

Methods used to compare islamic ceramic assemblages from northern Morocco *

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The systematic study of ancient ceramics can provide information on many aspects of past societies. Because of the richness of the documentary and architectural record of the Medieval period, ceramics are often relegated to a secondary status and largely viewed as paraphernalia of the past. The establishment of this colloquium, and the diversity of articles in this volume document a transformation in this attitude. Ceramics are the most abundant and widespread component of the archeological record making them one of the best, if not the very best, source of information on both everyday life and the organization of past societies. The challenge before us, and other archeologists, is to develop effective methods for utilizing these ceramics.

Traditionally, ceramics have been most useful in Medieval studies when they have been shown to be diagnostic of a chronological period or of long distance trade connections. These are extremely important issues that continue to concern us, but this traditional approach is unnecessarily limited. First, it is limited by the relatively small proportion of ceramics, only the most diagnostic and complete examples are actually used in making these inferences. Second, there are limits on the range and precision of information on these two topics provided by traditional methods of studying ceramics.

The position taken in this paper is not that the past treatment of ceramics was wrong, but that there are many additional methods we can apply to the study of ceramics providing new types of data about the past. These new approaches include a diversity of techniques ranging from refiring experiments and petrographic studies to advance statistical methods for analyzing quantitative information.

The central theme of this paper is not to describe in detail the techniques incorporated into the work presented here, but rather to argue for the use of a *problem oriented approach* to

the planning, collection and analysis of ceramic data. The kinds of behavioral problems addressed in this study include: 1) the diversity and distribution of activities and social groupings within individual sites; 2) the changing context of ceramic production and procurement at individual sites as a reflection of their economic and administrative systems; and 3) the comparison of the four sites, not solely in terms of chronology, but with respect to the above measures of internal community structure (for background to project see Redman, Anzalone, Rubertone, 1978, Redman, 1983).

FACTORS AFFECTING THE USE OF CERAMICS AS EVIDENCE OF THE PAST

Although the potential uses of ceramic information are many, the problems associated with its use require serious attention. The more the formation and deposition of a ceramic assemblage is investigated, the clearer it becomes that a multiplicity of factors are responsible for the composition of any particular assemblage. However, that is not a cause for abandoning sophisticated ceramic analyses, but rather a reason to be more systematic in their use. The simple assumption used by many prehistorians—that artifacts are made, used, and deposited in the same location—is clearly untenable when dealing with Medieval society. Among the processes examined by the members of our project have been to trace

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the patterns of disposal of ceramics and other artifacts in an archeological site (Boone, 1980; Myers, 1979). It is possible to identify different contexts of deposition that contain significantly different proportions of artifacts. These patterns are related to the fact that for each of these contexts the rate of discard of various artifact classes will differ according to their use life, reuseability, and likelihood of loss versus purposeful discard. Recognizing this, comparative analyses require assemblages from similar depositional contexts, such as the use of all room floors, all room fills, or all purposeful dumps.

Having selected the appropriate excavation units to study, the actual system used to record ceramic information has to be determined. One aspect of the recording system is the means of counting. When quantifying ceramics the alternatives of using numbers of sherds, weights of sherds, numbers of sherds per unit volume of dirt excavated, or some other standardization can yield measurably different results. We have found no simple solution to the ideal quantification, but at this time are experimenting with recording our ceramics by the percentage of the rim present. This approach has the advantage of allowing one to compare ceramics of differing types in terms of relative number of whole vessels that each assemblage contains. However, it has the disadvantage of not incorporating many of the sherds that are found and of being sensitive only to form varieties that can be identified by their rims.

