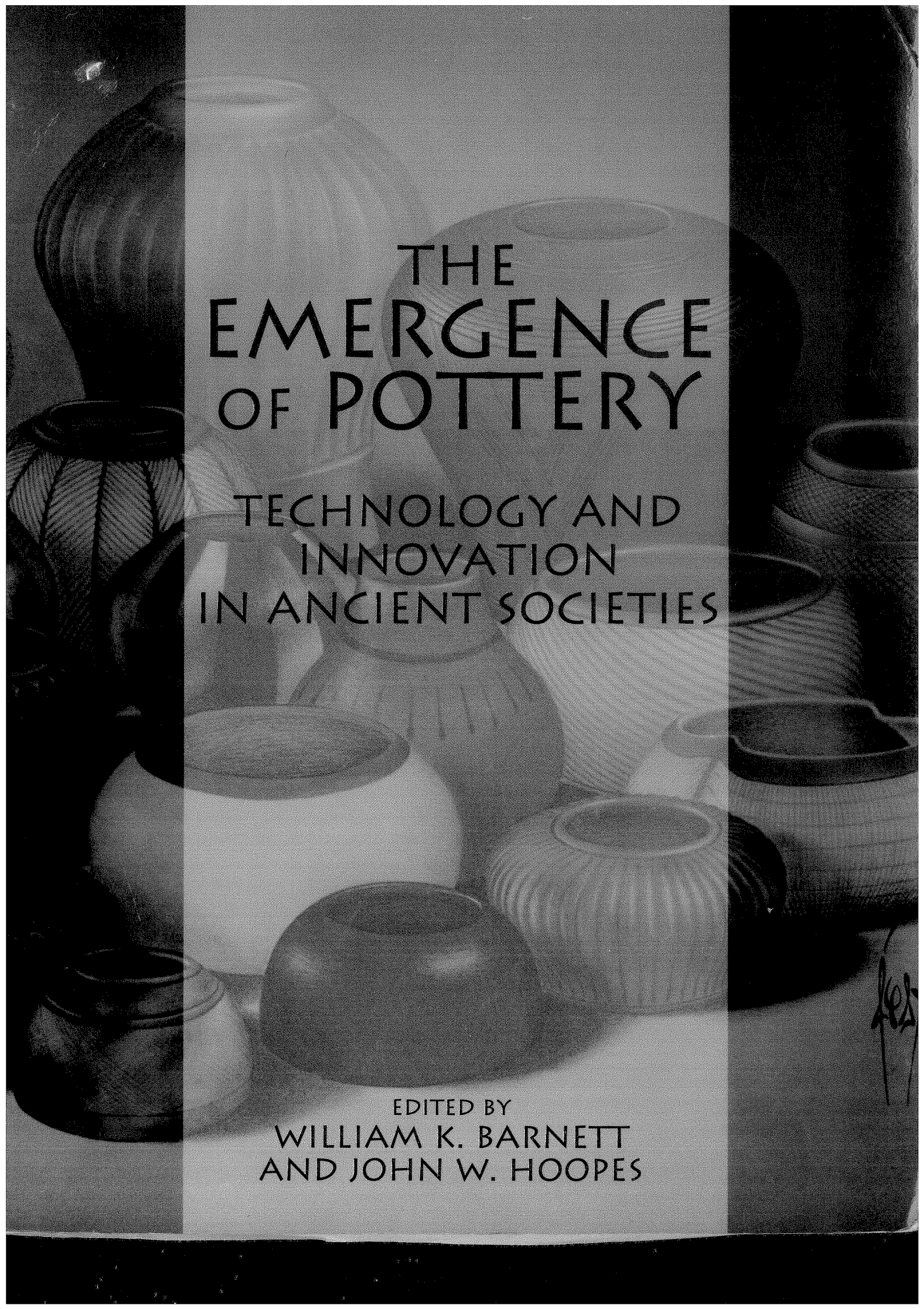

THE EMERGENCE OF POTTERY

TECHNOLOGY AND INNOVATION IN ANCIENT SOCIETIES

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The Emergence of Prestige Technologies and Pottery

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Scant theoretical attention has been paid in the past to the conditions under which prestige technologies emerge. Certainly, archaeologists have been cognizant of the obvious—that prestige technologies are used by the elites—but this does not advance our understanding of the issue very far. It does, however, relate the question to the more thorny problem of the conditions under which socioeconomic inequalities emerge. The purpose of this chapter is to advance the inquiry into the conditions under which prestige technologies develop, with specific reference to pottery.

