

carbon band) is always darker than the lower interior (that below the carbon band). In contrast, in rice pots, either there is no difference in color between the upper and lower interior, or the lower interior is darker than the upper interior.

This pattern is related to water. In vegetable/meat pots, the presence of water prevents the light carbonization of organic materials below the water level (in the lower interior). On the other hand, in rice pots, the light carbonization of rice grains occurs on the whole interior surface during the simmering stage as water is removed from the rice.

CONCLUSION

Rice and vegetable/meat pots show many distinctive differences when the resin removal stage is controlled for. The most distinctive features are color differences in noncarbon areas, the presence/absence of interior thermal spalling, the presence/absence of interior nicks, and the presence/absence of middle exterior oxidation patches. By observing these distinctive features, it was possible to identify the cooking technique (rice cooking or vegetable/meat cooking) for the 46 pots with 100% accuracy, regardless of resin removal stage. However, it should be noted that the cooking pots analyzed here were used only for rice cooking or vegetable/meat (including *chaycot*) cooking, according to the cooking survey. When a pot is used for rice cooking *and* vegetable/meat cooking, the use-alteration patterns will be a mixture of the rice patterns and the vegetable/meat patterns.

The differences in the interior carbon deposits between rice and vegetable/meat pots are explained by such factors as the amount of water in the pot, the distance from the heat source, and the intensity (temperature) of the heat source.

As rice and vegetable/meat pots are used, the middle interior carbon deposits get darker and thicker and the area of the middle interior carbon patches increases vertically and horizontally. Therefore, rice pots and vegetable/meat pots can be distinguished more accurately when the number of use events is controlled for.

8

POTTERY EXCHANGE AND THE REGIONAL SYSTEM

A Dalupa Case Study

Miriam T. Stark

The study of exchange has a hallowed tradition in archaeological research, and it continually produces models that focus on the intimate relationship between organizational complexity and modes of production and distribution (e.g., J. E. Arnold 1992; Brumfiel and Earle 1987; Costin 1991; Pool 1992; Renfrew 1986; Schortmann and Urban 1987). In areas ranging from the Near East to the American Southwest, models hinge on the identification of prehistoric exchange networks and the mechanisms that fueled these interregional interactions. Recent developments in compositional studies and a growing body of ethnographic literature have encouraged archaeologists to focus on aspects of both production and distribution. This study of Kalinga ceramic production and distribution represents such an integrated approach.

Although archaeological research can identify different types of data and techniques informative for studying prehistoric exchange, ethnoarchaeological research on ceramic production and exchange provides behavioral data needed to build models of prehistoric ceramic production and distribution. Case studies among ceramic-using societies document the range of distances in the movement of commodities, the scale in the number of commodities exchanged, and the temporal limits to a given system. Ceramic ethnoarchaeological research to date has been less concerned with distribution than with subjects related to ceramic production and consumption (Kramer 1985). Extant research on ceramic distribution has provided valuable contributions (e.g., Balfet 1981; Bankes 1985; Crossland and Posnansky 1978; Hodder 1979a; Miller 1985; Nicholson and Patterson 1985, 1992; Nicklin 1981; Oram 1982; Rice 1987). However, such research has rarely focused on details of scale and distance of distribution networks that archaeologists might compare with archaeological data sets (cf. Chávez 1992; Gill 1981:123–128; Kramer 1991).

Ethnoarchaeological research in the Kalinga village of Dalupa in northern Luzon, Philippines, explored a pottery exchange system. This chapter describes the mechanisms of Dalupa ceramic distribution, the quantity and distance that ceramic wares travel, seasonal fluctuations in the frequency of exchange, and the geo-

graphical extent of the ceramic exchange network. The relationship between Dalupa ceramic production and the broader Kalinga regional exchange system is then articulated. By tacking between comparative ethnographic data and the Kalinga case study, this chapter describes basic aspects of pottery exchange that archaeologists can use to formulate models of prehistoric ceramic exchange networks.

This ethnoarchaeological study has two main objectives. The first is to present results of a study on Dalupa pottery production and distribution by exploring dimensions of pottery as a medium of exchange within the Kalinga regional network. The second is to demonstrate that the village-level specialization observed in Kalinga is typical of regional exchange systems found throughout the continuum of organizational complexity. Ethnoarchaeological studies such as this one provide cross-cultural data on the distribution of pottery and help to identify factors that determine the structure of a given pottery exchange network.

BACKGROUND

The boundaries of the Pasil Municipality in Kalinga-Apayao Province (see frontispiece) roughly coincide with those of the Pasil River Valley. Pottery production in the Pasil River Valley was more extensive twenty to thirty years previously, involving at least four villages: the eastern community of Cagaluan, the central villages of Dangtalan and Dalupa, and the western community of Balatoc. This same tendency of smaller production centers to decline while larger centers expand to supply a larger area has been described in southeastern Nigeria (Nicklin 1981) and may be common worldwide.

By the time of Longacre's initial research in the mid-1970s, the only active potters in Pasil lived in Dangtalan and Dalupa. Kalinga pottery-making appeared to be organized as a system of limited pottery production, primarily intended for local use and for restricted circulation beyond their own households (Longacre 1981, 1985). The Dangtalan pattern of the initial fieldwork fits the "household system" of pottery production (Peacock 1982; van der Leeuw 1977). A narrow range of vessels were produced as needed for household use and for restricted exchange outside the Dangtalan community.¹ Vessel types

¹ Graves's use of the term *region* in most respects parallels my use of the terms *community* and *village*. The term *region* technically refers to a political entity that is a peace pact holding region (see for example Dozier 1966; Lavless 1977; Takaki 1977). A village can encompass a number of settlements and sitios, such as the Dangtalan-Lonong-Puapo unit, the multiple settlements that comprise Cagaluan, the sitios and settlement known as Magsilay, or the various settlements known as Balenciagao. The Kalinga, in daily usage, distinguish between communities, rather than peace pact holding units. I follow the Kalinga usage to describe the communities that figure in this study.

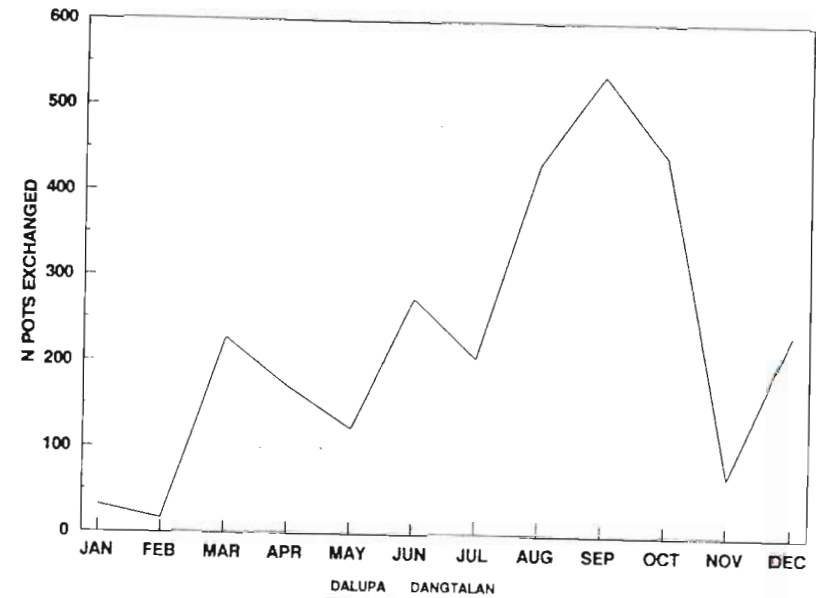


Figure 1. Seasonality in pottery exchange transactions: Dangtalan and Dalupa, 1988.

were strictly utilitarian, and pottery production and exchange were highly seasonal, with pronounced peaks during periods of minimal farming demands. (Seasonality in Dangtalan and Dalupa pottery exchange transactions is illustrated in Figure 1.)

