RETHINKING CERAMIC DEGENERATION: AN ANCIENT MESOPOTAMIAN CASE STUDY

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A primary research concern of archaeologists is the explanation of social change. Since archaeologists must deal with change as it is manifested in the variability of material culture, it is not surprising that special attention has been given to studies of pottery, one of the most abundant forms of archaeological evidence, and one most sensitive to temporal change. Unfortunately, interpretations of changing pottery repertoires have usually failed to consider the socioeconomic factors which also may be responsible for ceramic variation. This has been notably true when trends of change are judged to be "degenerative." A study of ceramic change in the 'Ubaid and Uruk periods of Mesopotamia illustrates how "degeneration" can be correlated with the development of complex societies in the region.

An Introduction to the Problem of Degeneration

A heterodox approach to the explanation of specific Mesopotamian instances of supposed ceramic degeneration is proposed in this paper for three fundamental reasons. First, traditional approaches all too often do not explain this form of change. At best they describe it and at worst, merely label it. Second, traditional approaches fail to view changing material culture in light of greater economic frameworks which restrict behavior in all complex societies, including our own. Third, traditional notions of degeneration are rarely explicitly defined, and tend to focus on examples of declining elegance in painted decoration to the exclusion of other aspects of ceramic change (cf., Perkins 1949:75). "Degeneration," as presently ill-defined, simply is not productive for the study of social change (cf., Lloyd 1978:45).

Further, existing archaeological accounts of degeneration commonly make the error of dealing with the results of change while overlooking the underlying basis of change: altered patterns of human behavior. An economic approach as adopted here, on the other hand, holds that one of the driving forces behind changing material culture is the changing demands of society's economic conditions. From this point of view, apparent ceramic degeneration may be more profitably explained by understanding why it became economically desirable to make less complex, less impressive forms of pottery. Thus, one means of understanding material degeneration is by way of the ancient potter's "pocketbook."

A Mesopotamian Case Study

Interpretation of prehistoric and early historic social change in Mesopotamia most commonly has been derived from the character of major pottery sequences. As such, long-term "degenerative" trends have attracted special archaeological attention and speculation. Such trends characterize

much of the pottery sequences through the 'Ubaid and Uruk periods (ca. 5300-3600 B.C.; 3600-3100 B.C.; following Porada 1965; Adams and Nissen 1972). These sequences provide a setting in which we can review the shortcomings of traditional descriptive interpretation and the possible advantages of an economically-based attempt at explanation.

This discussion will concentrate on the 'Ubaid-Uruk ceramic sequences from Eridu in southern Mesopotamia and Tepe Gawra in northern Mesopotamia. These sites were selected for several reasons. Use of data from both north and south may help correct for any geographical bias which might arise with the use of data typical of only the north or the south. Further, the vast amount of descriptive data available required, for purposes of clarity, that I concentrate on a small, but hopefully representative, sample of significant sites. Most importantly, the Eridu and Gawra sequences have been thoroughly described and discussed by authors such as Perkins, Porada, Oates and Oates, Lloyd, and Redman in their major treatments of the 'Ubaid and Uruk periods. Finally, Eridu and Gawra provide clear continuous portraits of the major tendencies of pottery development which are usually classified as "decadent" or "degenerative."

Before considering the nature of specific 'Ubaid and Uruk pottery changes, one should be familiar with the larger chronological context of this discussion (see Table 1). The 'Ubaid and Uruk sequences are known best from the soundings done at the southern Mesopotamian site of Eridu (Lloyd and Safar 1947, 1948; Safar 1950). The earliest levels excavated at Eridu are clearly 'Ubaid, though they contain decorated pottery similar to examples from Neolithic sites (Hassuna, Samarra, Halaf sites; see below) found farther north. Subsequent to the publication of the Eridu reports by Lloyd and Safar, Joan Oates revised the 'Ubaid sequence into 'Ubaid phases 1 through 4 (Oates 1960; also see Table 2). The Uruk and Jamdat Nasr periods in southern Mesopotamia follow 'Ubaid 4.

