resources were not available on the Middle Han, and a means for increasing productivity, such as planting, seems to have been a necessity.

Although conclusive evidence to support this inference is not

available, all the data from sites on the Middle Han are consistent with such a conclusion. An implement which could have been used for cultivation is found in quantity in the sites. The open habitat of the river banks was suitable for cultivation without extensive preparation, and the sandy clay still supports the undomesticated relatives of many locally utilized plants. The spacing of the sites, a kilometer or two apart along the river, leaves room between them for planted fields on the banks. Therefore the construct which fits all the data most economically is that of settled villages cultivating some plants in order to store food to last through the winter.

Early Agriculture in East Asia

A conclusion that small groups of people with scanty archaeological assemblages were cultivating some of their own food would have been surprising if not unthinkable a few decades ago. Although Sauer (1952:25) suggested the primacy of root crops over grains, the trend was to consider only grain cultivation to be true agriculture. Agriculture was often defined by the use of the plow rather than the digging stick, necessarily restricting the meaning to the cultivation of grains.

Recently, however, agriculture has been defined in a much wider sense, to include any manipulation of plants by man. And, with this more generous definition, independent beginnings of agriculture have been postulated much more widely than before. Vavilov's (1951) theory of many centers of origin of cultivated plants opened the way for botanical study of widely diverse areas, and archaeologists became more acutely aware of the possibilities for recovering botanical data from their excavations. The result has been the appearance of new evidence, along with new interpretations of old evidence. From many regions of the world there are suggestions of agriculture much earlier than had been previously expected. This has occurred quite notably in East Asia where early agriculture has recently been

postulated in several regions.

In a recent paper, Chang (1970) has reexamined the evidence for early agriculture in East Asia. He suggests that there were three separate centers of origin in this part of the world: Japan, South-east Asia, and north China. Chang does not address himself directly to the beginnings of agriculture in Japan but concentrates on north China (the Hwang Ho basin) and Southeast Asia, especially Thailand, summoning the as yet scanty but growing evidence of plant domestication in these regions, and pointing out that the archaeological assemblages in fact produce a good fit with the descriptions of the kinds of adaptations that early cultivators would have had.

The case for Japan has been summarized by Kidder (1968b). Kidder, like Chang, defines agriculture broadly, to include deliberate planting of fruit and nut trees. Remains of actual vegetable food, including carbonized "bread," have been found but are not accepted as conclusive evidence for agriculture. Nevertheless they are suggestive, and an increase in food volume by means of agriculture would go far to explain the population increase and cultural elaboration of Middle Jomon.

Even the Soviet Maritime Region is cited as having evidence for early agriculture. Sifting through old reports, Okladnikov (1965:75) found that carbonized grains had been discovered in a large pot in an early excavation. He believes this lends support to the inference of agriculture that might be made from the numerous grinding stones found in this region.

Thus, indications of early plant cultivation are beginning to be sought and found throughout East Asia. In this context a mixed economy of fishing, hunting, gathering and agriculture for the Middle Han sites is not out of line with other developments in East Asia.

Hypotheses Concerning the Beginning of Agriculture

It is interesting to compare the Middle Han data with various hypotheses concerning preconditions of and causes for the beginning of agriculture. Sauer (1952:20-22), for instance, sets forth six basic premises for the beginning of agriculture: (1) agriculture did not originate from a shortage of food, (2) agriculture did originate where many plant genes were available for recombinations, i.e., in areas of diversified terrain and/or climate, (3) agriculture did not originate in large river valleys requiring large-scale hydraulic works, (4) agriculture began in wooded lands, (5) some special skills predisposed a group to agriculture, and (6) sedentism is a necessary precondition for agriculture. The Middle Han sites are not in a location requiring any kind of water diversion (except to grow rice, which is a special case) because the wet season coincides with the growing season. The sites were on the edge of a forest, and perhaps the transition zone between forest and river adds diversity. Certainly the ruggedness of the Korean terrain provides diversity in elevation. In terms of specialized skills, the Middle Han people probably had the postulated fishing and gathering, as opposed to hunting, antecedents. Settlements seem to have been permanent. As to whether there was a shortage of food, the inference has been made that food was short only in the winter, requiring storage. Thus, although Korea is in a temperate rather than a tropical zone, the Middle Han sites conform to five of Sauer's six postulated criteria.

