NEW ZEALAND JOURNAL OF ARCHAEOLOGY

The Loss of Pottery in Polynesia

Genevieve Le Moine

Department of Archaeology, University of Calgary, Canada

ABSTRACT

The prehistoric loss of pottery in Polynesia has been of interest to archaeologists for decades. A number of recent models explaining this loss are reviewed here and a new model, based on ceramic ecology, is presented. It is concluded that a number of interrelated factors were important in the disappearance of the craft of pottery manufacture from Polynesia.
Keywords: POLYNESIA, LAPITA, POTTERY, ACERAMIC.

INTRODUCTION

> Ceramics are one of the tangible products of man's culture. Their relatively widespread manufacture among cultures of the world, their relatively imperishable quality, their persistence through time and their almost universal presence have made them a very important tool for the archaeologist in his study of the past (Arnold 1985: 1).

This widely held view of ceramics has coloured the view that archaeologists have of Polynesian culture and has led them to see the loss of pottery in Polynesia as a major and enduring problem in Polynesian prehistory (e.g., Davidson 1979). On close examination, however, the problem seems to disappear. Seen in perspective, the loss of pottery is not really very important; any significance it has comes not from the technological change itself, but from associated changes that were going on in the culture. In this paper I will critically review recent models that have attempted to account for the prehistoric loss of pottery in Polynesian culture, and present a new model which deals more fully with the problem.

PREVIOUS MODELS

One of the earliest and most widely held explanations for the disappearance of ceramics in Polynesia simply took note of the fact that most of the Polynesian islands lacked clays, and that this was why Polynesians did not make pots. It is now clear that this model does not fit available data, since four Polynesian island groups (Tonga, Samoa, Futuna and Uvea) manufactured pottery prehistorically for a very long time (Green 1974b, pers. comm.). Recently, however, this model has been revived by Claridge (1984). After extensive analysis of available clays and tempers from both western and eastern Polynesia, Claridge concluded that Polynesia was not well suited to the manufacture of ceramics. Claridge (1984) considers that the difficulty in constructing good pottery with available resources would have made it an uneconomic craft.

Although this argument is quite acceptable for eastern Polynesia, it is less satisfying for western Polynesia. The main problem is that it is not at all clear why after more than a millennium of local pottery manufacture people would decide it was uneconomic and stop. Other factors must have been involved. Further problems can be seen in Claridge's understanding of prehistoric pottery, and tempering in particular. When discussing Tonga, he indicates that the only suitable temper, sands of volcanic origin, is not found on the same islands as the clay, and so would have to be transported. Considering that watercraft

must have been available, this cannot be seen as much of a problem. If it was considered to be so, there seems to be no reason why coral-derived beach sands, which Claridge (1984) says are widely available, could not have been used. Vegetable fibres, crushed shell and ground up potsherds also make good tempers and would have been available. Although the use of calcareous sands or crushed shell would require the use of salt rather than fresh water in manufacture (Rye 1976), such a practice is by no means unknown and indeed, calcareous beach sand tempers are considered to be characteristic of Early Eastern Lapita at least (Kirch 1981). If calcareous sand was not used in the manufacture of later wares, it must have been for some cultural reason, rather than because of unavailability of such sand. The poor quality of clays and tempers said to be available by Claridge (1984) may have played a part in the disappearance of ceramics in Polynesia, but it was by no means the main cause.

Irwin (1981) has proposed a more complex model for the disappearance of pottery in Polynesia. According to his model, pottery manufacture was first lost in eastern Polynesia, as a result of founder effect: the first migrants from the west arrived in eastern Polynesia aware of ceramic technology but either had no potters with them, found no suitable clays, or found the available clays to be inappropriate (Irwin 1981: 486). After the settlers learnt to get along without pottery, new cultural practices associated with the lack of pottery spread back to western Polynesia. The main point of Irwin's argument is that the "pause" in the settlement of Polynesia between west and east never took place, but that the earliest settlers of eastern Polynesia are archaeologically invisible, or at least less visible. He attributes this to increased difficulty in finding possibly small, aceramic sites, as well as sampling error and site destruction by later occupations. Although some of the other arguments he presents against a pause in colonisation are good, there are many problems with this case. If after colonisation of easterly islands there was continued communication with the west, as there must have been for the idea of living without pots to spread back, then potters could have migrated eastwards, if clays were available. Since clays were not available, it is also possible that pots could have been traded. This seems to have happened at least once, with pots from Fiji reaching the Marquesas (Dickinson and Shutler 1974). The possible diffusion from east to west of the idea of not using pots is a more complicated problem, not really addressed by Irwin. It is unclear why one group would give up some aspect of material culture just because another group had to do without.