For 99 percent of human existence, there are *no* indications of the existence of any prestige technology. Not until the Upper Paleolithic (and even then, not until the later half of this period) do clear material indicators of prestige occur in the world prehistoric record. A number of prehistorians interpret the appearance of art and prestige material items in the Upper Paleolithic as due to the arrival of a new genetic variant of human beings on the scene: *Homo sapiens sapiens,* or anatomically modern humans. In this scenario, Neandertals and other pre-modern human types were incapable of much foresight, language, art, or culture, not to mention status distinctions and the ability to craft items to communicate these distinctions symbolically (Binford 1981, 1985; Chase and Dibble 1987; Gargett 1989; Stringer and Andrews 1988; for a more complete review, see Mellars 1989).

The view that Neandertals were incapable of symbolism, language, and culture has always appeared unrealistic to me for several reasons. First, not all modern human groups produce prestige items or have economically based socioeconomic inequalities, nor was this the case prehistorically. In fact, the occurrence of prestige goods is initially restricted to only a very few, largely subarctic or temperate regions. Only after the Pleistocene do prestige technologies become relatively widespread. This distribution indicates that economics, not genetics, is the key variable in understanding the occurrence of prestige items.

The second reason I view the genetic model as unsatisfactory for explaining the emergence of prestige technologies is because at the end of the Pleistocene, prestige goods largely disappeared from most of the areas where they had developed, at least for a while. This disappearance, too, indicates that economic factors were more likely than genetics to have played critical roles in the development of prestige technologies.

The third reason I reject the genetic model is that my experience with Mousterian and other early industries indicates that pre-modern people were extremely so-

phisticated in terms of their lithic technology, and on this basis it is inconceivable to me that their behavior was dramatically different from our own behavior. These arguments and supporting observations have been presented in detail elsewhere (Hayden 1993a).

Before exploring alternative explanations for the development of prestige technologies, it is useful to define exactly what is meant by the term. The distinction I have made between a *practical* and a *prestige* technology (Hayden 1993b:203) is that a practical technology is based on the principle of performing tasks in the most efficient and effective fashion possible. The less time and work involved, the better. In contrast, a prestige technology is based on the principle of displaying or showing off one's wealth, power, or control over labor and resources. Therefore, as much time and labor as can be spared are used to produce prestige items. The more time and work spent in obtaining or making them, the better. Thus the thousands of shell disk beads interred with the burials at Sungir (White 1993), the elaborately carved (and delicate) antler spear throwers from the Grotte des Trois-Frères and Mas d'Azil, and the long-distance trade in dentalium shells to decorate garments in Natufian burials all constitute prestige technologies.

The argument I make to explain the emergence of prestige technologies is based on economics (in the sense of cultural materialism and cultural ecology) and relies on the critical distinction between generalized hunter-gatherers (foragers, in Binford's terms) and complex hunter-gatherers (roughly equivalent to collectors). The important differences between these two types of hunter-gatherers for the discussion of prestige technologies revolve around *economically based* competition.

Among generalized hunter-gatherers, resources are so scarce, unpredictable, and vulnerable to overexploitation that sharing of food is an absolute imperative, while private ownership and the competitive use of food resources is anathema because of the detrimental effects for other members of the community (see Hayden 1981, 1993a, 1993b). I have argued that it is only when technological advances occur in subsistence procurement and food storage, such as those that typified many Mesolithic, Epipaleolithic, and Archaic groups (but which began in the Upper Paleolithic in some areas), that the restrictions on economically based competition are removed. With these technological advances, resources become much more abundant, invulnerable to overexploitation, and perhaps more constant, thereby permitting the private ownership of foods (especially stored foods), the private ownership of resource locations, increased sedentism, logistical mobility patterns, and most importantly, the emergence of economically based competition together with the resultant socioeconomic inequalities that this implies.