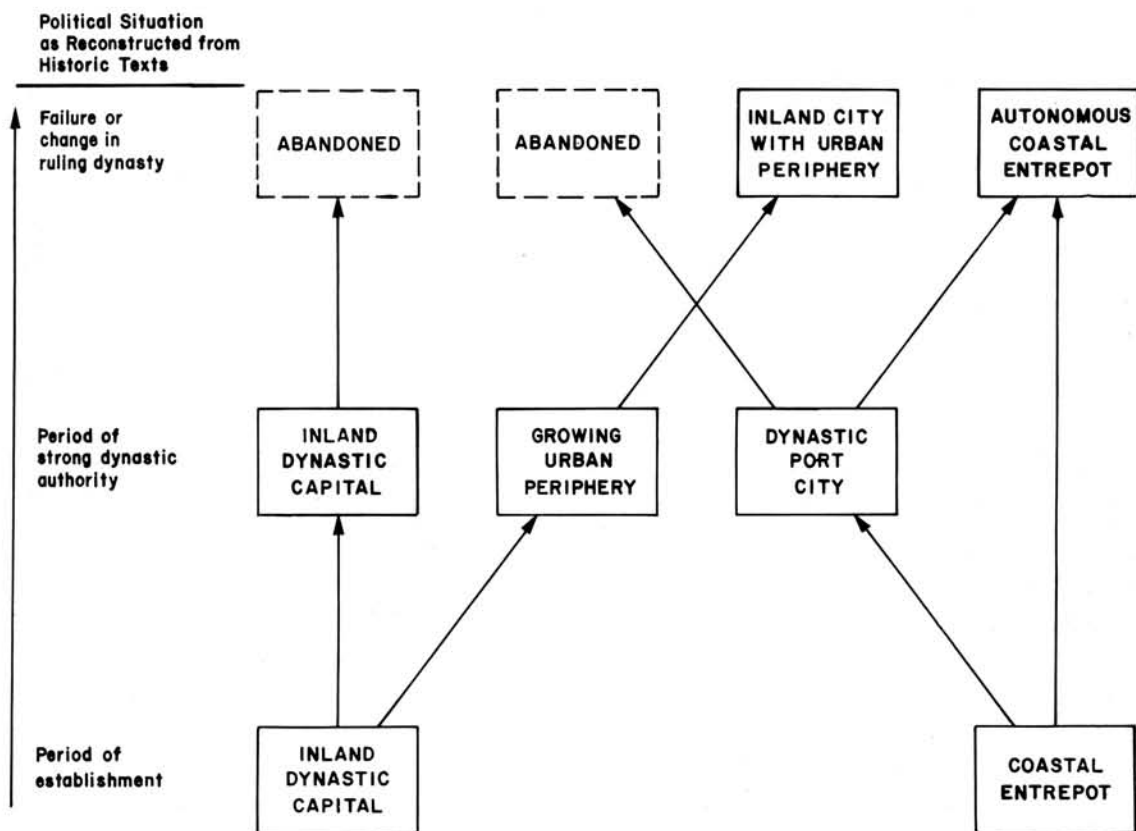
A second basic decision in formulating a recording system is to select the categories to use for classifying ceramics. One may decide to rely on a system of recording individual attributes separately, such as color, paste, rim diagnostics, individual design elements, etc., or may choose to use a summary system of «types» each defined on the basis of several attributes. A type system is easier to use for succinctly describing and comparing a collection, but it has been found that this approach often masks a substantial amount of the variation in the collection because the researcher is forced to fit the sherds into type categories even though in many cases all of the definitional criteria are not met. Once a type or an attribute approach is chosen, it is necessary to select the attributes to measure and whether to focus on those related to ware, vessel form, or decoration. The variability in each of these categories may occur together, but they may also vary independently, reflecting different information about the past. It is the possibility that each different category of ceramic variability reflects a different aspect of past behavior that has led our project to analyze the ceramics in several different ways by using separate sets of measures (Redman, 1978). To use a single, undimensional system for recording a ceramic assemblage limits one's interpretation of differences to a single descriptive pattern, usually attributed to chronological variation. On the other hand, the use of multiple systems of recording and analysis maintains the possibility for discovering differing patterns of variability, each reflecting its own aspect of the past society. However, the use of multiple systems of analyses of ceramic material often yields confusing or seemingly complicated results. We must seek to understand these results so that we can move beyond simplistic uses of our artifactual evidence. We propose that the key to understanding is to design our analytical methods to examine specific interpretive questions about the society being investigated.