Leach (1982) has suggested that increasing emphasis on cooking and storage techniques suitable for root crops, but not grain crops, was the impetus for the loss of pottery. She points out that ceramics, or more generically, heat proof vessels are necessary for the cooking of grain and legume crops. The proto-Austronesian peoples, from whom the Polynesians are ultimately derived, are thought to have cultivated rice and millet as staple crops. Pots would have been an important part of their material culture, for the cooking and storage of these crops. In Island Melanesia and Polynesia rice was not cultivated; root and tree crops became the staple starches. Earth ovens and fermentation/storage pits are as efficient, if not better, ways of storing and cooking these crops, and so they eliminated the need for pots. The use of these techniques led to the decline and eventual abandonment of the ceramic industry. Leach (1982) has made a very good point. The Polynesians did not need pots, and so could afford the luxury of not making them.

The question of a functional change in ceramics has also been addressed by Green (1974b). Ethnographic materials show that late ceramic vessel forms are duplicated in wooden vessels. Using these data, Green (1974b) has suggested that the loss of pottery

itself resulted in no functional change in material culture, only a change in the raw material used to form vessels. The functional change seems to have occurred much earlier, marked by the transition from Early Eastern Lapita to Late Eastern Lapita. At this time, a number of elaborate, decorated vessel forms dropped from the record. Functional equivalents of these vessels are unknown (Green 1974b: 249). Whatever function these vessels served, technological, social or ideological, it must have lost its importance at that time, rather than later, when ceramics disappeared altogether. Although this model addresses neither the "how" nor the "why" of the loss of pottery in Polynesia, it does point out an aspect of the problem not addressed by the other models, that the important change probably took place earlier in the sequence than the actual loss of pottery.

Green (1974b) suggested that social as well as functional factors played a role in the loss of pottery. Another model has emphasised social factors. In 1973 Kaeppler suggested that the loss of pottery may have been tied to the development of the hierarchical social structure, at least in Tonga. She postulated that originally pottery may have been used by all members of society, but that eventually it was used only by high status people. She suggests that decorated pottery was originally associated with high status. When decoration was no longer used, plain pottery became a high status item and lower status people used other containers. The fact that pottery was a high status item, according to Kaeppler (1973), would have had a negative, dampening effect on pottery manufacture. When pots were no longer in common use their very presence would make them special, a quality they would lose if they were still being manufactured. If they continued to be of some ritual importance, they could be imported (Kaeppler 1973: 220–221). Although this is an interesting possibility, it does not explain what replaced pottery, nor why it was replaced. It merely shows that there is an antecedent for such a replacement.

In a more recent model, Marshall (1985) suggests that the most important factors were economic. Specifically, she feels that the breakdown of widespread trade networks, associated with the breakup of the Proto-Polynesian language, in which pottery is thought to have been an important trade item, resulted in the loss of vitality in the ceramic industry.

The problem with Marshall's model is that she is basing her arguments on observations of modern ethnographic industries. It may be that her points are valid, (as her claim that women made Lapita pots seems to be), but it is by no means clear that a breakdown in trade would result in a loss of vitality culminating in the disappearance of the craft. In the example she gives, illustrating a similar loss of vitality in a New Guinea ceramic industry, there is no indication that the tradition would disappear completely, and if it did, other heat-proof vessels would probably be substituted. Many ceramic industries have survived in the absence of trade, because the makers see a need (real or perceived) for pots. Trade is important for the development of a specialised ceramic industry (Arnold 1985: 166), not for any ceramic industry. People will not cease pottery manufacture merely because it is no longer part of their trading pattern. Other factors must be involved.

All of these models make valid points, but none of them covers the whole issue of both how and why the Polynesians lost the craft of pottery manufacture. The main problem is that none of these models takes all of the others into account. The different models are not mutually exclusive, but each emphasises one aspect of the problem. I will present a model that incorporates many of the factors pointed out in previous models, and presents the problem in the theoretical framework of ceramic ecology.