It is under these conditions, I have argued, that prestige technologies emerge among hunter-gatherers such as some favored Upper Paleolithic groups in Europe and many more Mesolithic, Epipaleolithic, and Archaic groups. Some of the key food resources upon which complex hunter-gatherers are based include fish, reindeer, and grass seeds, together with the intensive labor required to dry and process these foods for storage. The emergence of agriculture in most instances simply amplifies all of the above developments among complex hunter-gatherers. Indeed, a number of prehistorians have noted the fundamental similarities between complex hunter-gatherers and simple horticulturalists (e.g., Shnirelman 1992).

Once technologies evolve to the point where private ownership and economically based competition can be sustained without immediate detrimental effects, it seems that some individuals in every community will attempt to aggrandize themselves and acquire material, social, and political benefits for themselves and their families. Such aggrandizing individuals occur in all human populations and probably are part of the natural genetic variability in personality types that characterizes human populations, even if they do not constitute a very large proportion of the population. This condition may ultimately be responsible for observations like those of Sahlins (1958:1), Voytek and Tringham (1989:496), Beteille (1981), and Saitta (Saitta and Keene 1990), who view tendencies toward inequality and class process as inherent in all societies.

According to the degree of aggrandizers' success and their social and technological starting points, these individuals can be viewed as developing prestige technologies to advertise their success and thereby attract supporters. In the terms of other vocabularies, prestige items are the material manifestations of the asymmetry inherent in economically based aggrandization. Although Sassaman (1993) suggests that aggrandization does not necessarily lead to asymmetrical relationships, this seems to me to be a contradiction by definition and certainly is inconceivable where *economically* based aggrandization is involved. The range of prestige technologies is constrained only by the materials available, the ingenuity of the craftsmen, and the degree of power that aggrandizers are capable of acquiring. It is

difficult to conceive of a more profound and far-reaching change in the nature of human culture than the emergence of economically based competition and prestige technologies at the end of the Pleistocene.

Prestige Technologies

I have argued elsewhere that many of the most important cultural developments of the last 30,000 years have initially been the products of prestige technologies in various forms. During the Upper Paleolithic, the heavy emphasis on finely curried skin garments (Hayden 1990) and the development of both movable and parietal art (Hayden 1993a) can be viewed as prestige undertakings. These are the distinctive hallmarks of European Upper Paleolithic culture. White (1992:560, 1993:289, 296) has similarly proposed that beads and other ornamentation evolved in the context of socioeconomic hierarchies during the Upper Paleolithic in Europe.

METALS

The earliest use of metals both in the western hemisphere and in the Old World was clearly for prestige purposes rather than practical ones. Moreover, the first appearances are not in agricultural communities but in communities of complex hunter-gatherers. In the area where I have been excavating on the Northwest Plateau of North America, copper appears first and exclusively in the form of tubular beads, ornamental disks, and ornamental sheeting at least 1,000–2,000 years ago (see Blake et al. 1993; Morrison and Myles 1992). The Old Copper culture around the Great Lakes used prestige copper items as early as 4000 B.C. (Binford 1962). In a recent analysis, Rosen (1993) points out that in the Near East, metals were introduced first and foremost as prestige display items (as is generally true of Chalcolithic cultures throughout the world), and that it was only after the use of metals had evolved to some degree as a prestige technology that people began to realize that certain metalic combinations (such as bronze) also had practical uses that made them technically superior to stone tools. The practical benefits of using metals appeared only incidentally to, and considerably after, the use of metals in the prestige sphere (see also Bradley 1984; Darvill 1987; Fallers 1973; Randsborg 1982; Shennan 1982).