Graves's (1991) previous research using Dangtalan data collected between 1975 and 1980 provides a longitudinal perspective on changing patterns in Pasil pottery production and distribution. Dangtalan household pottery inventories and limited data on pottery exchange suggested that a shift was occurring in the mode of Dangtalan pottery production. Whereas in 1975 almost 70% of Dangtalan women supplied their own households with vessels, only one-third were doing so in 1980. The scale of pottery exchange had concomitantly increased threefold (Graves 1991). In sum, fewer potters were making pots, and those who persisted were becoming part-time specialists and were engaged in trading pots beyond their own villages. Pottery production for exchange had become an important economic "buffer" for selected Dangtalan households that lacked adequate economic resources throughout the period 1975–1980.

Upon the Kalinga Ethnoarchaeological Project's return to the field in 1987, it soon became clear that the neighboring village of Dalupa (2 km distant) had assumed dominance over Dangtalan in pottery production and distribution for the entire Pasil River Valley (M. T. Stark 1991a,b). The magnitude of changes

observed in the earlier Dangtalan data may have been underestimated, since less than ten of the Dangtalan potters (one-fourth of the previous potters) had remained active. In Dalupa, meanwhile, the number of potters had grown by about 30%. Nearly four times as many Dalupa potters as Dangtalan potters made and exchanged pottery during the 1987 and 1988 pottery production cycles. The following comments are based on observations of pottery production and distribution in the Kalinga village of Dalupa.

RESEARCH METHODS

Field research was conducted as part of the Kalinga Ethnoarchaeological Project between October 1987 and late June 1988 in Dalupa (Figure 2). Two techniques of data collection were utilized: informant-produced data and observational data. Informant-produced data included structured and open-ended interviews with potters and nonpotters on aspects of ceramic production and exchange. Observational data used in this study included pottery exchange logs for 60 potters, photographic documentation, and a Dalupa population census. These data were gathered from all 77 of the Dalupa households during the 1987–1988 field season. Unstable political circumstances truncated the field season to nine (rather than twelve) months. However, the daily pottery exchange log was continued by a trained Kalinga assistant for the duration of the twelve-month study, resulting in a full one-year record of exchange transactions.

During 1988, Dalupa had a population of approximately 400 residents. Fifty-five (70.9%) of the households had at least one potter for a total of 56 Dalupa potters. Thirty-nine of those potters participated in the 1988 Dalupa pottery exchange network. This study uses data on 2,779 ceramic vessels and nontraditional forms, as well as the sources of information that were previously listed to describe the organization and scale of Dalupa pottery production.

VARIABILITY IN DALUPA POTTERY PRODUCTION

Kalinga potters manufacture all their products without a wheel. The stages involved in hand-building Kalinga pots have been described previously (Longacre 1981, 1991b) and involve a combination of paddle-and-anvil and coil-and-scrape techniques. Open firings, often involving the products of multiple producers, are conducted at several designated firing areas along Dalupa's periphery.

Pottery production and distribution is predominantly a female domain. It is only with the advent of nontraditional forms that men have entered the produc-

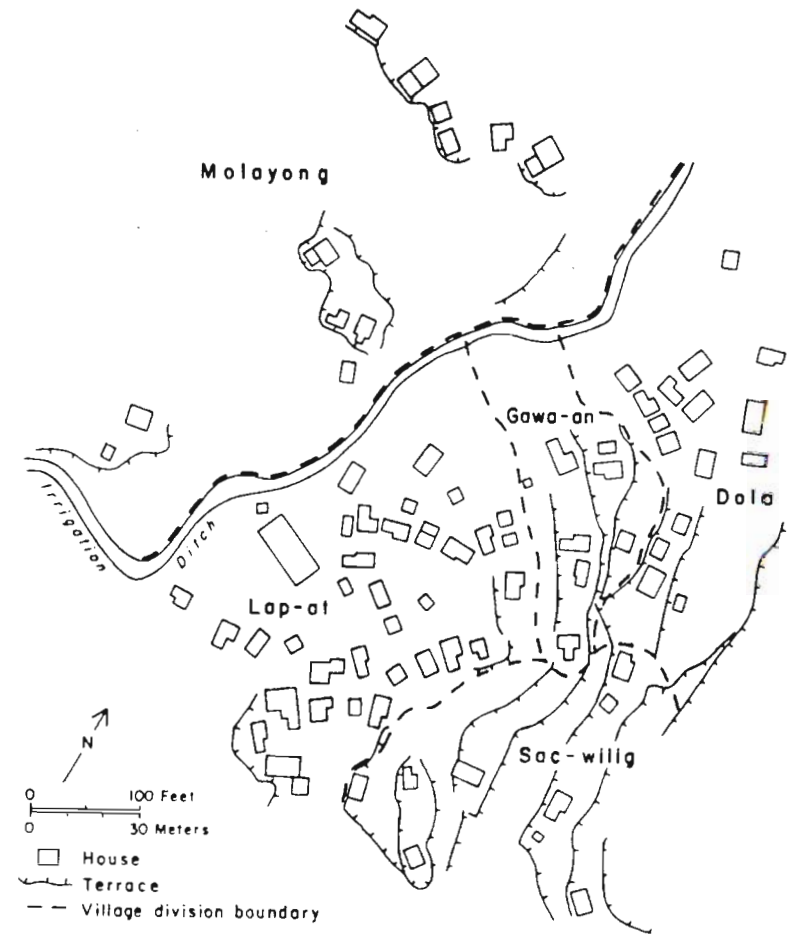


Figure 2. The pottery-making village of Dalupa.

tion arena. During the 1987–1988 study, one man had begun to make ceramic sculptures that were intended for sale, but he did not know how to produce vessels. A second man was helping his wife with the lettering on plaques bearing the inscription "God Bless Our Home," since the potter, his wife, was illiterate.

A combination of ecological and nonecological factors explains why Dalupa pottery production has remained a part-time craft specialization. The Pasil area experiences pronounced dry and rainy seasons each year. The dry season lasts between November and April, whereas typhoons and heavy rainfall frequently occur during the period from July to October. These annual climatic fluctuations limit the amount of weather suitable for pottery production while concurrently

causing predictable periods of food scarcity and less predictable droughts and crop-destroying rains.

Many potters stockpile pots to guarantee a supply of vessels to be bartered during the rainy season, a pattern also noted for the highland Maya of Guatemala (Nelson 1991). Others continue to make pottery, at a lower rate of production, throughout periods of inclement weather. Nonenvironmental factors also place constraints on the scale of production. These include the Kalinga system of land tenure, inter-kin group feuding, population pressure, and the differential potential for wage labor among families.

Dalupa potters are part-time ceramic specialists for whom the agricultural cycle determines the amount of time they devote to pottery production. An increasing number of Dalupa potters engage in pottery production nearly year-round. However, Dalupa pottery production remains subordinate to agricultural activities, so that the frequency of pottery production and exchange fluctuates in response to the labor demands of an intensive, two-crop, wet-rice cultivation cycle.

