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Ceramics and Craft Interaction: A Theoretical Framework, With Prefatory Remarks

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The fourth symposium on ceramics in history and archaeology, entitled Cross-Craft and Cross-Cultural Interactions in Ceramics, was held in conjunction with the American Ceramic Society's annual meeting in Pittsburgh, PA, on April 28, 1987. The focus of this symposium was the interaction of a ceramic craft or industry (whether pottery, vitreous materials, refractories, etc.) with another technology (possibly a different ceramic craft, or one involving metals, stone-working, textiles, chemical processing, etc.) within the same or different cultures. Until now, this topic has received minimal attention in the literature. Yet, it encompasses a vast subject matter in time and space, tantalizingly surveyed in Fred Matson's keynote address, that has important implications for historical and cultural interpretation. It has been claimed that "the motive power of a culture...lies in its technology, for here it is that energy is harnessed and put to work."[1] If so, then adopting the best technology available, from whatever source, is of supreme importance for any culture.

The "interaction" of two different crafts or industries can take many different forms, including (1) the borrowing ("transfer" or "diffusion") of styles and/or manufacturing techniques unchanged, (2) the adaptation of the latter to a different set of circumstances, often involving innovation, or (3) the imposition of styles and techniques from the outside with little regard for the peculiarities and integrity of the recipient craft. Such exchange mechanisms can involve direct interactions between individuals, groups, or entire societies, as a result of trade connections, political alliances, joint religious ceremonies, transhumance, intermarriage, itinerant craftsmen, travel and education abroad, foreign conquest or occupation, population movements, etc. Interactions can also take place without direct contact via written records, oral reports from second-party or more distant informants, and the trading of goods through intermediaries.

The concept of craft or technological interaction is part of a much larger theoretical issue—why does a ceramic craft, or any

industry for that matter, change or remain the same? As a touchstone for analyzing ancient technologies, we might well turn to the extensive literature that has grown up around understanding the major technological revolution that we are presently engulfed in. What began only several hundred years ago in Europe during the Renaissance has now spread to the Third and Fourth Worlds, and shows no signs of abating. Culling well-documented examples of technological interaction from this revolution, historians of science, anthropologists, sociologists, and natural scientists[2] have sought to derive general principles and theoretical constructs for understanding technological conservatism and change.

Developmental economics[3] is particularly instructive in its analysis of the transfer of Western agricultural techniques and practices to the rest of the world (the so-called "Green Revolution"). Initially, it was argued that more advanced technological concepts and machinery would be more readily transferred (diffused) if first adopted by more progressive, opinion-setting individuals, who then influenced more traditionally bound individuals and groups. In practice, however, the transfer of technology was much more complicated. Specific environmental constraints (e.g., soil types, water regimes, climate), social arrangements (land-tenure, inheritance practices), and economic considerations (labor supply, capital formation and investment) often inhibited the exchange process. Western technology and the recipient culture in its environmental setting are increasingly being viewed as independent variables in the transfer process. Technologies, comprising both tools *and* institutional arrangements, must be creatively adapted to specific situations, often resulting in mutual exchange, even innovation, between the two parties to the transaction.

Ceramic crafts and industries are at a higher lever of abstraction than agricultural practices, in the sense that the latter directly involve the subsistence or survival of cultures. Ceramics and agriculture, however, are both technologies, viz., "cultural traditions developed in human communities for dealing with the physical and biological environment,"[4] that employ artificially contrived tools and techniques, are constrained by specific environmental factors, and posit certain social and economic arrangements. For the craftsman and his/her family, occupational success is just as crucial for his/her livelihood as is food production for the farmer. Consequently, the change or perseverance of ceramic traditions and products in the Third and Fourth Worlds can be analyzed along the same lines as the transfer of Western agriculture to those regions.

A prominent feature of the Western impact on traditional industries today relates to the tourist trade and art market. For tourists, products are miniaturized (for easy transport, lower pricing, dustability), simplified (speeding up the production process and fitting with different home interior designs), and decorated with combined native and Western motifs (to appeal to various customers). Collectors, on the other hand, will often be attracted to a product for the opposite reasons (archaism, aesthetic elaboration, innovation, etc.).[5] Individual craftsmen, who are enterprising and have available cash for investment, stand to benefit most from the tourist and art

markets. Local governments, recognizing the profit to be made for the community as a whole, have sometimes funded cooperatives of craftsmen.[6]

The unique circumstances of the modern world, with extremely efficient transportation, communication, and monetary systems, can be inappropriately applied to past examples of interaction. More frequently, ceramic industries have been intransigent to change. One well-documented example is that of the Chinautla, Guatemala, potters.[7] Although close to Guatemala City where there was a thriving tourist trade, traditional pottery manufacture was retained for a long time in accordance with *costumbre* ("custom") and community identity. This conservatism can be traced back to the Spanish Conquest period.[8] Elsewhere, archaeologists have also noted relatively little change in ceramic products, even during times of major socio-economic, political, and religious upheaval.[9] Such observations led Foster[10] to conclude that there was a "basic conservatism in the psychological make-up of potters" world-wide.