INTERPRETIVE APPROACH CURRENTLY GUIDING OUR PROJECT

The current phase of research of my project in Northern Morocco is organized so that the field strategies and analyses are tailored to answer questions raised by a recently formulated interpretive model (Boone and Redman 1982). This model is concerned with the origin and growth of urban centers in medieval Morocco. We hypothesize that the politico-economic situation there created two types of geographic loci at which urban centers arose. Both of these were related to the long distance trade between subsaharan Africa and the countries along the Mediterranean basin. The first type of loci existed because of the geographically intermediate position that Morocco held between the gold producing regions of Sub-Saharan Africa and the centers of mercantile activity in the Mediterranean basin. This situation fostered the rise of the *dynastic administrative capitals* of interior Morocco that were concerned with facilitating and protecting the long-distance trade. The second set of loci are the geographic periphery of these dynastic empires: the Mediterranean and Atlantic coasts to the north and the edge of the Sahara to the south. Urban centers that developed here we refer to as *coastal entrepôts*: these were involved in a variety of transshipment activities, and were often outside the direct control of the dynastic states.

The objective of our current field investigations and the analysis of materials found is to document the existence and nature of the two hypothesized urban forms. Given the geographic settings used for settlement and the political conditions inferred from historic records, the character of medieval Moroccan urban centers should be in accordance with the model presented above. In order to effectively monitor the differences between sites and the changes that occur over time at individual sites, it is necessary to develop a series of implications that this model has for the patterning of material remains we could excavate. The two major elements of this model to be investigated are forms of integration and differentiation in existence at each of the respective site types (see Fig. 1). Integration refers to the strength of the ties that develop between discrete spheres of economic or political activity some that operate within the individual community and others between communities. We predict that ties of an administrative capital will be with other centers within the boundaries of its state and that most materials will be derived from local production. Coastal Entrepôts, in contrast, will maintain links with both cities of the interior state and cities in other countries.

The second element, differentiation, refers to the degree of diversification in an urban settlement, particularly in terms of occupation, status, and ethnic diversity. At least in their early stages, we predict that administrative capitals will have relatively low diversity in their array of economic activities and social groups (although widely disparate). Coastal entrepôts, on the other hand, owe their origin to the diversity of economic opportunities inherent in their location as transshipment points between land and sea. Hence, we would expect to find a wider range of activities and social groups in independent coastal entrepôts than in administrative capitals. These measures would not remain static such as, an entrepot's range of activities diminishing when coming under direct control of a dynasty; or an administrative capital taking on productive activities for the local populace in addition to its role in long distance trade. We have tried



IMPLICATIONS FOR COMMUNITY ORGANIZATION (Ceramic Indices Used For Measurement)

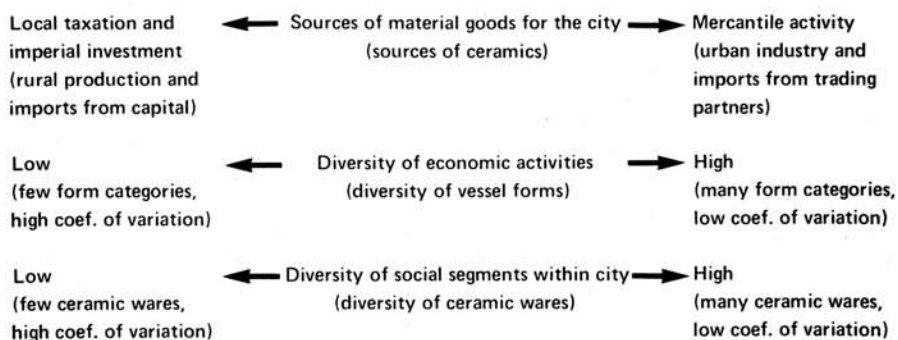


Figure 1: Alternate urban types and possible developmental trajectories with hypothesized differences in communitary organization and means of measuring with ceramics.