A NEW MODEL

Pottery functions in all three systems of culture, the technological, the social and the ideological (White 1949: 364), but its most important function is in the technological system. The roles it plays in the other two systems can be taken over by other objects or goods, but pottery itself is less easily replaced. Oceania, and Polynesia in particular, is the only area in the world in which the art of pottery was lost prehistorically. I believe that this was due to the decreasing importance of pottery in the technology of Polynesia, and that this decrease in importance was tied to the intensification of agricultural production. In a recent book *Ceramic Theory and Cultural Process*, Arnold (1985) has examined and elucidated the role of pottery in culture and society. Working in a systemic framework, he discusses the factors affecting the production and utilisation of pottery, and how these act as positive and negative feedback mechanisms on the developmemt of the craft. Arnold (1985) identifies seven main factors which affect development of ceramics: resouces, weather and climate, scheduling, degree of sedentism, demand, man/land relationships and technological innovation. Not all of these factors are applicable here, in part because suitable data for evaluating their effect were unavailable. Of particular concern are the effects of resources and demand. It is likely that some of the other factors, especially scheduling, are important, but these could not be evaluated.

The question of suitable resouces for pottery has most recently been addressed by Claridge (1984) in the article discussed above. In eastern Polynesia, the lack of good clays is the obvious and satisfactory explanation for the lack of pottery. In western Polynesia, a long ceramic tradition indicates that suitable clays are available. Claridge (1984), however, points out that these are not of high quality, and that clay and temper resources would not always have been available in the same places. According to Arnold (1985: 32), where the available clays are suitable for making pottery, but are of poor quality, the craft will not develop into a full-time occupation. In Polynesia, the islands were initially occupied by people who had ceramic technology. While ceramics were important, they continued to make them, but as they become less important, the relatively poor quality of the clays acted as a "deviation counteracting mechanism" (Arnold 1985). Thus the quality of the resources available in western Polynesia did not itself lead to the abandonment of pottery, but when other factors led to a decline in the importance of pottery, the quality of the clays acted to further the decline, rather than stopping it, as better raw materials may have done.

A more important factor influencing the decline of pottery is that of demand. The demand for pottery can arise from different needs; technological, economic, social or ideological. The economic aspects were considered by Marshall (1985), who attributed the decline in pottery to the breakup of trade systems, associated with the breakup of the Proto-Polynesian language. Although the decreased demand for pottery that would result from a declining trade would have a negative effect on the industry, it is unlikely that it would cause the craft to disappear completely, as long as there was some domestic demand for pottery.

It is also possible that apart from purely utilitarian purposes, pottery was important in other systems of the culture as well. This would create additional demand for ceramics for social and ideological reasons. Kaeppler (1973) has suggested that the social role of pottery in Tonga may have led to its decline, rather than having a positive effect on the craft. This is possible, although the reason for it is unclear. The role of pottery in the ideological system of Polynesian culture is also unclear. Arnold (1985) suggests that the incorporation of ideological or mythological symbols in the decoration or form of ceramics can have a positive effect on the craft. Clearly this did not happen with Polynesian ceramics, especially

in terms of decoration, since at the end of the sequence it was undecorated. On the contrary, Green (1979b) has demonstrated that the style of decoration (and whatever information it carried) was transferred to, or continued to be used on, barkcloth and in tattoo designs in Polynesia, from Lapita times onward, although it was no longer used on pottery. The loss of pottery in Polynesia did not result in a loss of information transmitted by art style, but could have contributed to it, since the undecorated pottery would not be in demand as an information carrying object.

The case of information transmitted by vessel form is more complicated, since the loss of vessel forms took place in two stages. The first to be lost were complex vessel forms associated with Lapita style decoration. These were lost when decoration was no longer applied to pottery (Green 1974b). Although the decorative elements were not completely lost from the culture, these vessels forms were. This still remains a mystery. The second stage, when the rest of the vessel forms were lost, is less of a problem. It is possible to find modern wooden vessels which parallel the shapes of the prehistoric ceramic vessels from the end of the ceramic sequence. Whatever information these vessel forms conveyed, and whatever function they served was preserved into the aceramic period (Green 1974a). This includes two vessel forms that had ritual significance, the kava bowl and kava cups (Green 1974a: 129). Thus, apart from the actual loss of the technology itself, only one stage in the decline of pottery represents a loss of some sort, when particular vessel forms disappeared. In every other case, designs and forms were transferred to, or maintained in, different media. If there had previously been a demand for ceramic objects of some ritual or ideological significance, these changes would have dampened it significantly.