The same process has continued in the development of new metal technologies: iron was used as a prestige metal long before techniques were developed to produce it economically for practical purposes. And initially, aluminum was so difficult to extract that its value surpassed that of gold, so that it was used only by the richest families for such things as Napoleon's tea set. Similarly, plastics were initially used primarily as elite jewelry.

The development of metals is an extremely instructive example for examining the development of pottery. A good case can be made that a very similar process occurred in the course of pottery development (as exemplified by many of the studies in this volume). We can then use the metals example as a template for examining the emergence of pottery—a topic to which I shall return shortly.

Metals made an ideal prestige medium for several reasons: the most common native metals (copper, silver, gold) were soft and plastic enough that they could be shaped by cold hammering into a wide variety of ornamental shapes. Moreover, their softness rendered them relatively useless for most practical purposes. The native metals were also relatively rare (much rarer than cherts, flints, chalcedonies, and quartzites), thus requiring considerable search time to procure. They were also time consuming to work and fashion into ornaments of any significant size. And finally, they were shiny and bright, thereby catching observers' attention. All these characteristics made metals extremely useful for displaying economic power.

SLAVES AND CRAFTS

In other areas of technology and economics, I believe that good arguments can be made that slavery initially appeared as an institution to display power and prestige (again, initially among complex hunter-gatherers such as those in the North American Northwest). Craft specialization similarly emerges first among complex hunter-gatherers as part of elite prerogatives (shamans, exclusive hunters, carvers) or to provide labor-intensive craft items for elites (see Clark and Parry 1990). I would suggest that nephrite or jade adzes functioned as specialist-produced items for elites, along with the first woven textiles of cotton and wool and finely woven basketry. Cauvin (1978:100) similarly argues that the first ground stone tools in the Levant were prestige items. Architectural elaborations such as the use of adobe brick construction, lime plaster, and arches can similarly be argued to have been initially introduced as more labor-intensive forms of architecture used for the display of wealth and power.

FOOD PRODUCTION AND FEASTS

Perhaps of even greater importance for the present discussion, I have suggested that domesticated plants and animals initially developed as parts of prestige technologies used in the context of reciprocal and competitive feasts (Hayden 1990, 1992)—an argument presaged by Cauvin's discussions (1978:77ff., 116–17) of domestication as resulting from social rather than ecological pressures. There can be little doubt that special efforts were made by the organizers of these feasts to indebt or impress guests by providing unusual quantities of the most desired types of foods and drinks, especially delicacies and highly labor-intensive foods (requiring either intensive procurement or intensive preparation). Organizers clearly competed to outproduce each other in quantity and quality; this assertion is based empirically on both emic and etic observations. It is my contention that this competition is an entirely new type of motivation on the evolutionary scene and that it logically leads to the investment of additional labor in food production that characterizes many aspects of initial food production. This aspect of the argument is the easiest to establish.

It is much more problematical to satisfactorily explain precisely what motivated some people to initiate (and other people to support) these competitive and reciprocal feasts. I have made one suggestion involving the use of these feasts in the creation of debts, the mobilization of manpower and womanpower, and the acquisition of power via the manipulation of debts and gifts. In this context, prestige items are used partly in order to attract people to participate in the production and debt system (much as in contemporary industrial society), partly to advertise the success of the organizers (thereby attracting supporters or desirable allies and mates), and partly to magnify or facilitate the creation of debts based on wealth. Other scenarios, however, may be just as viable. Such issues are not critical for the present discussion.

If we accept the premise that prestige displays—especially those involving food—were an integral part of reciprocal and competitive feasts, no matter what the ultimate motivation, then there are some extremely important implications for the technologies associated with food preparation and, particularly, food serving. If the biggest, best, most valuable, tastiest, and most succulent foods that feast organizers could procure were being offered to guests as a display of the group's success and wealth, or to create a favorable impression on guests so that they would enter into alliances with the hosts rather than with enemy groups, it seems highly unlikely that the presentation of foods meant to impress would not also be made in special, impressive containers. The use of containers meant to impress in the contexts of feasts may even be a universal cultural characteristic; it is certainly an integral part of our own culture and many others.