In northern and central Mesopotamia the 'Ubaid and Uruk periods are preceded by a series of ceramic assemblages labeled "Hassuna," "Samarra" and "Halaf." The geographical and chronological distinctions among these later Neolithic assemblages are problematic, but for our purposes here we can consider Hassuna to have commenced ca. 6000 B.C. and Halaf to have ended after 5000 B.C. (following Porada 1965:139ff.; Oates and Oates 1976:8; Lloyd 1978:66). Note that clear 'Ubaid assemblages do not appear at northern Mesopotamian sites like Tepe Gawra until midway through the 'Ubaid period (see Table 3). The Gawra excavations are reported primarily in Speiser (1935) and Tobler (1950).

'Ubaid pottery made its appearance in northern Mesopotamia as part of an apparently vast material culture unity extending over the Mesopotamian alluvium, western Iran (Goff 1971; Hamlin 1975; Hole, Flannery and Neely 1969; Hole 1977; LeBreton 1957) and northern Arabia (Bibby 1969; al-Masry 1973). It was the first such "unity" in the prehistory of southwestern Asia. 'Ubaid ceramics show striking trends of change, appearing most notably after this unity had been achieved in 'Ubaid 3. In the assessments of Perkins, Porada, Oates and Oates, Lloyd, and Redman, four trends seem significant at both Eridu and Tepe Gawra. They include technical change, standardization, simplification, and large-scale distribution (see Tables 2 and 3).

Table 1. Late Prehistoric Mesopotamian Chronology as Seen at Eridu and Tepe Gawra (based on Porado 1965: 139ff.; Oates and Oates 1976:8; Lloyd 1978:66)

YEARS B.C.	SOUTHERN MESOPOTAMIA		NORTHERN AND CENTRAL MESOPOTAMIA	
ca. 2900				
	Jamdat Nasr			Late Gawra
3100				
	Late Uruk	(Eridu stratum I)	(Gawra strata XIA-XI)	Middle Gawra
	Early Uruk	(Eridu strata V-II)	(Gawra strata XIIA-XII)	Early Gawra
3600				
	'Ubaid 4	(Eridu strata VII-VI)	(Gawra stratum XIII)	'Ubaid 4
4000			(Gawra strata XVI-XIV)	
	'Ubaid 3	(Eridu strata XI-VII)	(Gawra strata XIX-XVII)	'Ubaid 3
4400				
	'Ubaid 2	(Eridu strata XIV-XII)	(Gawra stratum XX, mixed Halaf/'Ubaid)	Transitional 'Ubaid/Halaf
4800				
	'Ubaid 1	(Eridu strata XIX-XV)		Halaf/ Samarra/ Hassuna
5300				
ca. 6000				

Table 2. Southern 'Ubaid Pottery Trends as Seen in the Eridu Sequence (based on Perkins 1949; Oates 1960; and Porada 1965)

TECHNICAL CHANGE

'Ubaid 1: Eridu strata XIX-XV
1) 'Ubaid 1 and Samarra pottery thought partly contemporary
2) Hassuna "milk jars" and "husking trays" in levels XIX, XVII and XV used to confirm this
3) Samarra decorative style shows greatest number of analogies to earliest Eridu pottery; designs so similar that they suggest a common origin (Oates 1960:42)
4) "Maltese square" design on plate floors reminiscent of Halaf
5) motifs "splashed on boldly and carelessly" compared to Halaf
6) fine quality monochrome painted ware is typical

'Ubaid 2: Eridu strata XIV-XII
1) wide bowls similar to late Halaf large plates; they retain some of the complexity of Halaf decoration
2) painting more careless

'Ubaid 4: Eridu strata VII-VI
1) on the whole, "there seems to be a coarsening and a degradation of the art of pottery painting" (Perkins 1949:75)
2) at some sites in the south late 'Ubaid pottery painting became "quite careless and uninspired, and even at Eridu the later wares are less skillfully painted" (Oates 1960:39)
3) Lloyd calls late 'Ubaid vessels "decadent" (1978:45)

STANDARDIZATION

beginning in 'Ubaid 1: Eridu strata XIX-XV...
1) all 'Ubaid 1 forms continue through 'Ubaid 2, two-thirds into stratum XII, some to stratum VIII
2) various simple bowl types persist thoughout all the painted pottery levels
3) simple coarse buff ware occurs throughout the sequence

'Ubaid 4: Eridu strata VII-VI
1) signs of tournette manufacture (anticipating Uruk period wheelmade pottery)

'Ubaid 4-Uruk: Eridu strata VII-VI...
1) appearance of light-colored wheelmade "Warkan" ware, much coarser than 'Ubaid light ware
2) also red and gray wares (usually slipped; sheelmade) manufacture:
    a) smother kiln for dark fabric (reduction firing)
    b) use of slip as sole decoration (form of simplification too)

Table 2 (cont.)