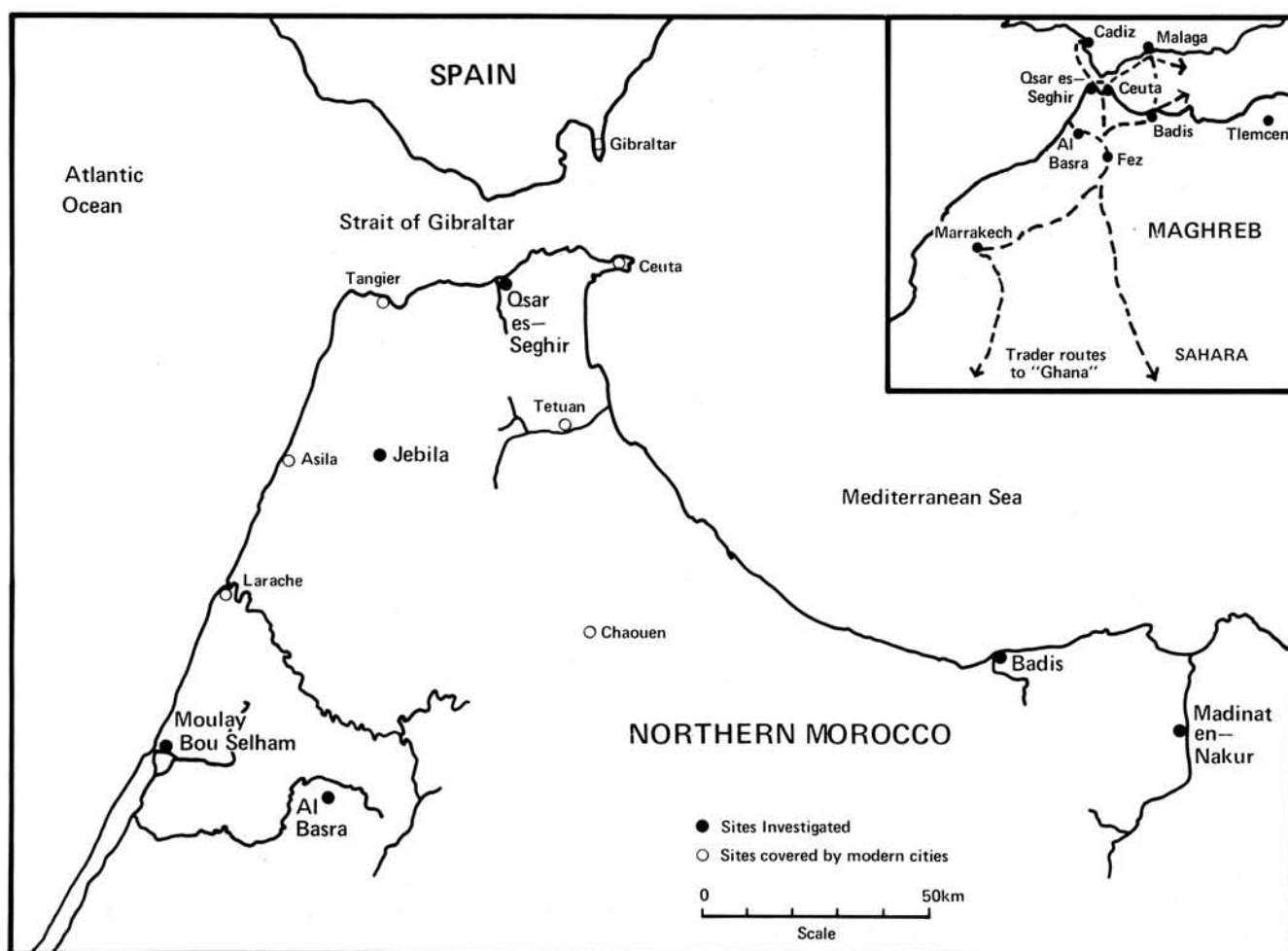


Figure 2: Location of archaeological sites in Northern Morocco that were investigated in this study.

to develop independent methods for measuring in each occupation phase the relative diversity of activities performed in a community and the relative differentiation of social groups.

The key to testing any interpretive model is to be able to collect the appropriate information. To do so we have identified six archaeological sites in Northern Morocco—three inland and three coastal sites—known from textual sources (Fig. 2). Four of these have been investigated with a series of dispersed excavation units. The strategy of using small dispersed test excavations is designed to maximize the representativeness of our collections and enable us to monitor changing community size and periodization. Four sites span the duration of the Medieval period from the first entry of Arab forces in the eighth century until the establishment of Portuguese and Spanish coastal colonies in the 15th and 16th centuries. I will briefly describe these sites and some of the ceramics we have recovered from them before discussing the methods of analysis used with their ceramics.

