

What is Special about Specialization?

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Abstract

This essay argues that several key issues regarding craft specialization deserve to be further investigated. These include how specialization develops, variation in strategies to achieve intensification of production, causal factors for technological innovation versus technological conservatism, and how specialization changes in relation to the development of urbanism. Recent studies moving us forward in productive directions with respect to methodology examine the value of goods in specific social contexts, consider the impact of ritual life on craft production, and more thoroughly assess the sources of variation in finished products.

Although craft specialization has been a key research topic in archaeology for decades, the answer to the question above is not readily apparent. During the new millennium the pendulum has shifted from optimism about explaining fundamental variation in organization of labor, to recent statements that the concept is no longer meaningful for archaeological research. After the publication of the seminal reviews by Costin (1991, 2001a) and Bey and Pool (1992), debates continue about the definition and significance of craft specialization. Given the presumed ubiquity of craft specialization in the past, many recent publications refer instead to “production” or “crafting” (Cordell & Habicht-Mauche, 2012; Costin, 2001a, 2005, 2007, p. 150; Hirth, 2009a; Shimada, 2007), or “skilled production” (Rice, 2009, pp. 125–126). Costin’s later publications (after Costin, 1991) simplify the definition of specialization to mean “production for use by others” (Costin, 2007, p. 150; see also Costin, 2005, p. 1038; Costin, 2001a, p. 276), removing the issue of production for exchange (Costin, 1991, p. 4). It is argued here that retaining the issue of exchange is desirable to highlight the key point (Costin, 2007, p. 149) that specialization is a social process which includes distinct patterns of distribution and consumption of goods.

I am optimistic we can face the challenge (Costin, 2001a; Hodder, 2012; Shimada, 2007, pp. 1–3) to make our research on craft production a more holistic enterprise. The aim of this review is to highlight recent studies which

offer insightful approaches for explaining the nature and significance of craft specialization in the past. There are basic questions relevant to craft specialization, some of which were raised decades ago, that remain to be sufficiently addressed for different historical contexts. The studies discussed here move us forward in addressing those questions by more effectively investigating diverse strategies of specialist production, relations between producers and consumers, the value of goods, and sources of variation in finished products.

IMPORTANT QUESTIONS RELEVANT TO CRAFT SPECIALIZATION

Under what circumstances does craft specialization initially develop in a region? Recent research in the American southwest usefully considers social factors in addition to economic issues such as the availability of necessary natural resources. In more than one area, a key factor was motivation to develop regional social networks and relations of economic interdependence (Abbott, 2009, pp. 548, 550; Harry, 2005, pp. 312–313).

How and why does intensification of craft production develop? As Sahlin (1972) asked over 40 years ago, how do we explain the development and nature of economies in which people produce more than they need (see Costin, 2001a, p. 281; Underhill, 2002, p. 1)? There is growing recognition that this process can involve one or more kinds of goods and be achieved by several methods (Brumfiel & Nichols, 2009, p. 246; Costin, 2001a). People could seek to increase output by involving more workers, devoting more time to production, and/or changing the division of labor. Increasing output may not involve a decision to change the spatial organization of production. High-intensity craft production can take place in houses in addition to separate locations such as workshops (Feinman & Nicholas, 2000; Pool & Bey, 2007, p. 37). Recent research in Mesoamerica especially has revealed the diversity of arrangements for production in households. It also demonstrates the necessity of considering craft production as part of the broader economic strategies of households (Hirth, 2009a, p. 2; Haines, Feinman, & Nicholas, 2004). A significant insight potentially relevant to other world areas is that most Mesoamerican households did not find full-time specialization a viable strategy, even after states developed (Hirth, 2009b, p. 24; Rice, 2009, p. 141).

A key issue is improving archaeological methods for recognizing different strategies of intensifying craft production. Recent studies rightly stress that terms employed for analysis of spatial areas used in craft production need to be clarified—especially the term *workshop*. It is often used to refer to any place where craft production takes place (Costin, 2001a, pp. 296–297; Rice, 2009, pp. 126–127). The long term study of potters' households in Mexico by D. E. Arnold (2012, p. 165) reveals, for example, that there may be only

minor differences in the use of space for production in houses versus production in separate areas some would label “workshops.” As Rice (2009, p. 140) points out, we should simply refer to specific areas where different kinds of production take place.