Dalupa's organization of production—a variant of household industry (Peacock 1982; van der Leeuw 1977)—resembles those observed worldwide (D. Arnold 1985; Rice 1987), from South America (e.g., D. Arnold 1975; Bankes 1985) and Mesoamerica (e.g., P. J. Arnold 1991; Reina and Hill 1978) to Africa (e.g., Balfet 1981; Gallay 1970; Hodder 1979a) and the Pacific (e.g., Allen 1984; Oram 1982; Specht 1974).

Figure 1 indicates that the number of vessels exchanged is highest in each three-month period preceding the rice harvest (from March to June and from August to October) in the annual agricultural cycle. Some households that experience rice shortages during these periods supplement their larders with rice purchased from the provincial capital of Tabuk. Those households that lack cash incomes and adequate landholding to meet consumption needs are hardest hit. For such families, pottery production for exchange is a critical buffer against semiannual subsistence stress. These shortages, as well as seasonal peaks in agricultural labor demand, govern the seasonal pattern of pottery production and exchange.

Data presented in Figure 1 illustrate scalar differences in Dalupa and Dangtalan ceramic production in 1988. The Dangtalan cycle exhibits two clear peaks that reflect rice shortage periods. This pattern, in which Dangtalan potters subordinate their potting to farming activities, has remained stable since at least the middle to late 1970s (see Graves 1991). Dalupa ceramic production, on the other hand, peaks not only during these semiannual rice shortages but also between them. That such peaks are still pronounced in Dalupa ceramic production suggests that Dalupa potters are part-time (rather than full-time) specialists whose households continue to practice intensive rice cultivation.

The pattern noted in earlier Dangtalan data (and then observed during fieldwork in Dalupa) was one in which the number of potters decreased while the scale and geographical range of pottery distribution increased through time. The question arises: why did some potters intensify their production while others virtually ceased production? The reason is largely economic. Political factors suggested previously, such as increased tribal warfare (Graves 1991: 131), have made Dalupa potters more selective in their choice of barter villages but have not deterred them from engaging in pottery production. Communities in marginal environments often specialize in craft production for exchange (D. Arnold 1985; Rice 1987). The total amount of cultivable land varies among households within villages, and between villages in Pasil, making differences in wealth obvious at both the intra- and intercommunity levels. Some Dangtalan households and most Dalupa households suffer from a lack of wage-earning alternatives. Women in these households have intensified their pottery production to compensate for household deficits.

Seasonal or chronic fluctuations in the availability of rice from the household's landholding affect the frequency of Dalupa pottery production and exchange. Seasonal fluctuations include delayed harvests or rodent infestation. Chronic fluctuations result from poorly irrigated agricultural fields, perennial crop pests, or a lack of rice fields. Some households own or have access to (through tenant farming) rice fields that have unpredictable water supplies or perennial infestation. Potters in these households continue to make and produce pots throughout the year, regardless of agricultural schedule. Monthly fluctuations in Dalupa pottery production and distribution contrast to the Dangtalan cycle, in which production output has a more pronounced seasonality and thereby reflects the lesser importance, at the community level, of pottery exchange as a subsistence alternative.

MECHANISMS OF POTTERY DISTRIBUTION

Pottery made worldwide in traditional, hand-built production systems can be distributed with the aid of pedestrian or nonpedestrian transport (e.g., waterborne transit, bullock cart, and, more recently, truck) (see Kramer 1985 and Rice 1987 for discussions). Distances vary in relation to local geography (e.g., topographic relief and available routes) and in relation to the mode of transport used. Frequently, two or more types of transport are combined to distribute pottery. Dalupa potters travel by foot to virtually all settlements within their traditional exchange system, which are those villages that are located within the Pasil River Valley. The introduction of regular truck transportation from the

Pasil area to the provincial capital has enabled potters to use motor vehicles to enlarge their distribution system. Dalupa is located closer to a well-traveled road than is Dangtalan, and this factor has favored the expansion in the scale of Dalupa pottery exchange.

In Kalinga, utilitarian goods (including pottery) are traditionally distributed within a barter economy by means of balanced exchange transactions (Takaki 1977). The southern Kalinga institution of exchange has been described by Takaki (1977) for the Uma community in the neighboring municipality of Lubuagan. Kalinga potters often participate in exchange transactions in which food, livestock, raw materials, manufactured items, and field labor are bartered for earthenware vessels.

Pounded rice is generally used in subsistence transactions, including pottery exchange (Takaki 1977:375). The range of traditional barter items has greatly expanded with increasing contact between the Kalinga villages and the outside world. Groceries, clothing (e.g., T-shirts, shorts, pants, skirts, and undergarments), rubber shoes, soap, medicine, enamel plates, and even metal cooking pots (known in the Philippines as *calderos*) were exchanged for Dalupa pots of differing sizes during the 1988 exchange cycle. Kalinga pots were also given as gifts in social displays of generalized reciprocity.

MECHANISMS OF DALUPA POTTERY DISTRIBUTION

Dalupa pottery circulates through two types of distribution: primary distribution (i.e., from producer to consumer) and secondary distribution (i.e., with an intermediate step between producer and consumer). Primary distribution is the traditional form of exchange and accounts for the majority of Dalupa vessels that are found outside the production center (see also Graves 1991:119–123). However, the importance of secondary distribution is increasing and seems related to the escalating scale of ceramic production.

Most pottery circulates through direct contact between producer and consumer. Dalupa potters ply their goods within the exchange system by means of formal barter trips to consuming settlements. At these communities, potters deliver previously ordered wares or bring a selection of goods with them to barter. Barter trips are generally planned in advance and utilize either foot or truck transportation. Trips involving motor transportation may be sufficiently distant to require an overnight stay. Potters frequently travel in groups of two or three women, although trips by single potters are not uncommon to neighboring localities, or to localities in which the potter has close relatives. Groups of potters manufacture vessels together as work groups (see Figure 3). Mem-



Figure 3. Some potters from one of Dalupa's work groups. Work group membership is related to kin and other social relations, and group size varies from two to five potters. (Photograph courtesy of the Arizona State Museum, University of Arizona; Miriam Stark, photographer.)

bers of these work groups also frequently travel together on barter trips. Potters with farming responsibilities, small children, or infirmities may ask their relatives for help in bartering or delivering their pots. Thus, daughters, sisters, and unrelated potters sometimes bring vessels to other communities. Dalupa men rarely if ever deliver pots to other settlements for their wives.

Consumers also visit Dalupa potters' homes to obtain pots. Social, economic, or political visits often include the giving of pots as gifts and the bartering of



Figure 4. Women from the Malucsad community with their gift pots from Dalupa at the end of a holiday season visit, 1987.

pots. Takaki (1977:4) notes that kinship represents the dominant organizing principle of social relationships. Dalupa potters have a series of customers from different settlements who are frequently linked through kinship ties (Graves 1991; Longacre and Stark 1992). Kalinga informants explained that these regular customers, established over many years, are inherited by those potters' children who later become potters.

The principal form of secondary distribution involves the growing reliance on pottery traders or intermediaries from Dalupa. A much less common form of secondary distribution occurs when a consumer, having acquired vessels from the producer, then barter- or gives away these vessels to a second consumer who has no relationship with the producer (see also Graves 1991:123). Kalinga women give pots, whether or not they are potters, on all sorts of occasions. Pots are given as gifts, for example, to visiting delegates during peace pact (*hodong*) celebrations, to ailing acquaintances during *ila* visits (to encourage recovery), to younger female relatives who are just starting a household, to groups of women visiting during the holiday season (Figure 4), and to young women who are experiencing their first pregnancy (*legading*). This type of secondary distribution correlates with the distance from a production center. Where pots are

not directly available from the producers, they travel through more hands during their distribution.