There are many possible food container technologies, including wood, basketry, stone, metal, shell, and ceramic. On the Northwest Coast of North America, in Melanesia, and in Polynesia, elaborately carved bowls, sometimes worth hundreds or thousands of dollars, were used to serve food at these feasts. Stone bowls and plates appear in Mesoamerica, South America, the Nile Valley, and the Near East in elite contexts. Gero (1989:104) has explicitly linked their appearance in Peru to a prestige technology, and stone bowls appear in the Near East before pottery (Schmandt-Besserat 1977). And, most importantly, highly decorated, labor-intensive bowls constitute initial ceramic developments in many centers such as the Chiapas coast (Clark and Gosser, chapter 17), Melanesia and Polynesia (Kirch 1988), the European Neolithic (Barnett 1990, chapter 7; Gebauer, chapter 9), North Africa and Greece (Close, chapter 3; Vitelli, chapter 5), the Central American isthmus and Colombia (Hoopes, chapter 15; Oyuela-Caycedo, chapter 11), and many other locations examined in the chapters of this book.

POTTERY

The exact form that prestige food containers take in each culture is probably dependent upon the materials most readily available, the climate, degrees of mobility, and the preceding traditions and values of the culture. Although we can expect a prestige food-serving technology to emerge in an almost deterministic fashion with the development of competitive feasts among complex hunter-gatherers and early horticulturalists, there is no guarantee that ceramics themselves will be included in the choice of technological media being used for prestige food containers.

In view of the lack of pottery prior to the development of complex hunter-gatherer and horticultural communities, it is tempting to view the initial development of pottery as a prestige technology in the same fashion that metals can be viewed as having initially developed as a prestige technology. Like metals, ceramics had a number of important qualities that probably made them a very useful prestige medium. At the outset, the potter's art would probably have been a dif-

ficult one to master. Clay sources had to be carefully selected for proper construction and firing properties. Tempers compatible with specific clays had to be obtained and processed, sometimes with a great deal of labor, as in the grinding up of sherds and calcite. Construction techniques themselves would have required considerable practice in order to make pottery that would be both functional and attractive. Surface finishing and decorations would have required further expertise, practice, and materials. Drying and firing would also have been extremely critical and subject to many initial failures. In order to produce the finest painted and burnished examples with the thinnest walls, a great deal more specialized expertise would have been required.

During the development phase of pottery manufacture, then, pottery may have represented a very labor-intensive endeavor with many problems and failures. It is perhaps this labor-intensive aspect, the shiny surfaces, and the sheer novelty of the forms and appearances that made pottery a favored prestige medium for food-serving vessels in many communities throughout the world. Another advantage of ceramics for prestige display is the extremely plastic nature of the medium, in contrast to the much more rigid and constrained mediums of stone and even wood or basketry. As in the case of metals, plasticity in ceramics could be used to emphasize the specialness of objects, such as in the ornate forms of Jomon ritual pottery. Finally, prestige pottery could be dramatically broken during feasts where the destruction of property occurred as a display of wealth (see Gebauer, chapter 9).

There may be other production costs and prestige advantages that have not been adequately appreciated as well, but the ones just mentioned are some of the most obvious. It is also possible that some ceramics were developed in order to permit the preparation of prestigious types of food such as those requiring long periods of boiling or brewing or straining (e.g. Myers 1989:3).

If the prestige scenario bears any relevance to the initial development of pottery in some, many, or even all geographical areas, there are a number of logical expectations that follow. The first is that pottery should initially occur in the form of food-serving vessels such as plates, bowls, and liquid containers—for example, beakers, *tecomates,* and cups. It must also be recognized, however, that some instances may occur in which pottery was initially (or coterminously) developed for the processing of prestige foods (boiling, brewing, or straining). Moreover, a rapid evolution toward labor-intensive, specialized production of highly decorated forms should occur, with great emphasis on control of the medium and craft expertise. Even in instances where pottery appears to be cruder than anticipated by this model, the possibility that organic surface decorations covered over rough surfaces needs to be examined. For instance, resin coatings existed on some Jomon and Southeast Asian pottery (e.g., Aikens and Higuchi 1982:125), and exterior bark decorations have been recovered from some Neolithic Swiss vessels (Corboud and Seppey 1991).