Recent research provides additional guidance in identifying material indicators for intensification of craft production. Ceramic ethnoarchaeological studies identify factors such as use of more specialized space, selection of more durable materials for production facilities, and greater quantities of production debris (D. E. Arnold, 2012, pp. 167, 183; Underhill, 2003; see also Costin, 2001a, pp. 280–281; Deal, 2007). Archaeological studies demonstrate the value of considering diverse criteria at the regional level for identification of intensification. Abbott (2009) analyzes intensification of specialized ceramic production in the Phoenix basin through identification of differential distribution of ceramic forms, pastes, and facilities for preparing clays (Abbott, 2009, p. 547). Another merit of this study is the assessment of diverse potential causal factors for change in production strategies. Abbott concludes there was a change from independent specialization to community level specialization in conjunction with ritual events taking place at ball courts. Similarly, Bernadini (2000, p. 367) proposes that unusual, isolated trench kilns in the Mesa Verde region indicate collaborative firings by specialist potters sharing knowledge about valued white wares, and he provides a method to estimate the number of participating households. Cooperation among stone tool specialists in Belize also was a chosen strategy for production of a form requiring great skill (Masson, 2001, p. 35).

How and why do social groups decide to make changes in more than one kind of craft production? Although “multicrafting” was probably common in the past (Brumfiel & Nichols, 2009, p. 240), we need more research on variation in strategies for multicrafting. This will require focusing on the agency of producers, related kinds of technological knowledge, and strategies in the use of space, rather than more debate about definitions (see Hirth, 2009b; Shimada, 2007). The concepts Hagstrum (2001) offers are particularly useful. “Intersecting technologies” involve the use of certain kinds of technical knowledge, resources, or labor for more than one type of production, while “complementary technologies” considers the suite of economic activities for households by season (Hagstrum, 2001, pp. 49–50; see also Hirth, 2009a, p. 4, 2009b, p. 22). Hirth (2009b, p. 19) points out that craft specialization can either reduce economic risk by facilitating household economic diversification, or increase risk by elevating the importance of a particular craft.

Dueppen (2012) moves the analysis of specialization with multicrafting a step forward through his holistic analysis of changes in social organization at the West African site of Kirikongo. He identifies the onset of specialization

in iron production and later, ceramics, from a shift to more restricted spatial areas with direct evidence for production. Later, both pyrotechnological crafts were conducted in the same spatial area (Dueppen, 2012, pp. 226–227). His assessment of ethnographic data for the area provides insights about the nature of possible social relations relevant to craft specialization in the past. Currently, many households consist of couples engaged in these complementary technologies—male iron workers married to female potters. Also, the act of smelting, a form of ritual labor, required special powers and conferred status on the crafts people (Dueppen, 2012, pp. 309, 317–318).

What causes technological innovation in craft production, or inhibits it? Relevant factors are the functions of goods, social demand, the status of producers, and available resources (Rice, 1984). Innovation could involve adoption of a new technology, a new type of product, a new management of labor, or innovation in the use of space. We cannot assume a relationship between technological change and social complexity (Loney, 2000). Also, assumptions about advantageous technologies can be erroneous. Roux (2003a, 2008) concludes that potters in the Near East were not willing to learn the required new motor skills required for adoption of the wheel, given the perceived risks. It took a change in social demand for a new kind of ritual vessel to provide the motivation for innovation. Some kinds of crafts such as ceramics may involve more technological conservatism than others (see D. E. Arnold 2012, p. 168; Arnold, Wilson, & Nieves, 2007, p. 70).

Intensification of metal production often involves diverse forms of innovation, and many studies stress the goal of increased efficiency. Maldonado (2009, p. 233) concludes that increased demand by state authorities for copper during the Tarascan empire of Mexico motivated innovations such as the adoption of more locations to smelt copper and a more refined division of labor. Similarly, demand by Qin empire authorities in China for mass production of bronze weapons inspired invention of the rotary wheel (Li, Martinon-Torres, Meeks, & Zhao, 2011). The causal factors for initial development of the complicated piece-mold production method for Erlitou and Shang bronze ritual vessels, however, are not known. This method did not emerge in China until after the initial production of metal items in more than one region (Linduff & Mei, 2009). Replication experiments show that the production steps such as preparation of clay models, forming clay mold sections, and firing mold sections require considerable time and skill (Li, 2007, pp. 190–191). Perhaps in this case, as suggested elsewhere (see below), deliberately nonefficient techniques were regarded as appropriate for production of the highly valued ritual vessels.