Intermediary traders provide a relatively new mechanism of Kalinga pottery distribution, and several Dalupa potters have become itinerant pottery peddlers. Dalupa potters now consign their pots to, or barter them with, these pottery merchants, who then travel to distant settlements where higher exchange values can be obtained for the vessels than are available in the Pasil area. Pots are bartered for utilitarian goods and raw materials, such as wooden mortars and pestles, resin, or store goods. The potters receive (at the least) the local value of the pot, and they may receive a higher value depending upon the exchange transaction and the intermediary's profit margin. How this introduction of pottery intermediaries has affected social relations within the Dalupa exchange system has been discussed elsewhere (M. T. Stark 1992).

Dalupa potters occasionally barter their vessels with traditional itinerant female peddlers known as "walking stores," who frequently visit Dalupa from their homes in the Lubuagan area. Petty trading of nonpottery products has provided isolated Kalinga villages with non-Kalinga products since at least the time of the initial 1975 study. Walking stores carry with them goods that are not locally produced but that most Kalinga households now use on a regular basis (e.g., salt, sugar, cooking oil, soap) as well as fresh produce when it is available. They also bring along crafts that are manufactured in the barrios of Lubuagan, such as backstrap loom-woven textiles. Kin ties and other established social relations between some walking store women and Dalupa residents make the community a popular barter destination for walking stores, even during periods of tribal warfare.

The exchange value of Dalupa pots varies with the site of the transaction, the phase of rice production, and the social relationship between producer and consumer. Where consumers travel to the potters, the prices of pots are relatively stable, a pattern previously noted in western Kenya (Hodder 1979a). The value of the pot is determined by its volume in dry rice. Seasonal rice shortages during the pre-harvest period account for variation in local exchange value, a pattern noted in neighboring Uma by Takaki (1977:422). One variation in value occurs when the potter or the consumer undercuts the pot's recognized exchange value (*ma-abacan*) under situations of subsistence stress. Certain villages within the traditional system are also known for routinely undercutting the exchange value, and are bypassed when possible. Another variation occurs when local exchange values dip below the accepted standard, and potters travel to distant communities (in which rice is more abundant) to avoid local seasonally induced inflation. Potters visit villages outside the system's traditional boundaries most often during seasonal rice shortages in Pasil (i.e., March-April and August) to take advantage of the better exchange values available elsewhere.

Table 1
Dalupa pottery classification

Type	Small	Medium	Large	Extra large
Rice cooking	Oggatit Ittoyom	Ittoyom	Lallangan Ittoyom	
Vegetable/meat cooking	Oggatit Oppaya	Oggan	Lallangan Oggan	Challay
Water storage	Im-imosso	Imosso		
Nontraditional forms		Ay-ayam		

TYPES OF VESSELS BARTERED

Dalupa potters produce three basic categories of cooking and water storage vessels in several sizes, as illustrated in Table 1. In addition, potters manufacture a burgeoning repertoire of nontraditional forms or *ay-ayam*. The term *ay-ayam* translates as *toy*, and these pieces range in form from ashtrays and flower vases to fish banks and miniature stove sets. At the time of the field study, over fifty different forms of *ay-ayam* were in production. The manufacturing steps involved in producing miscellaneous *ay-ayam* differ from those used in building functional vessels. The photographic sequence in Figure 5 illustrates the firing process for nontraditional forms. These forms must be fired for a longer period of time and coated more thoroughly with resin than traditional, utilitarian containers. Issues related to the development of this new ceramic tradition are discussed in detail elsewhere (M. T. Stark 1991a; M. T. Stark and Longacre 1993).

Table 2 presents the total distribution of Dalupa ceramic forms exchanged during 1988. Almost 10% (272) of all ceramic forms exchanged fall into the *ay-ayam* category. Nonutilitarian *ay-ayam* forms traveled along the same routes as did the utilitarian pottery, although the nontraditional forms were more likely to be bought with cash than bartered for goods. Utilitarian vessels and nonutilitarian *ay-ayam* are combined in the total assemblage considered for this study, but discussions of vessel types and sizes omit nontraditional forms in the percentages reported (for an *N* of 2503 cooking and water storage vessels, excluding 4 records that contained insufficient information on type and size).

The types of ceramic forms a potter carries with her on a barter trip depend on economic, logistical, and social factors that vary from locality to locality.

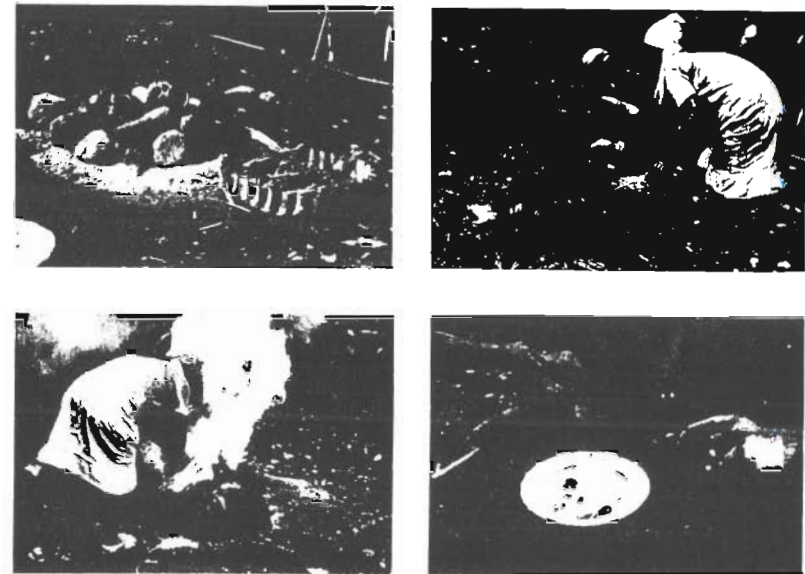


Figure 5. Firing one batch of nontraditional forms. The hanging shell flower vase featured in this series was pioneered in the early 1980s by a highly innovative potter, now deceased.

Table 2
Frequency of Dalupa vessels exchanged^a

Type	Frequency (percent)	<i>N</i>
<i>Oppaya</i> (all sizes)	68.5	1903 ^b
Small	59.9	1665
Medium	7.4	206
Large	1.1	31
<i>Ittoyom</i> (all sizes)	9.8	271 ^c
Small	3.5	96
Medium	1.8	51
Large	4.4	123
<i>Imosso</i>	11.6	323
Nontraditional forms	10.1	281

^a One pot lacked type and size data (*N*=2778).

^b Two *oppaya* lacked size data.

^c One *ittoyom* lacked size data.

Two determinants are the barter equivalents desired from the village the potter visits and village-specific demand for certain types and sizes of vessels, transmitted through word-of-mouth from other potters and through orders placed by those consumers.

The distribution patterns of vessels vary by functional type and by size. Consumer demand in specific consuming villages may be understood by Dalupa potters because of previous trips, after which the potters discuss settlement-specific preferences and announce orders. Potters bring a variety of different vessel types and sizes to barter in unfamiliar villages during the initial barter trips.

Ceramic use-life and use-frequency are two other factors that affect the frequency distribution displayed in Table 2. The relationship among consumer preference, nonclay substitutes, and differential vessel replacement rates is complex. However, some relationship exists between the frequency of Kalinga vessel types bartered and the frequency with which a particular vessel type is used. The combined meat and vegetable cooking pot (*oppaya*) categories represent 68.4% ($N = 1900$) of the total number of pots exchanged during 1988. Cross-culturally, small and medium-sized cooking pots—pots that are average-sized, everyday cooking pots—have the shortest reported use-lives (Nelson 1991:174).