SIMPLIFICATION

'Ubaid 1: Eridu strata XIX-XV
1) painted and unpainted coarse ware in addition to monochrome
2) "the decoration in general is more intricate than the bold and free style generally associated with 'Ubaid pottery"(Oates 1960:36).
3) intricate geometric designs, tending toward rectilinear patterns

'Ubaid 2: Eridu strata XIV-XII
1) patterns often clustered close together, creating dark zones on light buff fabric

'Ubaid 3: Eridu strata XI-VIII
1) decoration simpler, less "busy"
2) simple, often bold curvilinear designs
3) frequent use of negative space (integration of unpainted background into painted motifs; empty space is no longer dead space)
4) "lovely offering bowls of temples IX-VIII far surpass anything in the earlier levels for complexity and fineness of design and execution" (Oates 1960:36)

'Ubaid 4: Eridu strata VII-VI
1) designs are bold and sweeping
2) use of slips is uncommon
3) large numbers of unpainted bowls from burials

LARGE-SCALE DISTRIBUTION

by 'Ubaid 3: Eridu strata XI-VIII
1) rapid production "assured [pottery's] wide spread north of Mesopotamia to Syria and Iran" (Porada 1965:150)
2) extensive north-south Mesopotamian trade links (e.g., between Eridu and Gawra)
3) lenticular tortoise jars found in XI suggest transport north in bulk, especially to Gawra (levels XIX-XVII) (Porado 1965:150)
4) a typical form, the beveled-rim bowl spread from southwest Iran to Syria, "with a massive appearance the reasons for which are as yet unexplained" (Porada 1965:153; but see Beale 1978)

Table 3. Northern 'Ubaid and Uruk Pottery Trends as Seen in the Tepe Gawra Sequence (based on Perkins 1949; Porada 1965)

TECHNICAL CHANGE

Gawra strata XX-XVII:
1) 'Ubaid fabric coarser than Halaf
2) 'Ubaid pottery not as well fired
3) 'Ubaid pottery has little surface treatment
4) 'Ubaid motifs "simple, uninspired"

Gawra strata XVI-XV:
1) general monochrome quality decline, especially seen in crude execution

Gawra stratum XIII:
1) pottery "technically and artistically at its highest level since Halaf" (Perkins 1949:49)

Gawra strata XIIA and XII: (Porada's Early Gawra)
1) designs revert to those of XIX-XV, not XIII
2) pottery often overfired

Gawra strata XIA and XI: (Porada's Middle Gawra)
1) sudden change in shapes and fabric; crude shapes, irregular profiles
2) fabric called "decidedly inferior" (Perkins 1949:166)

STANDARDIZATION

Gawra strata XVI-XV:
1) decrease in number of shapes from earlier 'Ubaid and Halaf

Gawra stratum XIII:
1) new forms, new motifs, rare examples of new methods of ornamentation (ribbing, incision and applique)

Gawra strata XIIA and XII: (Porada's Early Gawra)
1) greater vessel homogeneity (e.g., storage jars as a standardized form)
2) tournette "rather widely employed"

Gawra stra XIA and XI: (Porada's Middle Gawra)
1) decrease in variety of forms; almost all distinctive late 'Ubaid forms disappear
2) tournette used less often than in XII

Gawra stratum IX:
1) fast wheel introduced, becomes common in Gawra VIII

Table 3 (cont.)

SIMPLIFICATION

Gawra strata XX-XVII:
1) Halaf: individual painted elements
early 'Ubaid: bowls with continuous elements
2) common use of negative space

Gawra stratum XIII:
1) beakers with bold and sweeping bands, and much use of negative space

Gawra strata XIIA and XII: (Porada's Early Gawra)
1) increase in proportion of undecorated pottery
2) storage jar painting highly simplified

Gawra strata XIA and XI: (Porada's Middle Gawra)
1) painting ceases; no other ornamentation takes its place until painted pottery regains popularity in the latest Uruk/early Jamdat Nasr levels

LARGE-SCALE DISTRIBUTION

(See Table 2, points 1-4).