Second, because competitive and hierarchical societies often use marriages and burials as occasions to reaffirm exchange relationships and advertise the wealth and success of the group, prestige ceramics might also be expected to feature frequently in these contexts.

Finally, the initial appearance and spread of pottery technology should occur among societies for whom feasting can be inferred to have been competitive or reciprocal for the purpose of creating allies or wealth-exchange partners, that is, among complex hunter-gatherers and most horticultural groups with incipient or developed socioeconomic inequalities. In addition to a number of other chapters in this volume that present cases consistent with this model, Gebauer (chapter 9) and Shennan (1986:135) have argued that European beakers used for drinking were essentially prestige items often used at ritual events.

The Role of Ritual

Although many archaeologists and anthropologists treat ritual and socioeconomics as distinct spheres of activity, recourse to the ethnographies of complex hunter-gatherers and horticulturalists shows repeatedly that these two domains are nearly inseparable in the context of competitive and reciprocal feasting. There are many possible reasons for this. Without going into detail, the reason I favor is that feast organizers use ritual as a pretext and a lever to gain the cooperation of large numbers of families within their own communities. Everyone in a community is generally viewed as having an obligation to keep the guardian spirits happy, or else calamity may visit the community in the form of crop failures, disease, pests, and battle defeats. Ritual can also be construed as demanding unusual and exotic items pleasing to gods and spirits—the procurement of which involves extra labor, production, and debts. Even more importantly, if leaders can convincingly portray their own ancestors

as powerful supernatural allies, this would enhance or help validate existing leaders' claims to power. Such leaders try to bury their immediate ancestors in as lavish a fashion as possible and maintain periodic sacrifices or feasts to them. Finally, the organizers of competitive feasts can easily appropriate the role of ritual and dance organizers, thereby enabling them to manipulate participants even more.

From this vantage, it should not be surprising that many of the prestige items used in competitive feasts take the form of unusually elaborate ritual items: incense burners, flower holders, offering vessels, and finely made figurines. Because of their plasticity, ceramics lend themselves admirably to the expression of ritual ideologies, the portrayal of deities, and the creation of ornate ritual forms. Whether the relatively crude ceramic figurines of cultures like that of the pre-pottery Neolithic of the Levant (Cauvin 1978) should be viewed as an expression of ritual elaboration generated and supported by the organizers of competitive or reciprocal alliance feasts is a difficult question to address. Other explanations may be equally useful, but the feasting scenario needs to be kept in mind.

In terms of other possibilities, we should not forget, for example, that the earliest use of ceramics involved the simple and crude creation of clay figurines from the easily molded loess of central Europe, apparently for shamanic divinations or spell workings (Vandiver et al. 1989). Crude ceramic figurines also occur among the complex hunter-gatherers of the North American Northwest (Mack 1991; Stenger 1986) and among the Epipaleolithic complex hunter-gatherers of the Near East and Japan. Although these figurines were products of quite complex hunting and gathering cultures, other developments of ceramic technologies, such as the creation of ceramic hearth stones in Australia (Harry Allen, personal communication, 1994) and the creation of simple, flat ceramic lamps among the Inuit (McCartney and Savelle 1989:40), appear to reflect the convenient use of the ceramic medium when other, more suitable materials were scarce. These are some of the best-documented initial occurrences of ceramic innovations as part of practical technologies. When we turn to pottery, however, in contrast to the broader range of ceramics, there is a stronger argument to be made for its development as stemming predominantly from its role in prestige technologies, including the storage and preparation of prestige foods. In order to consider the problem fully from an archaeological perspective, it is necessary to take into account the dynamics of prestige technologies.