Another unresolved issue is how craft specialization changes as urbanism develops (see Wailes, 1996). Addressing this issue requires regional studies, not simply focusing on individual urban settlements (Brumfiel & Nichols,

2009, p. 241). The specific nature and scale of urban organization must be considered. Research in areas such as West Africa (McIntosh & McIntosh, 2003, p. 106) and the Levant (Harrison & Savage, 2003) show we should expect diverse patterns for organization of labor, ranging from spatially extensive and functionally articulated economic organization, to nucleated patterns. Recent research at the Indus Valley site of Harappa provides insights about changes in spatial organization for different kinds of craft production as urbanism develops. The careful comparison of spatial areas over time employed for each craft at Harappa reveals a deliberate spatial separation of crafts with “reductive technologies” such as shell and stone versus pottery and other “transformative technologies” (Kenoyer & Miller, 2007, p. 176).

PRODUCERS, CONSUMERS, AND THE VALUE OF GOODS

Sinopoli (2003, pp. 32–33) and others emphasize the important point that the terms *attached* and *independent* specialization were conceived as endpoints along the continuum of “context” (as defined by Costin, 1991), not as a dichotomy. The goal of research should be to consider the range of possible social arrangements for production, distribution, and consumption of craft goods (Brumfiel & Nichols, 2009; Clark, 2003; Costin, 2001a, 2005, 2007; Flad & Hruby, 2007; Patterson, 2005; Schortman & Urban, 2004). This must include demonstrating evidence for restricted access to consumption of particular kinds of goods (Clark, 2003, pp. 131–132; Costin, 2001a, p. 306; Pool & Bey, 2007; Pool, 2009). In addition there are other potential forms of organization that do not involve long-term, tight control of labor for the production of highly valued craft goods, such as “sponsored” production (Clark, 2007, p. 31; Underhill, 2002, pp. 7–8; see also Hirth, 2009b, p. 16; Hirth, Puche, Arce, & De Leon, 2009; Spielmann, 2002).

A welcome trend in recent research is to carefully assess the value of goods in each specific social context (Clark, 2007, pp. 27–30; Hirth, 2009a, p. 4; Schortman & Urban, 2004, pp. 190–195). This includes exploring other concepts of value than simply those goods sought by elites for acquisition of political power. Clark (2007) usefully stresses that understanding value requires information on social context and how craft goods are circulated, not just the amount of labor expended to produce an object. The term *social valuables* (Mills, 2004; Spielmann, 2002, 2008), rather than “prestige goods,” helpfully conveys the expectation that any social group may produce or consume valued goods. We should expect that households would desire to meet various kinds of social obligations with craft goods through their own networks (Hirth, 2009b, p. 16), either heterarchical or hierarchical in nature (Schortman & Urban, 2004, p. 203).

Three recent studies provide refreshing approaches to the production and use of valued goods. Mills (2004) employs historical and archaeological data to develop a model of ancient Pueblo societies in which certain kinds of highly valued goods were inalienable, promoting communal identity, rather than symbolizing hierarchical relations. Similarly, Bayman (2002) shows that many marine shell objects either symbolized group membership and identity in the southwest, or they were used in public rituals. These objects were accessible to the entire community and brought a sense of power to the social group as a whole. The insightful analysis by Rice (2009) stresses the inalienable dimension of painted ceramic vessels from the Late Classic Maya period. The finest vessels were highly valued more as symbols of identity by the highest ranking elites, rather than their economic role as wealth or prestige goods.

Exciting new research focuses on the nature of specialized production in relation to ritual life. Spielmann (2002, p. 202) emphasizes that craft specialization in small-scale societies is often embedded in rituals, such that "It is the ritual context that defines the nature, timing, personnel, and magnitude of production." Intensification of craft specialization occurs in response to periodic communal ritual activities such as feasting, rather than elite competition. The value of goods can stem from use in special locations or from ritual knowledge required for skilled crafting. McAnany and Wells (2008, p. 7) rightly advocate studies of ritual economies for social groups of any scale, or "how values and beliefs motivate economic choices and how this process materializes worldview." This goal may be more readily achieved if some historical data about production, distribution, and consumption are available (see Wells & Davis-Salazar, 2008).

Another relevant issue is the ideological power that ritual participants could acquire, whether they were the producers of ritual objects, the consumers, or both. Spielmann (2008) usefully emphasizes the agency of social groups involved in the production and consumption of ritual goods, rather than only focusing on individuals. The regional study by Bayman & Nakamura (2001) reveals diverse patterns of production and consumption of goods with ideological value in ancient Hawaii. Similarly, two recent studies show that a range of Mayan households produced and consumed jade objects important for ritual life (Kovacevich, 2007; Rochette, 2009).