1. Technical Change. Generally, 'Ubaid pottery exhibits definite decline in quality of fabric, firing and decoration when compared with the finely-crafted Samarra and Halaf wares which precede it. Samarra and Halaf assemblages have traditionally been noted for extremely sophisticated painted design. 'Ubaid pottery is interpreted as partially contemporary with Samarra wares, especially at the central Mesopotamian site of Chogha Mami (Oates 1968, 1973:172). More significantly, it is said to share complex Samarra design principles to such an extent that Oates has suggested a common origin (1960:42). Decorative similarities with Halaf pottery are similarly enumerated in 'Ubaid 1 and 2 at Eridu. The trend of declining technical quality starting in 'Ubaid 3 clearly involves reduced attention to finely detailed ornamentation.

At Tepe Gawra, Halaf pottery provides the standard against which subsequent ceramics are compared. 'Ubaid pottery from the four lowest levels in this sequence also shows relative decline in quality of fabric, firing and decoration. This trend progresses to the point that Perkins refers to the fabric seen in levels XIA and XI as "decidedly inferior" (1949:166). However, we should note Perkins' contrasting opinion of the pottery in Gawra stratum XIII, which is considered "technically and artistically at its highlest level since Halaf" (1949:49). This stratum would seem to represent a significant, if unexplained, pertubation within this long-term quality decline.

2. Standardization. The ceramics excavated at Gawra show a number of trends of increasing standardization. The number of forms in later Uruk levels is diminished distinctly in comparison to Halaf or Early 'Ubaid strata. Vessel homogeneity within this repertoire of forms appears to become enhanced. However, once again Gawra stratum XIII proves to be enigmatic. Contrary to the long-term change before and after it, this level contains unexpected elements of morphological and decorative variability.

Evidence for standardization at both sites reflects introduction and increasing use of pottery wheel technology in the late levels (Eridu VII and later, Gawra XIIA and later). The appearance and proliferation of increasingly uniform wheel-made wares such as Perkins' "Warkan" ware (Eridu VII-VI) would seem to reflect increasingly standardized production procedures.

3. Simplification. Published descriptions of increasing simplicity have focused on painted decoration. Throughout the 'Ubaid-Uruk continuum, the intricate geometric designs of Samarra and Halaf ceramics gradually give way to motifs which require less work to cover a similar amount of vessel surface. At Tepe Gawra continuous painted elements requiring less time for execution replaced more intricate Halaf patterns, and the use of "negative space" decoration became common as early as Gawra strata XX-XVII. Negative space techniques utilized simpler, less complete coverage of pottery vessel surface, emphasizing the contrast between open background and painted design, rather than repetition and close association of different motifs (see Perkins 1949:47). Many forms

incorporated progressively less decoration to the extent that Uruk examples were not slipped or painted at all (e.g., Gawra XIA and XI).

4. Large-scale Distribution. As noted above, the 'Ubaid marks the first period in which north and south Mesopotamia are thought to have shared a generally consistent material culture. By the end of the 'Ubaid sequences at Eridu and Gawra, common monochrome and slipped wares had attained wide geographic distribution throughout the Mesopotamian Plain and its peripheries. Porada has suggested one factor responsible for this trend. She maintains that rapid production assured the far-reaching spread of pottery throughout Mesopotamia and beyond to Syria and Iran (Porada 1965:150). Not surprisingly, both Perkins and Porada have suggested long range trade as the mechanism responsible for extensive distribution, especially between northern and southern Mesopotamia.

Traditional Approaches

Exploration of these aspects of 'Ubaid/Uruk ceramic transitions has typically continued no further than limited appraisal of the "coarsening and degradation of the art of pottery painting," to quote Ann Perkins' hallmark study (1949:75). Unfortunately, even more recent works have seen fit to describe these ceramic changes in terms of aesthetic judgments. Seton Lloyd, for example, simply labels late 'Ubaid vessels "decadent" (1978:45). Indeed, declining complexity seems highly disturbing to many authors (including especially Perkins, Porada and Lloyd), eliciting from them description and interpretation in terms of "lack of inspiration," artistic regression, or technological decay.