The Dynamics of Prestige Technologies

There is another important lesson to be learned from the example of metal technology. It is that in some cases where a new medium is developed in order to supply prestige items partly because of its labor-intensive nature, craft specialists may generate technological advances that render the new medium useful in the practical sphere. This may be because of improvements in the technology, such as creating more durable cutting edges through alloying, in the case of metals, or creating heat-shock–resistant ceramics, in the case of pottery. Alternatively, prestige technologies can give rise to practical technologies due to technological improvements that greatly reduce the time and effort necessary to make the products. The previously cited examples of iron, aluminum, and plastics are important instances in which technological improvements greatly reduced costs. I have similarly argued that the initial domestication of plants and animals was a prestige technological development but that once genetic manipulation and gardening techniques had advanced to the point where domesticated foods could compete in terms of returns with wild foods, then domesticates spread to a much broader range of communities as part of a practical food producing technology and could even be adopted by groups without socioeconomic hierarchies.

At the point when a more efficient, cost-effective alternative to existing technological strategies is introduced, the new technology generally spreads throughout the surrounding area, as in the case of the replacement of stone tools with bronze in most technological domains in the Levant (Rosen 1993) and perhaps the spread of cooking ceramics in many parts of the world. It is important to recognize that even where communities lack the kind of competitive feasting structures that would make the diffusion of the original prestige technologies adaptive, the diffusion of the practical, cost-effective derivatives of prestige technologies can easily occur. This condition tends to confuse situations in which we have only a few glimpses of regional and areal diachronic developments.

Thus, whereas metals may have been developed originally as prestige technologies and initially diffused to hierarchical communities as prestige items, it was their later, practical, derivative products that were most eagerly sought by communities still using stone and often lacking socioeconomic complexity, including remote tribal communities in the nineteenth and twentieth centuries. Similarly, food production

may have originated in—and initially diffused to—communities with socioeconomic inequalities and competitive feasts, but once food production became cost effective compared to wild food gathering, agriculture must have spread to all environments where it provided a better return than wild foods, whether the inhabitants had complex communities or not. The same scenario may well have characterized the development of pottery. That is, even if the first pottery emerged as prestige items within broader prestige technologies, subsequent improvements in pottery technology may have created a derivative *practical* pottery technology used primarily for cooking or storage. This derivative practical pottery technology could have arrived first in peripheral areas where prestige technologies were not supported by the socioeconomic system, thus making it appear that practical pottery forms were the first to evolve in some localities.

Whether practical pottery technology or prestige pottery technology was the first to emerge in an evolutionary sense may thus not be as easy to determine as one might first expect. Either prestige pottery or practical pottery or both could have emerged independently, but it is at least worth exploring the possibility that the ultimate priority in all regions and areas lies with the development of pottery in the prestige technological realm.

Finally, it is worth pointing out that when technologies become affordable by a large number of people in communities, elites or incipient elites generally abandon the prestige forms that they initially pioneered. When this happens, elites go on to develop other prestige items and techniques that are not affordable by most people (see Bradley 1984; Cannon 1989; Fallers 1973; Randsborg 1982; Shennan 1982). If the cost of specific prestige items remains high, as in the case of gold and furs, prestige technologies and items persist for long periods, often along with practical derivatives that are more widely available, such as iron tools and leather shoes. If the cost of initial prestige items comes down dramatically over time, as in the case of aluminum and plastics, elites may completely abandon these technologies for the production of new prestige items. Alternatively, elites may find ways to embellish the value of objects through either expensive hand-crafted decoration or technical elaboration, as in the case of increasingly elaborate glassware and ceramics used even today to display prestige and impress guests. In many respects we can perceive the legacy of prestige technologies, including prestige pottery technology, in our own culture. The roots of these developments go back to the end of the Pleistocene, and one of the most challenging problems in contemporary archaeology is to understand the origins of prestige technologies and the impact they have had on the rest of culture.

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