The underlying causes for continuity, as well as change, in ceramic technology can only be elucidated by articulating the components of a given industry within its environmental and cultural setting.[11–15] Relevant factors include the availability or suitability of local raw materials, climatic conditions, the relative conservatism or openness to change of the industry (relating to individual motor habits and inventiveness, organizational control and secrecy, market demand, etc.), the degree to which ceramics are markers of cultural values such as status, diet, group identity, and religion, and the socio-economic position of the industry within the society (implying variable access to the means of production—capital, labor, and land). Depending upon the relative importance of each variable and their interconnections, a technique or style may be perpetuated or a new one adopted. This "general systems" perspective allows for changes over time in a multivariate context.

As implied above in discussing the transfer of Western agriculture to traditional societies, it is often most useful first to determine the limiting factors comprising and impinging on the craft or industry that might impede change. With a knowledge of the constraints, the factors which are more amenable to change can then be delimited.

Especially in the pre-modern world, the raw materials that were exploited by ceramic specialists were generally close to their workshops—clays and tempering materials, silica, lime, alkalis, and water being very prevalent world-wide.[16] On occasion, pigments and colorants of limited geographical distribution were traded,[17] although probably to a lesser extent than metals.[18] Given specific materials with specific physical and chemical properties, appropriate material handling, recipes, formation and decorative techniques, and firing schedules might eventually be developed by trial and error and become established by tradition. One consequence of repetitive tasks (such as raw material preparation and fabrication techniques), which require complex hand-eye coordination and are often learned at a young age, is that the motor habits become relatively fixed and difficult to change.[19] Even the specific shapes and sizes of ceramic

products may demand certain postures and physical movements in making and using them.

Dietary patterns in most cultures are also quite conservative. If certain utilitarian vessels are thought to impart or retain flavors in foods (such as cooking pots) or to cool water (porous storage jars with evaporative properties), then the specific materials, shapes, and other characteristics might well be retained in preference to changing them.[20]

To the extent that ceramics are markers of status, group identity, or religious affiliation in a relatively closed, conservative society, then internalized and social sanctions, as well as the lack of markets for products, will prevent changes in the ceramic industries. This circumstance can apply to utilitarian, luxury, or symbolic items.

The relatively low socio-economic position of potters in traditional societies has been cited as an important reason for their conservativeness.[16] Certainly, if the new technology involves large capital outlays for equipment, personnel, physical plant, transportation facilities, etc., perhaps with a delayed return on the investment, then any change will be beyond the means of poor individuals and groups. A noteworthy example in post-Renaissance Europe was the attempt to develop a porcelain industry under the patronage of the elector of Saxony.[21] People less well positioned socially, economically, and politically will also generally have less exposure to new techniques and concepts.

The low socio-economic status of many ceramic specialists in societies around the world today, however, need not have been the case in antiquity. The materials themselves, as among the earliest man-made synthetics, were viewed as almost miraculous replications of naturally occurring minerals, metals, and other substances, often associated with specific deities (e.g., blue-green glazed faience duplicated turquoise, the semi-precious stone virtually synonymous with the Egyptian goddess of foreign lands, Hathor[17b]). To judge from the large percentage of cultic and other special artifacts made from pottery and silicate materials found in public buildings and tombs, ceramic crafts and industries were often of central cultural significance. Ceramic practitioners might then have risen to higher socio-economic positions and had more opportunity for experimentation in a relatively "open" society.

If it is unlikely that the raw materials of a region will be depleted, that the diet change, or that the religious and social customs be radically overturned, barring a catastrophic event (even then, some ceramic industries register little if no change), are there any other factors that are more subject to change? Probably the most important long-term, internal cultural factor contributing to change is increasing social stratification and political centralization, often accompanied by increasing population.[22,cf.23] This development can markedly alter the supply and demand conditions of production[23,24] by enlarging markets, creating better transportation systems, concentrating capital formation, and contributing to more diversified tastes and needs within the society. Assuming that rational economic decisions will eventually prevail,[25] that any threat to the existing power structure has been

minimized,[26,27,cf.28] and that craftsmen or their organizations have access to capital and are "open" to change, then changes in the craft's organization (e.g., mass production), investment structure, and products (by targeting specialized sectors of the market) will be the ultimate outcomes. By the multiplier effect, the emergence of a specialized ceramic industry, here considered as the independent variable, could propel the culture in the direction of ever greater stratification and centralization.