Increasingly more studies emphasize how individuals can gain power through the act of producing ritual goods. Hruby (2007, p. 70) argues that some classes of artifacts should be analyzed in a context of "ritualized production," or a production process including oral and physical performance symbolizing concepts of the sacred. Research on elite producers at the well-preserved Mayan site of Aquateca enlightens us about the acquisition of power through the process of creation (see Inomata, 2007; Aoyama,

2013, and earlier publications). The production process by these people, possessing highly valued and restricted knowledge to prepare valued goods made from shell, stone, and other materials, may have included a theatrical component. Rice (2009, p. 140) provides a compelling argument that ritualized acts of ceramic production by Mayan individuals included painting and firing the finest polychrome vessels (see also Kovacevich, 2007, p. 90; Liu, 2003, p. 9 for jade).

Production of ritual goods may take place in private or public settings. Widmer (2009) provides fascinating archaeological evidence for elites at the Mayan site of Copan engaged in ritual production of sacred shell, star-shaped gorgets in two well-preserved rooms situated in a relatively restricted, private location. The material evidence, deliberately wasteful production methods and low output as identified from extensive collection of microdebitage (Widmer, 2009, pp. 182, 188, 199), is potentially useful for indicating “ritualized production” in other areas.

In contrast, production of long obsidian blades during the Early Bronze Age in the Cyclades islands may have taken place during public funeral rites. Carter (2007, p. 100) argues that skilled producers gained prestige from “conspicuous production” of the striking objects, most of which were subsequently buried. His careful comparison of lithic remains in both residential areas and graves indicates that the cores must have been especially valued.

Much research on China stresses elite control over production and consumption of valued goods, especially for bronze vessels (Keightley, 2012; Li, 2007; Liu & Chen, 2003, pp. 133–135). It is not clear to what degree different parts of the production process were controlled, however, such as shaping the ceramic models or creating the alloys. Li (2007) raises the possibility that lower ranking elites at Anyang also had roles in the production of these vessels. Li and Hwang (2013) point out that more research about the regional distribution of different kinds of bronze objects is necessary in order to adequately understand variation in patterns of production and consumption. Indeed, new research at Late Shang sites beyond Anyang is showing that different alloys were used in local production of bronze vessels and other objects (Chen, Rehren, Mei, & Zhao, 2009; Mei, Chen, & Cao, 2009). It also is not known whether certain decorative motifs, forms, or alloys on bronze vessels were restricted to the highest elites during the Erlitou and/or Late Shang periods. Some elites could have been involved in steps of production for vessels regarded as sacred, such as carving particular designs on ceramic molds and/or models, or final polishing.

INTERPRETING SOURCES OF VARIATION IN PRODUCTS

Another step forward in research on craft specialization is greater understanding of the complex relationship between degree of standardization of goods and social organization of production. Standardization may be assessed with respect to decoration and raw material (see Rice, 1987, pp. 202–203), or, size and shape. Ceramic ethnoarchaeological studies have provided empirical support for the relationship between degree of dimensional standardization and intensity of production (Arnold, 2008, pp. 270–272; Roux, 2003b; Stark, 2003, p. 206; Underhill, 2003). These studies and others (Costin, 2000, p. 387, 2001a) show that a variety of social factors such as consumer demand may impact the decisions of potters about whether to standardize vessels, and to what degree. The motivation by specialists to standardize plain wares in the Phoenix basin, for example, was not caused by the efforts of potters to increase efficiency; rather it was the desire of people to communicate social affiliation (Abbott, 2009, p. 548). Any study must explain how and why changes in degree of standardization are significant. Furthermore, an increase in intensity, output, and/or scale of production may not be identifiable from an increase in degree of standardization of craft goods. The more effective ceramic studies assess change in degree of standardization from multiple angles (dimensions, paste composition, etc.), coupled with regional data such as change in settlement organization (see Costin, 2001b; Dai, 2006; Flad, 2011).

Especially helpful is the proliferation of research on the social contexts of learning and practicing different kinds of craft production. A greater understanding of the material indicators of skill is making it possible to better understand the significance of change in standardization. The current focus is the American southwest (but also see Costin, 2001b, p. 217). Crown (2001) provides a pathway for recognizing the work of prehistoric children who were learning ceramic production by assessing different levels of skill on finished pots. She more recently (Crown, 2007) demonstrates the importance of modeling the organization of labor for different historical contexts. In the southwest, where cooperation was valued more than competition, it was common for different individuals, sometimes with varying levels of skill, to work on different parts of a single vessel. Even with this situation, however, it is significant that Crown is able to recognize intensification of ceramic production by a shift from uniform skill levels in painted decoration to the use of more complex designs and greater differentiation in levels of skill (see Crown, 2007, pp. 679, 684).