Water jars (*immosso*) constitute 11.9% of all vessels traded during the study period. No nonceramic substitutes (e.g., plastic buckets, non-Kalinga ceramic jars with attached faucets, or metal containers) have effectively replaced the Kalinga demand for *immosso*, as Kalingas insist that the water stored in clay vessels is “cooler and sweeter” than water stored in nonceramic alternatives. A longer use-life for water jars (6.4 years) also leads to a lower replacement rate, generating a lower but consistent demand for water jars than for cooking vessels.

Vessel size also affects potters' manufacturing decisions. Recent research suggests that small vessels generally have shorter use-lives, and therefore must be replaced more frequently (Nelson 1991; Shott 1989). The 1988 exchange data reflect this pattern: approximately 63.5% (1765) of the vessels exchanged were small in size, while another 9.1% (253) were medium-sized vessels. Larger cooking vessels are reserved for communal cooking events on special occasions, so that the replacement rate of large vessels is much lower than that of small vessels.² They are used and exchanged far less frequently, comprising 5.5% (153) of the total assemblage. Dalupa potters noted that they rarely bring large vessels with them on bartering trips unless they have received orders from particular customers.

2 Nelson (1991:Table 8.4) demonstrates a similar pattern among the highland Maya, among whom average-sized (i.e., small and medium) cooking vessels are replaced at least six times more often than are large cooking pots or water storage jars.

One factor explaining the overwhelming representation of small and medium-sized *oppaya* in the 1988 Dalupa pottery exchange records, then, is differences in replacement rates of vessels based on size. Ease of transportation, including stackability, also encourages Dalupa potters to produce and trade more small and medium-sized pots than large pots. There is also a consistently higher demand for the smaller, daily-use vessels than for large vessels. Small (and sometimes medium-sized) *oppaya* are used at every meal and consequently have the highest breakage rates of any category. *Ittoyom* are being replaced with metal vessels (*calderos*), reducing the rate of vessel use (and vessel breakage) as well as the demand for this category of cooking vessel.

Use frequency is the second critical factor that determines the distribution of Dalupa vessels exchanged. Schiffer (1976) utilizes the term “systemic number” to describe the average number of an artifact type normally in use, and different Kalinga vessel types exhibit different systemic numbers. *Oppaya* are used on a daily basis (see Kobayashi, Chapter 7), and may be used for each prepared meal, whereas *ittoyom* have largely been replaced by *calderos* in Kalinga households (Skibo, Chapter 6). *Ittoyom* account for only a small proportion of the total number of Dalupa vessels exchanged in 1988. The widespread introduction of metal and plastic substitutes for water storage (*immosso*) and daily rice cooking (*ittoyom*) pots has also decreased the consumer demand for these vessel types, but no comparable product has been introduced to replace the *oppaya*.

NUMBER OF POTS CARRIED

The number of vessels that potters bring with them is related to the types and sizes of products and the distance traveled. Because pots must be hand-carried, they are mounded into a basket, packaged in a cardboard box that is bound with rattan cord, or stacked into three- to four-foot-high columns. The mode of packing is related to the size and types of vessels carried (see Figure 6). When a potter carries a small number (e.g., less than eight) of small vessels to a neighboring village, she piles the vessels carefully into a basket. When non-traditional forms are being transported, they are placed in a cardboard box that is secured with rattan or carried in a plastic shopping bag. On long barter trips, potters carry stacks of vessels that are wrapped in either banana leaves or large rice bags and bound with rattan. Using this latter packaging system, potters may carry twelve to fourteen small and medium vessels or as many as three or four large rice cooking vessels (*lallangan ittoyom*) or water jars (*immosso*).

The potter's supply of pots and the primary purpose of the trip influence the number of vessels that she carries with her. On barter trips to distant settlements, Dalupa potters strike a delicate balance. The anticipated volume of exchange



Figure 6. Potters leaving Dalupa early one morning to begin their barter trip to a distant locality. (Photograph courtesy of the Arizona State Museum, University of Arizona; Miriam Stark, photographer.)

equivalents in unpounded rice affects the number of pots that the Dalupa women bring with them. It is easier to carry bundled pots en route to the barter village than it is to carry the huge sacks of unpounded rice (barter equivalents) back to Dalupa.

Of the 2779 vessels and nontraditional forms exchanged during the 1988 year, 77% ($N = 2445$) were exchanged outside Dalupa. Barter localities were divided into two categories: proximal and distant. Proximal localities included all villages reached on foot and corresponded to the Pasil Municipality boundaries. Distant localities included all communities reached using both foot and truck transportation. Motor transportation time ranged from one to four hours, barring vehicle breakdowns. All settlements within the Tabuk and Balbalan municipalities fell into the "distant" category.

Table 3

Relationship between distance traveled on barter trips and number of vessels carried

Location	Number of pots carried
Distant localities (total)	11.5
Tabuk communities (total)	10.5
Gao Gao/Tommiangan	8.3
Soyang	10.3
Naneng	11.3
Bollaguian	11.4
Bulanao	12.3
Balbalan communities (total)	12.1
Pasil localities (total)	6.5
Ableg	4.5
Guina-ang/Galdang	6.1
Malucad/Pugong	6.1
Magsilay	6.3
Cagaluán	7.4
Balenciagao	7.8

Pottery exchange data from 1988 provide some index of the effect of distance on the number of vessels that Dalupa potters carry on each barter trip: the greater the distance, the greater the number of pots carried (Table 3). For pottery-consuming villages within and beyond the Pasil River Valley, distance looms large in the number of vessels carried. Within Pasil, Dalupa potters carry the fewest vessels per trip to the neighboring settlement of Ableg, which lies fifteen minutes east and downhill of Dalupa. More Dalupa pots were traded in Ableg than in any other Pasil community except Dalupa itself (10.2% of all Dalupa pots traded in the Pasil Municipality). Balenciagao (to the north) and Guina-ang/Galdang (to the northwest) are located substantially farther away, and so Dalupa potters bring larger numbers of pots with them on each trip.

The same pattern obtains in "distant" localities. The Gao Gao and Tommiangan communities, visited as part of a single barter trip, are the closest Tabuk communities that Dalupa potters visit. Potters carry the smallest number of vessels per trip to those locations. Reasons for the differing averages between Tabuk and Balbalan are suggested later in this chapter in a discussion of the expansion of the Dalupa regional network.

The correlation between vessel number and trip distance is not a perfect one. For example, potters often bring along pots on social rather than economic trips to other villages, and in these cases the number of pots carried is usually small: two or three vessels that can be carried in the potter's hands. In addition, changes in the potter's life cycle (e.g., pregnancy, lactation, widowhood) affect the scale and extent of the potter's barter trips. Changes in household economic resources also affect potters' production and distribution activity by determining the number of vessels that are available to exchange. Potters who are pregnant, lactating, or otherwise restricted in their pottery-making may still travel from village to village to sell clothes or store goods during harvest, when cash is available. These potters will bring along available vessels, but the number of vessels will be small since the primary purpose of such trips is to peddle other types of goods.

DISTANCES TRAVELED ON BARTERING TRIPS

Several factors influence the distances that Dalupa potters will travel to barter their vessels. Some factors include the presence of relatives or friends in consumer settlements (to facilitate bartering), seasonally available barter equivalents, household cash needs, the availability of traveling companions, and the potter household's current food supply. In addition, the presence of a high consumer demand, coupled with higher prices than those available in Pasil, is an important consideration.