However, these value-laden accounts of pottery change can do no more than describe the results of that change. By simply categorizing ceramics as "degraded" or "decadent" these authors fail to explore why this pottery has changed so as to arouse their displeasure. Their aesthetic impressions clearly do not suffice as explanation.

An alternative approach has sought to explain declining pottery sophistication in terms of subsiding interest in the craft. It is usually proposed that such a change is triggered by increased emphasis on other industries. Joan Oates, for example, has suggested that "perhaps the increased use of metal at this time contributed to a lessening of interest in the potter's craft" (1960:39). She specifically cites a "falling off of interest in painted pottery manufacture particularly at the end of the 'Ubaid period" (1960:39). Lloyd seems especially taken by the increasing "profusion" of metal objects in northern Mesopotamia during the Uruk period. In fact, he sees this increase in metal objects as a crucial indicator of the 'Ubaid/Uruk transition (1978:75).

As impressive as the evidence might be, this approach must also be judged inadequate. In ancient societies growing in complexity, it should not be assumed that one technology (metallurgy) would necessarily cause a halt in the development of another (ceramics), unless one is replacing the other. This would not seem to have been the case in 'Ubaid/Uruk Mesopotamia.

In fact, ceramics and metallurgy may have enjoyed some aspects of mutual technological improvement. For example, the introduction and development of kiln technology may well have benefitted both industries.

Clearly, the approaches adopted by Perkins, Porada, Oates, and Lloyd have not identified the roots of change. While it is impossible to address all the problems of understanding degeneration with one example, I want to outline what may be a more comprehensive explanation of the technical decline, standardization, simplification and expanded distribution observed in 'Ubaid and Uruk pottery assemblages.

An Economically-based Hypothesis

The perspective adopted for this case study emphasizes the influence of economic variables on the manner in which pottery was produced and distributed. Initially, therefore, we must develop a clearer picture of the ways in which producer and consumer interacted.

Modern economists account for interaction between producer and consumer in terms of marketing behavior. Marketing involves "business activities that direct the flow of goods and services from producer to consumer or user" (Alexander 1960). In the broadest sense, market activities simply link producer and consumer.

However, marketing theory can be applied properly only under certain conditions of economic exchange. Although it is not assumed at the outset that 'Ubaid and Uruk period ceramics were exchanged as part of a market economy, I would suggest that 'Ubaid/Uruk ceramic industry was not confined entirely to household production and use. In this study a "formalist" approach is adopted using the concepts and analytical methods of Western market economics to understand ancient Mesopotamian behavior.

> "At the very heart of formal economics is the postulate of economic rationality or economizing...Deliberate decisions must be made about how scarce means can be optimally allocated to alternative ends. Thus, the economic problem is defined as an allocative problem and the theory that purports to illuminate this problem is essentially a set of formal propositions about the 'logic of choice.' The basic units of analysis are rational, autonomous individuals..."(Kaplan 1968;233-234; see also Schneider 1974; Nash 1961;186).

"Substantivists," following especially Polanyi and Dalton, would argue against the validity of any analysis based on market exchange and individual decision making (see e.g., Dalton 1961; Sahlins 1969). They are not concerned with the economizing behavior of individuals, but rather with the aggregate behavior of social institutions. Thus, substantivists would not approach this 'Ubaid-Uruk case study via analysis based on economic rationality and decision-making behavior in a marketing context.

However, I propose to show that the fundamental aspects of 'Ubaid-Uruk pottery development are explained best through the use of at least a nominally market-based economic analysis.