As emphasised above, pottery is most important in the technological system of culture. Its main function is as a vessel for storing and/or cooking food. Arnold (1985: 151) states that "the utilitarian advantages of ceramics created a demand which provided a deviation amplifying mechanism for the original development of pottery." As long as there is a demand for (inexpensive) cooking and storage vessels, (and assuming that other factors such as climate and availability of clay make it possible), pottery will be produced, although it may not develop beyond the stage of household production (there are other factors influencing this). Where suitable conditions for the manufacture of pottery on some level exist, as they must have in Polynesia, the lack of demand for pottery is the most likely reason for its decline and eventual disappearance. As has been shown above, some decline in demand was the result of less trade and possibly less demand for ritual items made of clay. Other reasons for this decline have been presented by Leach (1982), as previously discussed. In Polynesia, cooking and storage techniques that did not use pottery were highly developed. As these increased in importance, demand for ceramics declined on the most fundamental level.

There is evidence that pit storage and earth ovens were known and used in early Lapita sites (Green 1979a: 37; Davidson 1979: 93), but they are reported to exhibit less prominence in these sites than in the ones that follow. In later sites from the ceramic period in Tonga and Samoa, the evidence for fermentation pits is "substantial" (Davidson 1979: 94). The early Lapita sites of Polynesia are associated with initial adaptation. Sites of this period are less common (Kirch 1984). Following this is a period of expansion, population growth and increase in the area of land under agriculture, without intensification (Kirch 1984). It is this period that fits with the later ceramic sequence in Tonga and Samoa. For Tonga, Kirch (1984) suggests that all arable land was in use between 300 B.C. and A.D. 700. After this

period of expansion, which on an island must always be limited, comes intensification. According to Kirch (1984), this was only partly a response to increased population. A more important cause was the demands of the chiefs to increase production of surplus, so that they could increase their prestige. Also important was the need to store surplus as insurance against drought and famine, which are regular occurrences in Tonga (Kirch 1984).

Whereas in most of the world intensification of agriculture was based in part on grain crops, in Oceania it was based on root and tree crops. No grains were cultivated. As Leach (1982) has pointed out, ceramics are important for cooking grain and legume crops, whereas root crops can be cooked and stored by other means. In Polynesia, the slow loss of pottery is correlated with the expansion and intensification of root and tree crop agriculture in which pottery did not play an important part. As more time and energy was put into an agricultural system where ceramics were unneccessary, demand declined and the manufacture of pottery became less and less important.

A further possible factor which should be considered is the "marginality" of potting as an occupation. Potters, full or part-time, are often unwilling to make use of their craft (David and Hening 1972: 4), and abandon it if they can (Arnold 1985: 193–194). As David and Hening (1972: 25) noted, "the hall-mark of the successful potter is to have stopped potting." Both Arnold (1985) and David and Hening (1972) attribute this to the low socio-economic position of potters. The status of potters in prehistoric Polynesia is unknown. Marshall (1985) found that generally in Oceania where males are potters potting could be a route to high status, but that for female potters this was not usually possible. If Lapita potters were female, as Marshall (1985) suggests, then the above argument may hold. If they were males, then low status may not have been a factor. Arnold (1985: 193) also points out that pottery is economically a riskier undertaking (as a full-time craft) than farming, since pots must be traded for subsistence. David and Hening (1972) noted that in northern Cameroon potters were women who usually had no other means of supporting themselves. If the situation in Polynesia was similar, then the lack of demand for pottery would have been an overwhelming incentive to stop potting, even on a part-time basis, and find some more economically lucrative craft.

The link of the decline of pottery with the intensification of agriculture in Polynesia is important, but it is not the only factor. If it were, pottery would have disappeared throughout Oceania, which it did not. Significantly, however, the locations where it was maintained are continental islands. These are more complex geologically and so have better clay resources. In the case of Fiji, trade in pottery remained important into historic times (Marshall 1985). These two factors, better quality resources and continued importance of trade, counteracted the declining demand for pottery which came with the intensification of agriculture.