The existence of established social relationships between at least one potter in the group and residents of a particular consumer village is also important in determining the distance that Dalupa potters will travel to sell their goods. The number of ways in which these social relations are established have increased as Dalupa potters have explored new markets for their products. Kalinga tradition dictates that relatives or friends provide visitors to a village with food and lodging; potters are hosted by local residents during barter trips. Hosts may receive gifts of pots in return for their hospitality. In a community of strangers, a potter and her companions rely on customary Kalinga hospitality for meals, and she often barter all her vessels from her first customer's house (Stark 1992).

During periods of rice scarcity preceding harvests, Dalupa potters travel to non-Pasil Municipality (i.e., non-traditional) localities where surplus rice is more abundant for barter, and thus has a lower relative exchange value. Constraints that affect potters' choice of settlements to visit include areas plagued by tribal warfare, areas not serviced by trucks, and localities whose truck fare

and travel time prohibit a 24-hour round-trip visit. Armed conflict between the Philippine military and the Communist Party insurgent group known as the New People's Army was also a consideration in the potters' selection of target barter settlements during the 1987-1988 field season.

About 63.9% ($N = 1776$) of all Dalupa vessels bartered in 1988 were exchanged in Pasil Municipality villages, all of which are less than three hours' walk (i.e., less than 10 km) from Dalupa. Included within this distance are all of the villages within the traditional exchange system around the Pasil River valley. Dalupa potters now also walk down to the village of Ableg to wait for trucks to carry them to villages at greater distance in neighboring municipalities. The remainder of the Dalupa vessels bartered were exchanged in non-Pasil communities.

THE REGIONAL SYSTEM PERSPECTIVE

Interregional trade has played a crucial role throughout Philippine history in linking populations from disparate ethnic and environmental backgrounds (e.g., Hutterer 1976; Hutterer and Macdonald 1982). Archaeological evidence from the Visayas indicates that extensive trading networks, whether interregional or long-distance, extend back in time to at least the eleventh century A.D. (Junker 1990). Sixteenth-century Spanish accounts of communities in northern Luzon describe extensive highland-lowland trade that brought mountain traders into surrounding lowlands to exchange highland goods such as forest products and gold ore (Scott 1982). Trade networks involved the Cordillera peoples whose descendants now inhabit areas contained within Mountain Province, Ifugao Province, Abra Province, and Kalinga-Apayao Province (Figure 7).

Between Kalinga communities, economic networks that bridged ethnic boundaries were traditionally encouraged through the political institution of the peace pact or *bodong* (Bacdayan 1967; Dozier 1966; Takaki 1977). Highland-lowland exchange was facilitated through the development of trading partnerships, at least some of which also relied on peace pacts (e.g., Scott and Flameygh 1978). Such exchange transactions focused on the importation of prestige goods such as Chinese porcelains and water buffaloes from the surrounding lowlands until the 1930s. Pasil Kalinga concentrated their trade with residents of the Cagayan Valley (in Cagayan Province), and they conducted commerce on a smaller scale with residents of Abra (Figure 7).

Uma communities west of the Pasil area have also been characterized as forming a web of economic interdependence in a system of community-based specialization (Takaki 1977:167). Physical isolation from external influences and wide-

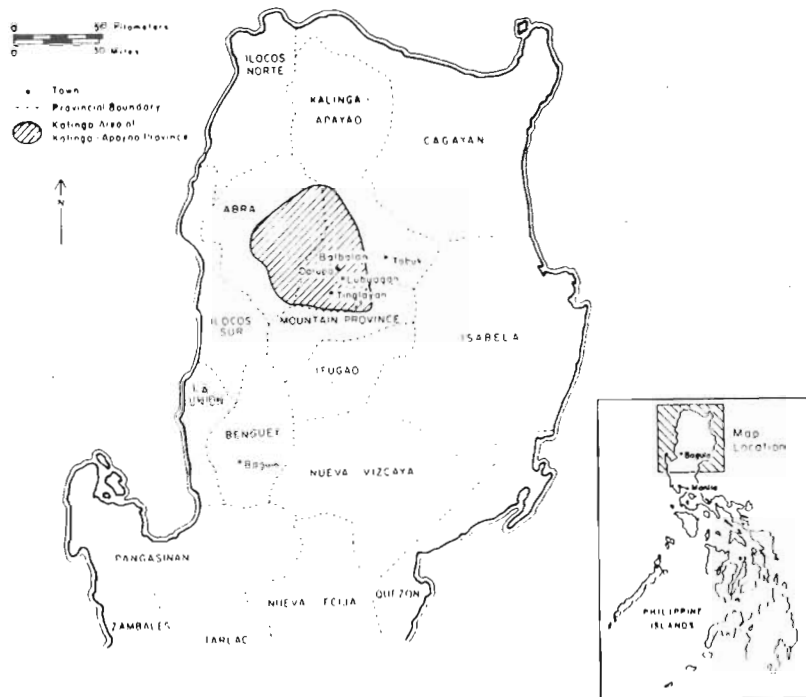


Figure 7. Provinces in the northern Philippines.

ranging *bodong* agreements promoted broad but sporadic systems of interregional exchange and specialization. Restricted production for exchange, rather than for household consumption, centered on the manufacture of locally available raw and manufactured material that could be traded within Kalinga settlements for needed subsistence items through direct balanced exchange, or *qalos*.

Although intracommunity exchange plays an important role in meeting Kalinga subsistence needs, an intercommunity system of village-based specialization and exchange provides a needed supplement to rice agriculture for Kalinga residents. The exchange of manufactured goods and of raw materials supplements locally available resources and—in some areas—compensates for substantial resource deficits. Certain villages within the Pasil Municipality, for example, supply surplus coffee, whereas others furnish oranges or excess rice during periods of rice scarcity (M. T. Stark 1991b:Table 3). Communities neighboring the municipality are sources of seeds for swidden plots and of construction materials. The pottery exchange network is embedded in this wider system of regional specialization. Dalupa potters continue to barter more of their wares in villages within the traditional boundaries of the system than

beyond these boundaries in villages where new consumers have been found who desire Dalupa pottery.

The village-based specialization that characterized the Pasil Kalinga is far from unique, from a cross-cultural perspective. Nonstate societies frequently participate in interregional exchange systems characterized by the movement of a myriad of subsistence and luxury items (Spielmann 1986) and by community-level specialization in the production or procurement of one commodity (e.g., Chávez 1992). Subsistence foods, raw materials, and utilitarian crafts (e.g., pottery, baskets) are distributed across social and ethnic boundaries to compensate for local subsistence deficits. Pottery represents one common medium of exchange that is widely traded for food (Rice 1987).

Ethnographic studies provide other examples of community-level specialization in Africa and in Oceania, and additional examples have been described elsewhere (see Kramer 1985; Rice 1987; M. T. Stark 1991b). For example, groups that inhabit varying ecological zones in Tanzania (Waane 1977) and Ghana (Crossland and Posnansky 1978) compensate for fluctuations in localized resource availability through markets and widespread trading of pottery and other subsistence goods. Melanesian village specialization and intercommunity trade networks within specific geographical boundaries were also based on variations in natural resources. For example, Motu villages used the *hiri* network to obtain subsistence foods in exchange for their pottery (Allen 1984; Oram 1982), and village-level specialization in other regions has also been documented in other parts of Melanesia, such as the Solomon Islands (Specht 1974) and the Vitiav Straits (Harding 1967).