Ouarzazat has been the main focus of our research for the past eight years. Although there are textual references (Redman, Anzalone, and Rubertone, 1978; Redman, Boone, and Myers in press) identifying the site as early as the eighth

century, our archeological work has shown that its primary occupation is under the Almohad and Marinid dynasties.

Badis is located 150 kilometers to the east on the Mediterranean coast at the mouth of a valley of the Rif mountains. Textual sources refer to Badis as the main Mediterranean port for Fes. Our archeological soundings there date the major occupation to the Almohad and Merinid dynasties.

The inland sites selected are a contrast to their coastal neighbors. Oldest of these is the earliest known principality of Islamic Morocco, *Madinat en-Nakur*. It is located about 50 km. east of Badis and 25 km. from the Mediterranean coast, at a strategic point in the Nakur river valley. Documentary evidence indicates that it was founded in 760 A.D. and destroyed by the Almoravids in about 1080 A.D.

The largest and historically most important of the sites we have tested is *al-Basra* located 40 km. inland from the Atlantic coast. Basra was supposed to have been founded by Idris II early in the ninth century and to have been capital of the Rif and Ghomara region until al-Hakam II razed its fortifications in 973 A.D. Some sources report that the city continued to exist for another century, although with diminished prominence. Our archeological findings are very much in accord with the textual sources. Only early medieval ceramics

have been found at the site. Of very special interest, was our discovery in 1980 of a well preserved rectangular up-draft kiln. On the basis of a brief magnetometer survey conducted by Patrisse Cressier we have located this past summer a *second kiln* of similar design, although somewhat smaller. In both cases the evidence is not definitive, but we believe at least a part of their function was for firing ceramics.

APPROACHES TO QUANTITATIVE CERAMIC ANALYSIS

Although the analysis of ceramics from our expedition is far from complete, it is possible to describe some of the techniques we have already used and indicate others that are currently being applied. We, as other expeditions, rely on ceramics as chronological indicators. The occurrence and abundance of specific types or attributes is often linked to chronologically sensitive factors. Hence, we have spent considerable effort identifying the time sensitive ceramic types, forms and wares in each of our assemblages. The changes in some of these may not be so rapid, requiring a quantitative recording of changing proportions. Many changes in the ceramics that correlate with the successive periods of a community may be related to chronology, but others are caused by the occupants modifying their habits of ceramic procurement or production. Some of these are the result of political-economic changes described in the earlier model. Figure 3 is a graph of what we have identified as the seven classes of ceramic wares, that occur at Qsar es-Seghir and their relative abundance in each of the five chronological phases of the site's occupation. We believe that these general classes of wares are not direct time indicators, but more closely reflect the procurement patterns of the community. The graph most clearly documents the changing proportion of «foreign» luxury wares and rurally produced wares that enter the site when it is controlled by a dynasty versus when it is an independent port.

Interpretive objectives that seek to understand the organization of a community usually focus the analysis on material from one or at the most a few particular periods of occupation. This type of *synchronic, distributional analysis* is at the heart of understanding the functioning of past communities. Once one divides the excavated material into groups of proveniences judged to be contemporaneous it is possible to calculate summary measures or to seek spatially distinct patterns of variability across the site. If one wanted to characterize the wares at a site such as Qsar es-Seghir during its Islamic occupation one could look at the relative proportions of the wheelmade plainware (94.7%), hand built ware (4.4%), and imported luxury wares (1.0%). Another approach is to monitor the division of ceramics into all 30 ware categories used in the classification system. For our purpose here I have calculated, instead, a measure for the variability in the 15 most common wares (representing 95% the sherds). For Qsar es-Seghir the coefficient of variation is 92 reflecting a relatively even distribution of sherds among these categories (Blalock, 1960; 73-74). The presence of differing ware categories probably reflects some sort of diversity in the community's exchange and procurement patterns possibly indicating in this case a large number of social-economic segments within the site.

A similar set of measures could be derived for other aspects of the ceramic assemblage, such as vessel form categories. For a particular period of occupation it is possible to graph the frequency of each, or only the most popular vessel forms. It also is possible to calculate a summary measure of variability for the overall assemblage. For the Islamic Qsar es-Seghir assemblage 71 vessel forms have been identified. The 20 most common forms represent 80% of the collection and are better to use for analysis of assemblage variation. The coefficient of variation for this information is 73. Indicating an even distribution of forms, as with wares. This then implies the existence of a wide diversity of activities (as measured by diverse vessel forms) at the site. But these are summary measures for one aspect of the assemblage, we should also examine the patterning in individual vessel forms as they vary between the excavation units. For the five most common forms in the Islamic levels the coefficients of variation are (in order): 112.2, 104.0, 87.6, 118.4, and 82.9. Each of these forms may have a hypothesized use and their occurrence across the site can be traced.