Harris (1969:9) has also made some suggestions about the kinds of locations where agriculture could arise. He particularly suggests "marginal transition zones or ecotones between major ecosystems," especially forest and woodland edge situations. He mentions forest and river, or forest and coast as particularly suitable places. He also suggests that generalized hunter-fisher-gatherer populations

would be likely to inhabit such areas, and that they would be less nomadic with a more generalized subsistence base. The Middle Han sites can easily fit into this scheme.

However, even if it is granted that the necessary preconditions for the beginnings of agriculture were present during the Middle Han Phase, existence of preconditions does not constitute an explanation. In contrast to Sauer, who believes that hunger could not have been an impetus to agriculture, Binford (1968) has hypothesized that population pressure creates a need for food production. He proposes a model in which settled populations by the seashore would have been able to increase due to their sedentism, which reduces constraints on population increase. As populations of these efficient exploiters of sea products increase, by budding off they eventually fill the coastal niche, and new daughter colonies must then move inland. There they would meet an established population already using the local resources to the full, and the result would be population pressure. One result of this pressure could be more intensive use of the land in the form of incipient cultivation.

In the case of the Chulmun Period, there is considerable reason to postulate a development from Early Jomon because of pottery resemblances as well as similarity of niches, although this needs to be investigated more thoroughly. It could be argued that the populations of the Japanese coast, successfully exploiting the seacoast resources, repeatedly fissioned, rapidly filling the niche of warm coast in both Japan and Korea. This much would be in accord with Binford's hypothesis. The demographic element which Binford proposes, however, which is the crux of his model, does not seem to be present in the Middle Han Phase. The only pre-existing populations in this area which have left their traces seem to be Upper Paleolithic, and even these sites are very rare.

Binford suggests that attempts to explain the beginnings of cultivation must postulate a change in either the environment or

the demographic composition of the population involved. In this case, however, it appears that neither a change in the size of the groups nor a local change in environment occurred. Rather, the beginnings of cultivation appear to have been caused by the gradual movement of a group of people from one ecosystem to another.

The Middle Han area is astride a geographic boundary, the edge of double-cropping. It is possible that groups which had been successfully exploiting sea coasts expanded and eventually moved inland up the river valleys. Farther south, winter survival would not have been difficult, and wild food resources could have been exclusively utilized throughout the year. Eventually, however, a latitude was reached which required the storage of food for winter consumption, due not to larger populations but to smaller carrying capacity of the environment. The pressure of the added requirement of winter storage would have led to the necessity of producing more food. Hence population pressure as such would not account for the beginnings of food production.

In this case, the storage of food does not represent surplus food, but food to last through a season of scarcity. Even with rice cultivation, there is an expression in Korean meaning "spring hunger," the time when the stored food is running out and the early crops are not yet available. Cultivation, therefore, does not necessarily imply increased amounts of food.

The size of the social groups seems to have been determined by the previous niche. Finding themselves in a region of reduced resources, the Chulmun people might have rearranged their social habits to conform to the realities of the forest ecosystem. Instead of doing this, however, they found a way to preserve their social structure by more intensive use of the available resources.

Binford points out the usefulness of distinguishing between "functional" and "structural" variants, and in this case the

cultivation appears to be a functional variant of seacoast subsistence. There is no evidence that the new element has changed the system; the villages become neither denser nor more complex.

Conclusions

The Han River Project, then, has produced the tentative conclusion that the subsistence base of the Middle Han Phase included broad-spectrum utilization of both wild and cultivated resources. This could only be conclusively confirmed by the finding of definite cultigens within Middle Han Phase layers, an unlikely event even if such evidence is deliberately and carefully sought.

Various parts of the explanatory model, however, could be tested in several ways. Since the model rests on the assumption of fissioning of seacoast populations, the demonstration of a relationship between Early Jomon and Chulmun is required. Radiocarbon dates indicate that Early Jomon antedates Chulmun, and the resemblances are apparent. A chain of related pottery across the southern and western coasts of Korea would be convincing evidence of such a relationship. Careful comparative study of the attributes of the pottery types also might reveal such relationships.

If the hoe-axe was indeed used for cultivation in the Middle Han Phase but not in the (presumed) earlier sites further south, it should appear in relatively larger numbers in the Middle Han sites. With controlled excavations including random sampling, this could be easily tested.

If the larger sizes of pots were created especially for winter storage, they should be found either exclusively in the Middle Han sites, or earlier there. Of the sherds that have been measured, the large sizes are found exclusively on the Middle Han, but a larger sample, including more coastal sites, should be measured to test this result.

More research, then, is needed before the model which has been presented can be accepted. For the moment, however, it is the one which best fits the available data.