Being "open" to change applies equally to the individuals and groups within the society. The primary source of any decision for change is the individual. Any given individual may be more or less educated, have been exposed to a wider or narrower range of experiences, be more or less conditioned by societal constraints, and so forth, but it is on the basis of that individual's intelligence, imagination, and goals (possibly purely to survive; alternatively, as superfluous, playful activity) that change is entertained and promoted.[29] Other individuals may disagree, and in the clash of conflicting ideas and power plays within and between groups of individuals, only some changes will be realized. Cyril Stanley Smith[30] has stressed that technology is "the integrated work of man's hand, eye, and mind, preeminently the individual as inventor," and that technological advance most often occurs for aesthetic rather than pragmatic reasons. Homer Barnett[31] also emphasizes the importance of the extraordinary individual, who is able to juxtapose different principles or forms, either drawn from nature or existing cultural phenomena, and infer entirely new relationships. Instances of highly innovative individuals, who have had a major impact on pottery industries in traditional cultures, are documented in the ethnographic literature.[32] Such individuals, however, do not think or act in a cultural vacuum, a concept also stressed by both Smith and Barnett. They are perhaps the most "open" individuals of any in their societies, but if the groups of which they are part resist change, then they are per force ineffective as initiators of change.

Once granting an "openness" for change on the part of both individuals and groups within a culture, from whence do the new techniques and concepts for changing a ceramic craft arise? Another craft, especially if its workshops are in close proximity to those of the ceramic craft, is a logical candidate. It might well be that another craft has already devised processing methods or organizational arrangements that are readily transferable, possibly with some innovative adaptation, to the recipient craft. The piece-molding of both ceramic and metal artifacts in ancient China would appear to be an excellent example of such a development.[33] Cross-cultural contacts (as trade goods, native craftsmen who have been educated aborad, the arrival of itinerant craftsmen, etc.) can be particularly stimulating and evocative of new possibilities, since they disrupt the customary way of viewing materials and processes. For this reason, direct interactions, with the exception of political or economic subjection in which the parties are distanced from one another, are usually more effective in transferring technology, than indirect interactions. Indeed, because of the complexity of most technologies, the most effective transfer-

ence is accomplished by hands-on, apprenticeship training in the other craft.[34] The adoption of a new industrial technique or concept, possibly in a different cultural or environmental setting, will often require innovative adaptations.[35] Moreover, the acceptance of one element of a technological system may well lead to the adoption of auxiliary elements and eventually more far-reaching cultural developments.[36]

Because of the numerous permutations of the various environmental, individual, and cultural factors in any given instance of craft interaction, many different outcomes are possible. The dominant matrix of factors leading to a particular outcome can sometimes be reconstructed *ex post facto*, but the predictive power of the model is limited.

The reconstruction of past interactions between crafts solely on the basis of archaeological evidence is extremely precarious. Archaeological data represent a very small, highly selective fraction of the original technology. Ceramics and metals, as inorganic materials, are very prevalent in excavations. Evidence for textile, woodworking, and other industries involving organic materials, on the other hand, will be almost non-existent, except under special circumstances (e.g., in dry climates or oxygen-depleted environments). How then are interactions between these crafts to be evaluated? Even for ceramics and metals, workshops and raw material processing sites are rarely located and properly excavated, or the finds thoroughly enough analyzed, to determine the sequence of technological operations and the organization of production for each industry.[37] The additional step of inferring craft interactions from such evidence (as a special instance of "middle level" archaeological theory) is therefore on even shakier ground. Without written records, which present their own problems of interpretation, it is doubtful that the relative significance of the various factors involved in an instance of craft interaction can be unequivocally demonstrated.

Such reservations aside, the group of fourteen papers assembled here should provide the reader with enough "grist" for his own innovative "mill," to sort out the theoretical and pragmatic grounds for the course of craft interaction. The first eight papers, including Fred Matson's survey of the beginnings of craft interaction, are principally concerned with the Near East and the Mediterranean world. Karen Foster's and Michael Vicker's papers represent ground-breaking research on how styles developed in one industry (whether basketry, stoneworking, silversmithing, etc.) are imitated in a ceramic (pottery and faience). Foster's discussion highlights the multifaceted, highly inventive character of ancient Minoan culture. Vicker challenges the conventional notion that Classical Greek pottery was as highly valued as has been claimed.