CONCLUSIONS

The loss of pottery in Polynesia is the result of many interacting factors. The most important of these is the lack of demand for pots as cooking and storage vessels, since this is the most basic function of pottery. However, many other factors must be considered to explain the disappearance of pottery completely. Among these are the quality of available resources and the demand created by the use of pottery as a trade item. Other factors include the social and ideological function of ceramics and the fact that potting is often considered a marginal craft which people will abandon whenever possible. It is important that all of these factors be taken into account. When they are considered independently, as in earlier models, none of them can fully explain the loss of pottery.

As I stated in the introduction, when all the factors discussed above have been considered, the loss of pottery in Polynesia does not seem to be much of a problem. Polynesians stopped making pottery because it was no longer in demand. Suitable substitutes for it were readily available, in all of its various roles.

ACKNOWLEDGEMENTS

This paper was originally presented as part of a Graduate Seminar in the Department of Archaeology, University of Calgary, offered by Drs Roger Green and David Kelley. I thank them, and the other participants in the seminar for their comments on this paper. I also thank Patrick Carmichael, Helen Leach, Scott MacEachern and anonymous reviewers for their comments on various drafts.

REFERENCES

Arnold, D. 1985. *Ceramic Theory and Cultural Process.* Cambridge University Press, Cambridge.

Claridge, G. C. C. 1984. Pottery and the Pacific: the clay factor. *New Zealand Journal of Archaeology* 6: 37–46.

David, N. C. and Hening, H. 1972. The ethnography of pottery: a Fulani case seen in archaeological perspective. *Addison-Wesley Modular Publications* 21: 1–29. Addison-Wesley, Reading, Mass.

Davidson, J. M. 1979. Samoa and Tonga. *In* Jennings, J. D. (Ed.), *The Prehistory of Polynesia*, pp. 82–109. Harvard University Press, Cambridge, Mass.

Dickinson, W. R. and Shutler, R. Jr. 1974. Probable Fijian origin of quartzose temper sands in prehistoric pottery from Tonga and the Marquesas. *Science* 185: 454–457.

Green, R. C. 1974a. Excavation of the prehistoric occupation of SU-SA-3a. *In* Green, R. C. and J. M. Davidson (Eds), Archaeology in Western Samoa, Vol. 2, pp. 108–154. *Bulletin of the Auckland Institute and Museum* 7.

Green, R. C. 1974b. A review of portable artefacts from Western Samoa. *In* Green, R. C. and J. M. Davidson (Eds), Archaeology in Western Samoa, Vol. 2, pp. 254–276. *Bulletin of the Auckland Institute and Museum* 7.

Green, R. C. 1979a. Lapita. *In* Jennings, J. D. (Ed.), *The Prehistory of Polynesia*, pp. 27–60. Harvard University Press, Cambridge, Mass.

Green, R. C. 1979b. Early Lapita art from Polynesia and Island Melanesia: continuities in ceramic, barkcloth and tattoo decorations. *In* Mead, S. (Ed.), *Exploring the Visual Art of Oceania*, pp. 13–31. University Press of Hawaii, Honolulu.

Irwin, G. 1981. How Lapita lost its pots: the question of continuity in the colonisation of Polynesia. *Journal of the Polynesian Society* 90: 481–494.

Kaeppler, A .L. 1973. Pottery sherds from Tungua, Ha'apai; and remarks on pottery and social structure in Tonga. *Journal of the Polynesian Society* 82: 218–222.

Kirch, P. V. 1981. Lapitoid settlements of Futuna and Alofi, Western Polynesia. *Archaeology in Oceania* 16: 127–143.

Kirch, P .V. 1984. *The Evolution of the Polynesian Chiefdoms.* Cambridge University Press, Cambridge.

Leach, H. 1982. Cooking without pots: aspects of prehistoric and traditional Polynesian cooking. *New Zealand Journal of Archaeology* 4: 149–156.

Marshall, Y. 1985. Who made the Lapita pots? A case study in gender archaeology. *Journal of the Polynesian Society* 94: 205–233.

Rye, O. S. 1976. Keeping your temper under control: materials and the manufacture of Papuan pottery. *Archaeology and Physical Anthropology in Oceania* 11: 106–137.

White, L. A. 1949. *The Science of Culture*. Grove Press, New York.

Received 23 June 1986