The concept “communities of practice,” or shared technological traditions achieved through learning specific motor habits (Stark, 2006, pp. 21–26) has been embraced by recent studies of ceramic production. Some routinized

actions used in a region over time that are indicative of shared motor habits can be recognized archaeologically, such as the direction of slant for spinning the cord used to make cord-mark impressions on pottery. Individuals are not likely to later change the direction they had learned (Minar, 2001, p. 393; see also Gatto, 2002). Building up detailed patterns about attributes of products indicative of social networks should ultimately improve our interpretations about changes in degree of standardization. Cordell and Habicht-Mauche (2012, p. 2) show, for example, how techniques to produce glaze paint and polychrome ceramics in the southwest were learned and developed over time through interactions of potters. Gosselain (2008) provides a particularly useful regional ethnoarchaeological study by illustrating how spheres of social interaction during each season of the year in southwestern Niger form the main source of knowledge about ceramic production throughout the lives of potters. The interactions affect their individual decisions about whether to accept new techniques or not (Gosselain, 2008, pp. 167–168, 176). We need more ethnoarchaeological studies documenting not only the process of learning and transmission of knowledge, but also the impact on finished products.

Ethnoarchaeological, experimental, and archaeological studies regarding objects made by reduction technologies also provide valuable information about the impact of social contexts of learning on variation in finished products. Stout (2002) identifies differences in skill among male stone adze specialists who undergo a long apprenticeship period in Irian Jaya, Indonesia. Comparing the products of the experienced versus less experienced adze makers, he finds noticeable differences in the size and shape of finished adzes and waste flakes, as well as the sequence of production steps taken which demonstrate a relationship between the skill of producers and tool uniformity (Stout, 2002, pp. 705–706). Similarly, Ferguson (2008, p. 55) documents differences in degree of dimensional standardization for experimental stone tools made by known skilled people in comparison to unskilled people, even when the process of learning involves “scaffolding” (more experienced producers helping beginners). Lithic studies also show that objects which appear to be uniform and made from the same basic technology can mask important differences in organization of production. The experiments of Hogberg and Larsson (2011, p. 147) reveal different sequences of production steps from Middle Stone Age tools in South Africa. Similarly, Falkenstrom (2011, p. 144) concludes that although there was a standardized concept about what a greenstone adze should look like in prehistoric Sweden, only experimental analysis of debitage revealed differences in production steps indicative of the amount of risk people were willing to take and differences in individual skill (see Bleed, 2008; Yerkes, 2003 for other insightful studies). Finally, replication experiments by J. E. Arnold (2012) reveal there were apprentices for shell bead production in the Channel Islands of California after circa AD

1000. The rich historical and archaeological records aid in the identification of different levels of skill and demonstrate that one type of unusual bead probably represents the work of children learning the craft.

CONCLUSIONS

This review has highlighted recent work that moves us in productive directions for investigations of craft specialization. Rather than concluding the concept should be disregarded, I argue that analysis of craft specialization provides an important dimension to analyses of social change. Some important questions raised in the past have yet to be adequately addressed for different historical contexts. These include explaining how and why intensification of production occurs, under what conditions do crafts people embrace or reject technological innovation, and how specialization of production changes in relation to the development of urbanism. Several insightful studies move us forward by illuminating different kinds of social relations between producers and consumers, especially through ritual activities. We need more diachronic, holistic studies which systematically investigate not only craft specialization but also patterns of exchange and consumption for different kinds of goods. Ethnoarchaeological and experimental research have provided insights about potential sources of variation in finished products, helping us begin to understand how the concept of standardization can be useful for identifying changes in organization of production in specific contexts. We now have more useful tools to investigate how and why craft specialization may change over time.

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Anne P. Underhill is a Professor of Anthropology in the Department of Anthropology at Yale University and a Curator at the Yale Peabody Museum. Anne's longstanding interest in craft specialization began with her PhD dissertation (completed in 1990) on ceramic specialization during the Longshan period (c. 2600–1900 BC) in northern China. The opportunity to conduct ceramic ethnoarchaeological research in Guizhou province from 1992 to 1994 was invaluable for learning about varieties of constraints potters face and important factors in their decision making process. With Shandong University, Field Museum, and Yale University colleagues she conducted a systematic regional survey in the Rizhao area of Shandong province and excavations at the Longshan period center of Liangchengzhen. Her most recent publication (2013) is her edited volume (30 chapters), *A Companion to Chinese Archaeology*, Wiley-Blackwell Press.

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