The preceding discussion of regional studies has identified two common patterns in nonindustrial societies of interest to archaeologists: (1) village-level specialization in the production of agricultural and manufactured goods, including pottery, and (2) extensive networks of intercommunity subsistence exchange that enable groups to exploit areas of marginal subsistence potential. Pottery exchange represents one aspect of regional exchange systems that can be documented from the perspectives of both production and distribution in contemporary, nonindustrial societies.

EXPANSION OF KALINGA EXCHANGE SYSTEM BOUNDARIES

Studies worldwide of pottery production systems have documented key factors that contribute to changes in the scale of production and the range of distribution (Rice 1987). In some areas, the development of a tourist market alters the

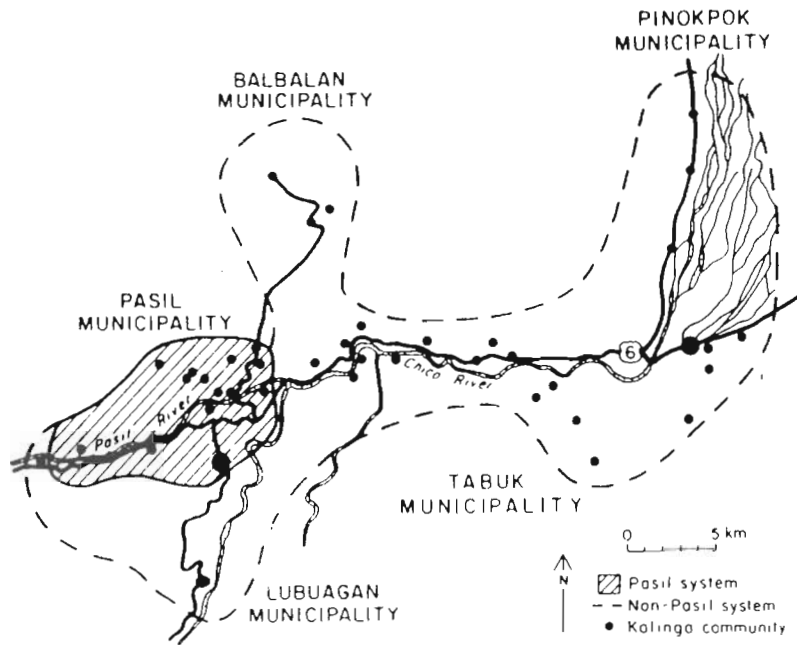


Figure 8. The Kalinga regional exchange network: Pasil and non-Pasil exchange systems.

quality, quantity, repertoire, and range of ceramic production and distribution (e.g., Nicklin 1971). External political factors such as war also affect pottery production (e.g., Annis and Geertman 1988:161–163). The demand for ceramic substitutes for scarce metal and synthetic products may increase the scale of production, whereas related local warfare may modify production strategies and restrict the distribution of ceramic vessels. Increases in contacts with the outside industrial world through the construction of roads and the introduction of motorized transport in the form of boats or trucks play a major role in changing the shape of ceramic production and distribution. For example, the construction of formal dirt roads into the Pasil area and the concomitant increase in regular truck transport have effected profound changes in the distribution of Dalupa pottery.

The boundaries of the Dalupa pottery exchange system have expanded in the last several decades, from a traditional system linking most villages near the Pasil River Valley by foot travel to a network of settlements linked by trucks along the road system (Figure 8). The hatched area on this map represents the traditional exchange system, and the larger area constitutes the Dalupa ex-

change system documented during 1988. At least forty new communities now participate in the Dalupa pottery exchange network, and the majority of these communities lie within two municipalities: Tabuk and Balbalan. A very small proportion of pots (0.6% of vessels recorded) were also traded in the Lubuagan and Pinokpok municipalities.

The Pasil River is a tributary of the Chico River, and the truck transport route links the Pasil village of Ableg to the provincial capital of Dagupan/Bulanao by way of the Chico River, along which numerous communities with direct access to the road are located. Those villages located closer to Ableg (i.e., within two hours' ride by truck) are visited more frequently by Dalupa potters than those in and near the capital (i.e., Bulanao, Dagupan). These capital communities are more distant, and more costly to reach by truck for Dalupa potters. Other pottery-producing communities in the Tabuk Municipality (e.g., GobGob and Gilayon) can supply the area and ethnic enclaves within the capital itself contain active potters from both the Tanudan and Balbalan municipalities. These potters likely meet the local demand for Kalinga ceramic vessels. Ilocano residents in the capital may also prefer Ilocano vessels over Kalinga vessels, but this question was not investigated during the 1987–1988 study.

About 10% (282) of all pots traded outside the traditional exchange network went to these Tabuk communities (Figure 9). Many of the barter trips recorded for the capital area constituted embedded activities during trips made to sell coffee (and, less frequently, gold from local mines), to seek medical care, and to bring children to local schools. Bartering trips to the nearer non-Pasil villages have grown increasingly common.

The Balbalan Municipality has recently become an attractive market for Dalupa pots: 25.2% ($N = 702$) of all pots traded in 1988 went there. Lying north of Pasil, and commonly reached by truck transport, Balbalan is accessible to potters from Ableg. Although the availability of truck transportation has encouraged the entry of potters into Balbalan, the reactivation of the gold mines in the Balbalan area has also played a role. Dalupa potters received almost twice the standard barter equivalents for their vessels in Balbalan.

Although the Dalupa-based interregional exchange of ceramic forms has grown in geographical extent and scale, Dalupa potters continue to barter their wares within the boundaries of the traditional exchange system. In 1988, nearly two-thirds ($N = 1776$) of all Dalupa vessels were exchanged in Pasil villages. Two Pasil villages, Colayo and Balatoc, are virtually exempt from the system, because of, respectively, prohibitive distance and the replacement of all ceramic vessels with metal vessels in response to profits made from neighboring gold mines.



Figure 10. Miniature *gusi*, a nontraditional form that imitates the large stoneware jars from the Ilocos region in which Kalinga sugar cane wine is stored.

producer specialization and product standardization. Pottery distributed from a single production center may exhibit uniformities in composition, functional type, and size categories for two different reasons. The first is a form of village-based specialization in which producers from a single community manufacture one or a few functional types. The similarity may also result from a situation in which potters within a single community specialize in producing one or a few functional categories. In Dalupa, inexperienced potters specialize in different varieties of nontraditional forms, whereas older, more experienced potters make large, traditional vessels and a nontraditional form (the *gusi*) that is a miniature jar (Figure 10). Potters in separate work groups have established sets of customers (who are often relatives and friends) in pottery-consuming settlements that span generations of site occupation. Clusters of morphological or stylistic categories in archaeological ceramic assemblages therefore need not reflect full-time craft specialization as is found in state-level societies. Instead, such patterning may reflect distribution in a less intensive form of ceramic production, as is found in the Dalupa network.

The Kalinga example also suggests that pottery production areas identified in the archaeological record are not necessarily evidence for craft specialization (e.g., P. J. Arnold 1991; Rice 1987; B. Stark 1985). Moreover, the iden-

tification of localized production cannot be equated with centralized control (Kenoyer et al. 1991). Organizational types proposed by van der Leeuw (1977) and Peacock (1982) require refinement to accommodate "intramodal variability" (P. J. Arnold 1991). The intensity of ceramic production within a single organizational form may vary greatly, as several researchers have argued for the household/household industry end of the organizational continuum (P. J. Arnold 1991; Underhill 1991). When pottery production is balanced with subsistence activities, the output of potters within a single village—or between neighboring villages—may differ widely.