Gloria London's ethnographic case study of itinerant potters on Cyprus illustrates a situation, which might be totally invisible in the archaeological record, viz., regional typological and technological differences, which have definite environmental and cultural underpinnings, but which are not due to an indigenous technology. Indeed, the technology, which is brought in from the outside, is not transferred at all. On the other hand, in Bob Henrickson's consideration of prehistoric Iranian pottery, a developmental sequence which has often been viewed as heavily conditioned by foreign influences, is explained as a local development resulting from new modes of production.[38]

A well-documented instance of imperialistic control at Beth Shan in Late Bronze Palestine provides the context for Pat McGovern's assessment of the degree to which the techniques and styles of the superior political power (Egypt in this instance) were transferred to the native pottery and silicate industries and vice versa. With the emergence of a syncretistic Egyptian-Canaanite cult, innovative objects, combining religious concepts, iconographic representations and technological features, were produced at the site.

It has been observed that two primary industries of antiquity, metals and ceramics, are similar at least in one respect—the raw materials must be transformed by relatively high-temperature firings. Shouldn't it then be possible to trace this pyrotechnological connection in other ways? As John Merkel demonstrates in his paper on the copper-smelting industry at Timna, Israel, the refractory properties of clays available in the Timna region, which were used to construct the smelting kilns, had the advantage of offsetting excessive fluxing of the slag and thus of controlling the smelting process. The firing of pottery vessels, of course, necessitates different spatial arrangements and heating requirements than that of smelting a metal ore.

In a rare example of large-scale mass production in antiquity, Bill Anderson describes the kilns and pottery work areas at the Phoenician site of Sarepta (Sarafand), Lebanon. Contemporaneous kilns of similar type are documented throughout the Mediterranean and Near East, and have important implications for cross-cultural connections.

The afternoon session of the symposium focused on India and the Far East, with many of the same concerns of the morning session being re-echoed. Another probable pyrotechnological connection between pottery and metal crafts is discussed by Thelma Lowe, specifically the use carbon-rich pottery crucibles to convert iron into steel in India.

Technological *and* stylistic interactions between the pottery and metals industries are especially well-illustrated over the course of Chinese history. The initial development of piece-molding metal and pottery artifacts is attributed by Ian Freestone and his co-authors to the high-quality molding properties of the very prevalent loess deposits of the country. Jessica Rawson demonstrates that porcelain forms, decorations, and techniques continued to imitate those in metal when sheet metal vessels, particularly of silver, came into vogue in the early centuries of the present era. In later periods, Rose Kerr presents evidence for Chinese pottery copying bronze prototypes and vice versa.

What might appear to be a digression on Iron Age opaque enamels in Britain sets the stage for a thorough study of Chinese metal enamels and ceramic glazes during the seventeenth and eighteenth centuries A.D. by Julian Henderson, Nigel Wood, and Mary Tregear. The authors convincingly argue that the *famille rose* porcelain palette

need not have been imported into China from Europe, since comparable cloisonné enamels were already in use in China. The celadon pottery glazes of Korea, on the other hand, have very distinct physical, mineralogical, and chemical differences from those of the mainland, according to the study by Pamela Vandiver, Louise Cort, and Carol Handwerker. Although the inspiration for Korean technology and artistry probably comes from southern China, the conservative tradition established in Korea is peculiarly adapted to its raw materials and the organization of pottery production.

As for previous volumes in this series, all the papers were subjected to peer refereeing and revised before publication. A logistical problem which emerged midway through the review process was a new ACerS publication policy, requiring each author to submit a text version of his/her paper on magnetic disk. The editors would like to thank the authors for their cooperation and patience during this process; it's never easy to "keep up with the times." It should be noted that abbreviations for scientific and archaeological periodicals and series are in accord with *Chemical Abstracts* and the *Journal of Field Archaeology*, respectively.

The final task of assembling the papers and producing the finished product was ably coordinated by Pamela Achter of the ACerS publication office. The editors also gratefully acknowledge the advice and help of their fellow-committee members, Pamela Vandiver and Wendell S. Williams, at various stages of the planning and publication process. Finally, this volume is due in no small measure to the gentle encouragement and scholarly insight of the general editor of the Ceramics and Civilization series, Dave Kingery.

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