The question of whether markets and "true" market exchange existed in antiquity will not be answered definitively here. We can note, however, the unambiguous existence prior to the 'Ubaid and Uruk periods of significant commodity surpluses and extensive distribution networks, two crucial prerequisites for regional market exchange. Storage of surpluses is suggested by installations dating as early as the seventh and sixth millennia . . in western Asia at sites such as Beidha (Kirkbride 1966, 1968), CayönU (Braidwood, et al. 1971, 1974) and Umm Dabaghiyah (Kirkbride 1972, 1973a, 1973b, 1975). The presence of surplus wealth just prior to the 'Ubaid period has been domonstrated further at the Samarran site of Tell es-Sawwan. At Tell es-Sawwan, beneath several substantial buildings commonly considered to be temples, a large number of burials were found containing a wide array of valuable objects, often made of alabaster (Abu al-Soof 1968). Trade networks, especially those dealing in obsidian, also predate the 'Ubaid and Uruk periods by thousands of years (Wright 1969). Of special interest for this study is the suggestion made by Watson and LeBlanc (1973, in Redman 1978:199) that elite groups living in different Halafan communities maintained widespread contacts which encouraged the exchange and imitation of commodities such as Halaf painted pottery (see also Davidson and McKerrell 1976). In light of this evidence, the possibility of market exchange may well afford us fresh insight into the problem of these apparently enigmatic 'Ubaid-Uruk pottery transitions.

The most important consideration in this discussion is that the success of large-scale commodity production and exchange depends upon the flow of information, in the form of decisions, between producer and consumer. For example, decisions to buy constitute "demand," decisions to sell are considered "supply" (Fisk 1967:5). This information flow will also include decisions by pottery makers concerning the best, that is the most profitable, means of ceramic production. In any market-based analysis the profit motive must be considered the major force guiding economic behavior.

The four trends of change in the Eridu and Gawra sequences enumerated above implicate decisions in favor of a specific mode of production. Increasingly standardized, simplified pottery entails correspondingly standardized, simplified means of production. In addition, this kind of production certainly includes widespread product distribution and, most likely, a pervasive element of craft specialization. In sum, the physical properties basic to 'Ubaid-Uruk pottery fit well with characteristics suggested for the general system responsible for this pottery: mass production.

Mass production systems incorporate standardized, simplified manufacturing techniques to enable high volume production of marketable commodities. In mass production economies widespread distribution and exchange of goods are necessary for the system's survival. Therefore, creation and consumption of these goods cannot be restricted to one and the same household. Further, such an economic system must involve manufacture of goods by craft specialists.

The success of the ceramic producer lies in his ability to exchange goods at a price higher than his production and distribution costs. This balance is especially precarious for the mass producer, for he engages in business in millions, but profits merely in pennies (after Fisk 1967;54). The slim nature of this profit margin means that successful mass production requires mass consumption. It is this consideration which has far-reaching ramifications for the nature of any mass production system and the products it creates.

A basic assumption underlying the approach outlined here is that the physical qualities of pottery are largely the result of the amount of time and energy put into its manufacture (cf., Balfet 1965; Irwin 1978: 300). It is suggested that craft specialization, and decreased energy expenditure per pot provide the increased efficiency of production needed to serve a potter-consuming market growing in size (cf., Easterfield 1962:35). Adaptive responses to widespread market demand may involve production of standardized regional trade wares such aa Fourmile Polychrome (Whittlesey n.d.:10-11), Papuan Mailu wares (Irwin 1978:300ff.), and Mesoamerican Late Classic and Postclassic Plumbate (Shepard 1948, 1968: 354) and Fine Orange Ware (Rathje 1973; Sabloff and Rathje 1975; Connor and Rathje 1973). These responses to market pressure also will include less time consuming production techniques and products as seen in Yoruba (Cardew 1969:89, 91) and Tzeltal (Nash 1961:188) pottery making. Standardization and simplification of production, and craft specialization within the production system therefore provide a multi-faceted strategy which is especially adaptive for the mass producer. These characteristics collectively can be considered behavioral aspects of mass production.

Concluding Remarks

Before simply concluding that 'Ubaid-Uruk pottery was indeed mass produced, and that traits like those of 'Ubaid and Uruk wares might be used as indicators of profound socioeconomic change during these periods (e.g., the rise of managed economies) we must strike several cautionary notes.

First, for the sake of precision, any analysis of past exchange should discern whether the commodities being traded included primarily the vessels recovered archaeologically, their ancient contents, or both. The contents and even the general function of many of the wares considered here are not matters of general agreement. Therefore, I am unable in this brief treatment to differentiate apparent ceramic mass production which was a by-product of other changes from that which was adopted for its own sake.