This ethnoarchaeological study also touches on several issues that are related to the study of prehistoric exchange networks. For one thing, distinct circulation patterns likely characterize different classes of goods in regional exchange systems at most levels of political development. Contrasts between circulation patterns in state-level societies may reflect a combination of attached and independent specialists who produce and distribute goods in different networks (e.g., Brumfiel 1987; Brumfiel and Earle 1987; Costin et al. 1989). Alternately, such contrasts might reflect complementary systems of exchange by independent specialists who provide different types of goods to service different sets of customers. The *jajmani* system described for Indian potters provides one such case (Kramer 1991; Kramer and Douglas 1992; Miller 1986).

Economic interdependence is also common at the intra- and intergroup levels in nonstate societies (Spielmann 1986). Such interdependence may involve the movement of both subsistence and prestige goods, as has been amply demonstrated in Melanesia (e.g., Allen 1984; Harding 1967; Oram 1982; Specht 1974). The Kalinga case provides an alternative mechanism behind the development of craft specialization, that of resource heterogeneity. However, environmental diversity is not the only factor explaining this phenomenon, as cases of village specialization have been documented in ecologically redundant zones (e.g., Harding 1967). We know little about the conditions under which communities in nonstate societies specialize, particularly in areas of resource homogeneity. The incentives behind developing trade networks and social relations, and how such relations are transformed into social institutions, are worthy of further research.

A second point is that intrusive ceramics recovered from a site (whose production center lies at some distance from that site) may represent "point-to-point" exchange (Muller 1987:20) or secondary distribution, rather than primary distribution by long-distance traders. Whereas primary distribution may entail organizational complexity (especially where long-distance traders operate in some relationship to a state apparatus), secondary distribution by local intermediaries or through primary consumers is found in societies at several

points along the organizational continuum. For example, Yoruba pottery traders in Nigeria (Ibigbami 1984) and intermediary villages in highland New Guinea that link products from the lowlands and the highlands (Coutts 1967:485) further redistribute pots from the initial consumers.

Informal redistribution networks are less well-documented than are intermediaries in the ethnographic literature. This likely results from the informal nature of these exchanges, which are embedded into everyday life. Kalingas in venues located at great distance (i.e., three hours or more walking time) from pottery-producing villages seem to practice secondary redistribution more often. The interpretation of an archaeological ceramic distribution as a reflection of direct transfers of goods between producer and consumer may thus be incorrect, as artifacts may change hands repeatedly before entering the archaeological context.

The rate of change in a given distributional system is the third point for consideration. The configuration of Dalupa pottery distribution has undergone rapid changes in the last decade. Although it generally exhibits a localized distribution curve typical of utilitarian pottery (Rice 1987), the shape and extent of the Dalupa exchange network have expanded substantially. Comparative ethnographic studies of ceramic production and exchange (Nicklin 1971) suggest that distribution patterns may be affected by the introduction of new mechanisms of exchange (e.g., the emergence of intermediary traders in Kalinga), by the development of new routes or transport mechanisms (e.g., the introduction of truck transportation, Papousek 1981), or by changing needs of consumers that accompany technological changes (e.g., the differential demand for functionally different vessels). The flexibility with which these exchange patterns respond to changes in the social environment may have characterized past systems as well. The rapid change in the Dalupa ceramic distribution patterns underscores the need for tight chronological control in studies of archaeological ceramic distribution.

A final contribution of the Dalupa study concerns the kin-mediated nature of pottery exchange. Relatives and friends regularly act as pottery bartering intermediaries, as hosts to visiting potters, and as consumers in the Kalinga pottery exchange network (M. T. Stark 1992). Earlier efforts to reconstruct kin relationships within archaeological communities (e.g., Hill 1968; Longacre 1970) have been problematic, in part because the social relations that guide ceramic production and distribution were poorly understood. Distributional patterning, as well as some forms of artifact standardization, may be affected by kin relations in ways that are just now being explored by archaeologists in ethnographic settings (e.g., Chernela 1992; Kenoyer et al. 1991:56; Kramer and Douglas 1992).

CONCLUSIONS

In this ethnoarchaeological study, I have focused on aspects of Dalupa pottery production and distribution, emphasizing exchange processes and resultant patterns of distribution. Details of the Dalupa exchange system may interest scholars who are familiar with highland Philippine economic systems. For archaeologists interested in ceramics, the value of this type of detailed research lies in the accumulation of cases that can be used as a data base, as has been done by D. Arnold (1985) and Rice (1987).

Throughout this study, I have pointed out similarities that the Dalupa system shares with other ethnographically documented exchange networks. To non-ceramic archaeologists, the value of this study lies in the fact that the circulation of ceramics, as utilitarian items, shares much in common with that of other artifact classes, be they beads, baskets, lithic microblades, or stone hoes (e.g., J. E. Arnold 1987, 1992; Brumfiel 1987; Kenoyer et al. 1991; Muller 1987; Shafer and Hester 1991). Models developed in ceramic studies might fruitfully be tested and refined using other classes of material culture. At the very least, data from ethnographic settings cannot help but stimulate the archaeological imagination.

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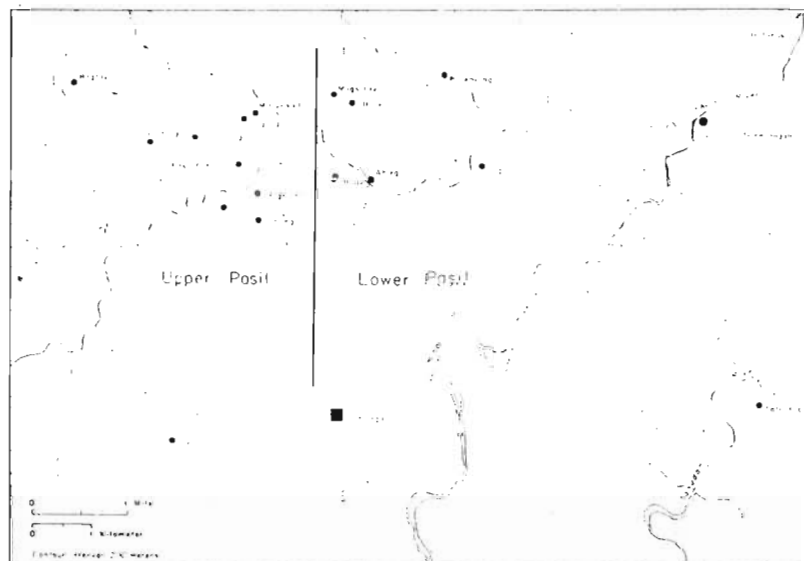
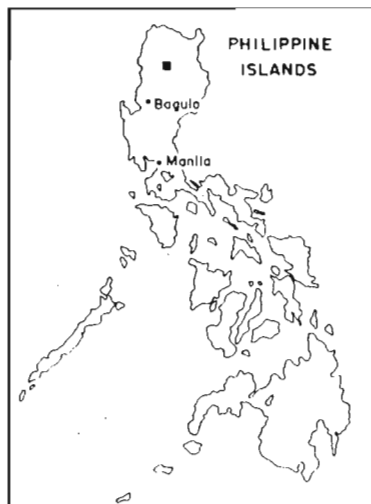
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Map of the Pasil Municipality (the Kalinga area), showing the location of Dangtalan, Guina-ang, and Dalupa, the three principal villages of the Kalinga Ethnoarchaeological Project. The vertical bar divides the upper and lower parts of the Pasil River valley. (Upper map drawn by Brigid Sullivan; lower map by Ronald Beckwith.)



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