Analyses that provide summary statistics or examine single ceramic types are useful for particular kinds of information, but a more generalized approach to differing activities across the site requires that the distribution of all of the important vessel forms be examined in a unified multivariate analysis. One approach to this would be to use a *cluster analysis* to identify groups of assemblages that are similar to each other. Using this method to study the distribution of vessel forms in a late level of Qsar es-Seghir, four clusters are identified (Fig. 4). Based on the vessel forms present, cluster one could be interpreted as representing industrial activities, cluster 2 a form of residential refuse, cluster 3 lived-in residential areas, and cluster 4 specialized dumps of residential serving pieces.

It should be remembered that this particular interpretive subdivision of the site, even if confirmed by other tests, still is inferred from a single category of information—vessel forms—and may reflect only a small fraction of the information encoded in the ceramics. By using similar methods, but different input data, such as the distribution of the seven common wares at the site one can discover quite different distributional patterns.

Although the above approach to within site analysis can provide useful insights, the most important type of analysis for documenting our current model involves comparisons between sites and periods within each site. It is only through some sort of comparative approach that we are able to provide real interpretive meanings to the material we are investigating. However, as useful as a comparative approach is, it also has serious drawbacks. The ceramic inventory of a site or a period within a site is formed by a number of factors and we cannot expect these to yield identical material at different sites. Hence, it is difficult to use a single uniform system of classification and recording of ceramics for differing assemblages, or even for different periods at a single site. This complicates the comparisons and necessitates the formulation of specific lines of inquiry to be examined and compared. This, once again, highlights the need for an interpretive model to use as a guide to one's analysis. The model pinpoints the measures to use for comparisons giving them interpretable meaning. In the case of our model of urban forms, I have calculated preliminary measures—of the diversity of activities and social groups at each site.