Second, if ceramic simplification is truly indicative of mass production, one must ask why polychromes make a significant reappearance in the Jamdat Nasr period following the 'Ubaid-Uruk sequence (Porada 1965: 159). This might seem especially perplexing in light of the apparently common use in this period of the fast wheel, a significant element of technological standardization and, presumably, continued mass production.

However, one cannot assume that technological innovations, such as the tournette and fast kick wheel, are straightforward material correlates

of the earliest mass production. This correlation seems implicit in some treatments of ceramic industry (Adams 1968:197-198; Neumayer 1967:5; Woolley 1963:577-578; cf. discussions in Nicklin 1971:48, and in Foster 1959b:100ff.), and is apparent in previous comments on the 'Ubaid-Uruk pottery sequence. Joan Oates has suggested that the invention of the fast pottery wheel "almost certainly contributed to the decline in ['Ubaid] painted pottery and its eventual disappearance" (1960:39). Oates and Oates have subsequently elaborated on this idea in terms of a general loss of old craft skills in the 'Ubaid and Uruk periods (1976:122-123). Fortunately, we can amend such stereotyped expectations on the basis of Foster's work with Mexican village potters (1959a, 1959b, 1960, 1965). His studies have demonstrated the fallacy of strictly equating high volume production with wheel technology. Foster has illustrated an array of comparably efficient production techniques (notably the use of circular molds) available between the extremes of basic hand construction and fully wheel-thrown pottery. Therefore, contrary to Oates and Oates, the earliest mass production and reduced product quality would not have required pottery wheel technology. In the Eridu and Gawra sequences this technology makes its appearance (Eridu strata VII-VI; Gawra strata XIIA and XII) only after the 'Ubaid transitions described above. Rather than being the technological foundation for mass production, the tournette and fast wheel may really represent subsequent elaborations which allowed development of more refined decorative techniques in later periods (e.g., Jamdat Nasr).

Third, it has been argued that Uruk period bevelled-rim bowls and Jamdat Nasr period conical cups provide the "earliest strong evidence for a managed economy" (Redman 1978:254, 260). This position has been propounded in greater detail by Nissen (1970) and Johnson (1973) who interpret bevelled-rim bowls as standardized, centrally produced food ration vessels used within Mesopotamia's first centralized redistributive economy. However, these authors neglect the earlier 'Ubaid and Halaf economic changes which provided the foundation for Uruk managed economy. Halaf exchange networks involved a significant degree of regionally centralized production of trade wares at sites like Chagar Bazar, Tell Halaf and Tell Brak (Davidson and McKerrell 1976:52-53). Furthermore, bevelled-rim bowls have been reinterpreted recently as the products of decentralized, household manufacture (Beale 1978:306). Clearly, the role of centralized manufacture in ancient Mesopotamian ceramic industries remains a matter of contention. Unfortunately, the data utilized in this study are unsuitable for analysis of individual forms or wares as a means to address this question. One should note, however, that very simple and extremely elaborate painted pottery forms coexisted as early as 'Ubaid 2, and that while pottery-making centers could have been in use in the 'Ubaid and Uruk periods, centralized production was not necessarily responsible for all varieties of 'Ubaid and Uruk ceramics. Therefore, characterizations of entire industries or exchange systems as "centralized" or "uncentralized" (cf. Johnson 1973, 1975) provide minimal insight into specific instances of 'Ubaid-Uruk ceramic degeneration and mass production.

Finally, in applying any formalist economic approach one must avoid the simple tautology of assuming that marketing conditions prevailed in the past, followed by use of analysis based on marketing principles to

corroborate that initial assumption. I have attempted to avoid circularity in this treatment. Rather, I have pointed out the overriding need for alternatives to mere description of "degeneration." This study strongly suggests that to understand the evolution of complex society in Mesopotamia we should not limit our investigations to the better-known evidence of Uruk or later periods (e.g., bevelled-rim bowls, common use of pottery wheels). These periods best illustrate complex regional economic systems as accomplished facts. To comprehend the development of these systems our attention must be directed earlier. Indeed, through market-based analysis we may be able to explain the emergence of Mesopotamia's first material culture unification. 'Ubaid-Uruk ceramic mass production is offered here as an initial hypothesis to enhance our understanding of the growth processes which led ultimately to the establishment of Mesopotamian civilization.

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