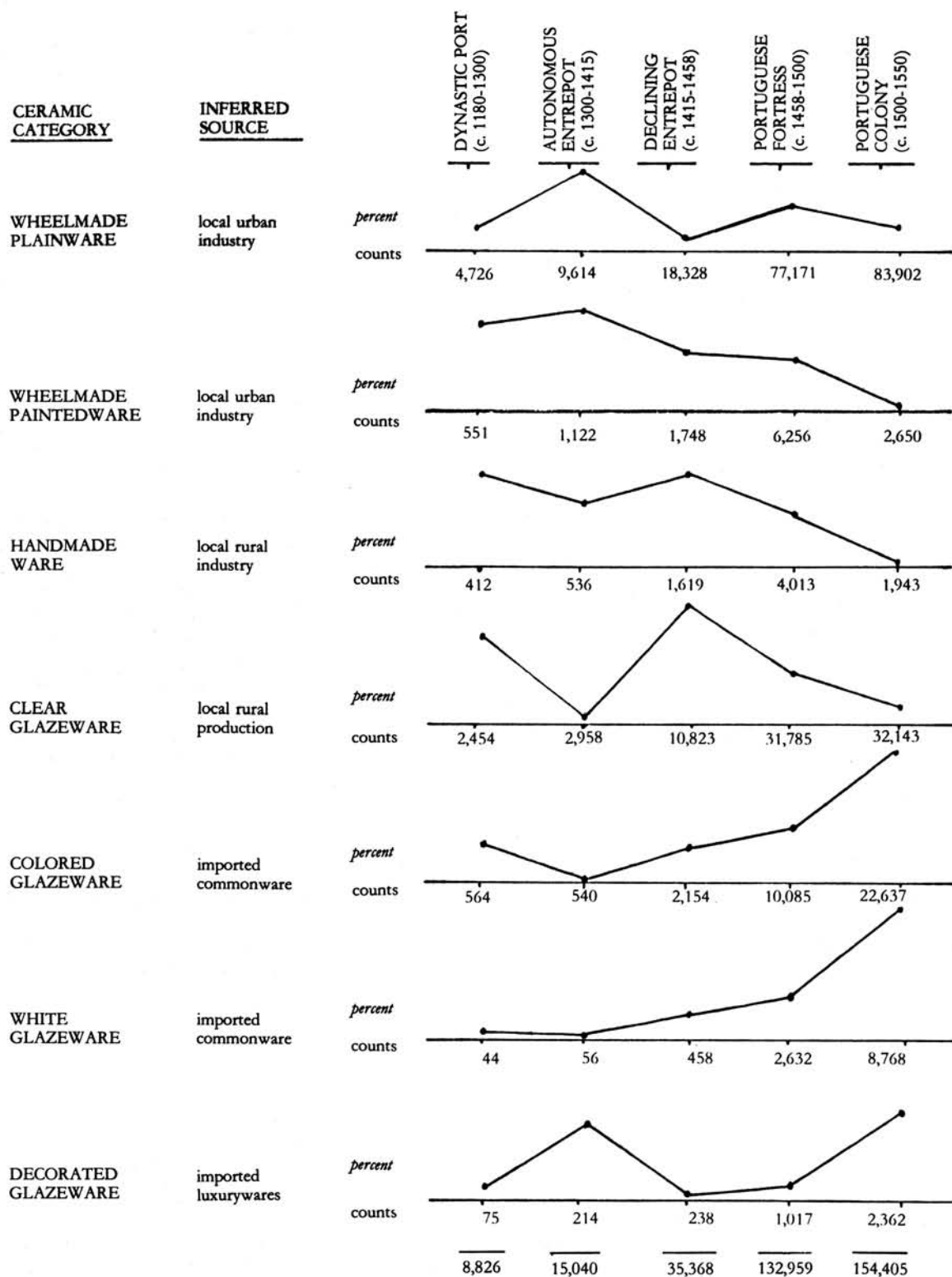


Figure 3: Proportion of basic wares found in each occupation phase.

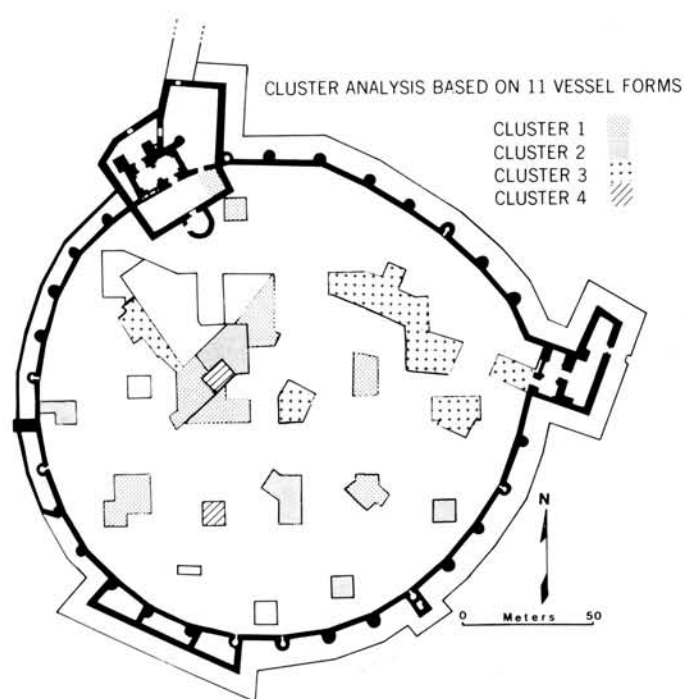


Figure 4: Cluster analysis of major excavation areas based on the distribution of 11 common vessel forms.

The kinds of measures of diversity we have used at Qsar es-Seghir can be calculated for the other sites and then compared. Even the simplest comparison of the basic division of wares at the four sites already analyzed is informative. The coastal site of Qsar es-Seghir and the inland site of Basra are extremely similar on these measures, both having a very low proportion of hand built wares indicating that little of their assemblage derived from small-scale unintensified ceramic production. This emphasizes the «urbaness» of the two sites. In contrast, the inland capital of Nakur and the coastal site of Badis both have relatively high amounts of hand built ceramics indicating strong interaction with the rural elements and/or the maintenance of small-scale productive units within

the city. Interestingly, both Badis and Nakur are located to the east in the Rif mountain region, an area that has maintained its independence and resisted urbanism until the present day.

If one calculates an overall measure of diversity of wares for each of the sites, the pattern is similar, but with some differences. Qsar es-Seghir and Basra have similarly low values, both indicating a wide diversity of wares reflecting a diversity of socio-economic groups or at least participation in a diversity of procurement strategies. Nakur has the highest coefficient of variation, reflecting the least diversity of wares in its assemblage indicating the limited contacts and sources of materials this isolated early kingdom utilized. Badis exhibits an intermediate value of diversity of wares showing more wide-ranging procurement strategies than Nakur, but not as diverse as the other two sites. Badis might fit into our model as a coastal site that is dominated, and hence inhibited in its contacts, by a dynastic power as well as by the isolation of its geographic region.

When applying a similar analysis of variability to the data of vessel forms, the resulting pattern is quite different. This time Qsar es-Seghir and Badis, both coastal sites have low coefficients of variation indicating a wide diversity of vessel forms. This is interpreted to be a reflection of a wide diversity of activities involving ceramics that were conducted at these sites. As our interpretive model predicts, the inland capital of Basra and Nakur have substantially higher coefficients of variation, reflecting the narrow range of activities performed within the bounds of their communities.

Even though these are only tentative, incomplete measures of the processes we are interested in, it is clear that more rigorous application of similar methods will yield substantial insights into the organization and comparative structure of urban communities. To complete the picture, other avenues of inquiry must be pursued, although not treated here. Qualitative analyses, comparisons of specific traded wares, and petrographic analysis of all wares are integral components of any attempt to understand urban structure from ceramics.

The key issues presented in this paper are that 1) it is necessary to organize analysis to incorporate *diverse* categories of information within a *structure* that will provide information relevant to the questions being asked; and 2) that the formulation of an interpretive model of the processes being studied will help to specify the exact inquiries that must be pursued and will be an aid in determining the overall structure of fieldwork and analysis.

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TABLA I
ANALYSIS OF QSAR ES-SEGHIR CERAMICS

Proportion of three major wares in assemblage:

Wheelmade plainware	Handbuilt ware	luxury imported ware
94.7 %	4.4 %	1.0 %

Summary measure of diversity of wares in entire assemblage:

Number of categories	% of sherds in first 15 categories	Total sherds	X	S _x	C.V.
30	94.8 %	27,552	1,306	1,204	92.2

Summary measure of diversity of vessel forms in entire assemblage:

Number of categories	% of sherds in first 20	Total Sherds	X	S _x	C.V.
71	80.0 %	4,517	180.6	132.3	73.3

Measure of diversity of individual vessel from categories:

Category	Total sherds	X	S _x	C.V.
Jar form 30	1,426	118	133	112.2
Bowl form 10	512	43	44	104.0
Basin form 28	429	36	31	87.6
Bowl form 19	377	31	37	118.4
Bowl form 13	298	25	21	82.9

TABLA II

COMPARISON OF CERAMIC MEASURES FROM FOUR SITES

	Wheelmade Plainware	Handbuilt ware	Imported luxury ware
Qsar es-Seghir	94.7 %	4.4 %	1.0 %
Basra	93.7 %	5.4 %	1.0 %
Badis	61.7 %	37.0 %	1.2 %
Nakur	61.7 %	32.1 %	6.1 %

Summary measure of diversity of wares in each assemblage:

	Number of Categories	% of sherds in first 15	Total sherds	x	S _x	C.V.
Qsar es-Seghir	30	94.8 %	27,552	1,306	1,204	92.2
Basra	16	100.0 %	2,167	144	132	91.6
Badis	27	97.0 %	2,543	164	204	124.1
Nakur	21	99.5 %	212	14	26	184.0

Summary measure of diversity of vessel forms in each assemblage:

	Number of Categories	% of sherds in first 20	Total sherds	x	S _x	C.V.
Qsar es-Seghir	71	80.0 %	4,517	181	132	73.3
Badis	42	88.5 %	728	32	26	80.4
Basra	39	96.0 %	1,729	83	95	115.0
Nakur	25	95.5 %	155	7	8	112.8