Fundstellen

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GIORGIO BUCCELLATI, MARILYN KELLY-BUCCELLATI

THE CERAMICS OF URKESH: STATISTICS FOR A BROWSER EDITION

THE FRAMEWORK: GLOBAL RECORD AND BROWSER EDITION

An important goal of the Mozan/Urkesh Archaeological Project has been the development of an all-encompassing system that builds up the record as an incremental whole, in such a way that the record itself becomes the embodiment of the final publication. The digital dimension is inscribed in the record from the moment an observation is first made in the field, and it governs every successive moment. The result is a real-time link between the very first observation of stratigraphic/typological attributes and the final online publication. Each daily input, as done in the field, acquires an immediate published status, against which the ongoing strategy of excavation can accurately measure itself.

The success of such a properly digital archaeological analysis depends on the rigor and coherence of the pertinent theoretical presuppositions. They constitute a closed "grammatical" system whereby each element is endowed, implicitly, with multiple tags. The application of programs makes explicit the full web of paradigmatic connections that these tags imply, and it automatically creates the final presentation, which is fully hyperlinked. Each time a program is run, it updates the very same presentation that constitutes the core of the final publication. The minutest detail is thus immediately accessible and is at the same time embedded in a variety of synthetic tabulations.

In so doing, we seek to achieve the two complementary goals of a rigorous preservation of every single atomistic observation on the one hand, and, on the other, to construct a meaningful and intuitive framework within which all the observations cohere. This gives the user a way of seeing the final product not from the top down, as is the case with standard narratives. Rather, each element is embedded in an ever widening context where the element itself is at the same time a focal point and a link to a myriad other focal points. The structure of the Urkesh Global Record allows for an indefinite expansion of attribute categories, especially in the typological realm. The amount of descriptive detail is unlimited, and yet the resulting picture is always transparent and coherent. The data are instantly integrated within the system by means of a powerful intra-site network that links all the computers operating in the expedition house. The result is that the archaeologist can analyze the data and modify or nuance the excavation strategy daily, while in the field, resulting in an approach that supports the archaeologist's intuition with clearly quantified information.

While the Global Record is the sum total of all observations conceived atomistically, the Browser Edition is the framework that provides integration among all component parts and functionality in the use of the data. It is intrinsically interactive, meaning that its full potential can only be realized online. A goal of the system is to let an overall narrative emerge of its own volition, as it were, out of the seemingly disparate congeries of data. An additional narrative overlay is woven into the system, in such a way that linear and non-linear dimensions are fused harmoniously into a coherent whole. In such a close interaction between attribute analysis and narrative overlay lies the profound difference between our system and any other database type of approach. While a database is a static repository that does not develop an argument and that can only be consulted, the Browser Edition is a dynamic whole that proposes arguments and can properly be "studied". This is then an altogether different model of archaeological publication, which is not only electronic because of the medium in which it appears, but is properly digital because of its conceptual dimension.

In the present article, we wish to illustrate the way in which ceramic analysis is integrated into this system, with particular regard to the sherd inventory. Given the large quantities involved, statistical conclusions are significant. What the system makes possible, is the seamless and instant integration of typological attributes with the complete details of the full stratigraphic setting. This results in comprehensive overviews, one of which will be highlighted here, the frequencies. Finally, we will offer an example of how the system can properly be "studied" in view of substantive results.

The beginnings of the system go back to our years in Terqa, when our friendship with Hartmut Kühne first started. On the occasion of some of his visits, in the late 70's, we had the opportunity to show him our first attempts in this direction, and it is now with fondness that we think back to those early encounters, as we dedicate to him the publication of some of the results.

Minimal constituents

An important feature of the system is the ease with which one can move from the higher syntheses to the single constituents, and vice versa. The documentary value is to be found in the minute, atomistic detail, while the conclusions, and the argument that can be built on them, is to be found in the overarching picture that includes tallies and frequencies. We will illustrate this with reference to a single sherd, tracing some of the many connections that are developed, automatically, on the basis of the attributes inscribed in the initial categorization of the sherd.

Fig. 1 shows the main page for a particular sherd. The full stratigraphic information is given for the pottery lot which subsumes all the other sherds contained in it. It is not illustrated here, but by clicking on the first entry (q582) one will see a list of all the other sherds in the lot, the coordinates which define the emplacement spot of the lot, and the feature where it belongs. Following the drawing and the reference to the stratum and phase to which the lot (hence the sherd) belongs, one will find a typological description, which is based on 23 typological attributes that define standard categories and are subsumed under categories such as ware and ware variation, shape, decoration, quantity, measure. All entries that are underlined are automatically hyperlinked, so that one may follow independent lines of argument – with the opportunity to check, at each step, the pertinent documentary basis.

We illustrate here one such example. By clicking on "Descriptive: Ware/material" a screen will appear as shown in Fig. 2: Here the photo of the section of one or more sherds of that ware will be found, with a detailed verbal description of the ware itself. Note that in the lower portion of the right hand side column a complete list of all the sherds belonging to this ware is given, including of course the one here under discussion. The grand total of sherds of this ware for this particular excavation unit is given at the bottom. The "elements" are the entities defined stratigraphically, that is the lots (for a total of 5,322), the components are the sherds of this ware contained in the lots (for a total of 34,787).[1] These high numbers are even more significant if one considers that they pertain to just a single excavation unit – this particular one (A16) consisting of eight 5 x 5 squares, excavated to a median depth of three meters.

1 For any one unit all the sherds are analyzed, including the body sherds. Typically the shape sherds comprise between 5% and 15% of the total.

Frequencies

Analogous results are available for the other attributes. Significantly, one may construe any cluster of attributes that seems significant, e.g., combining wares with other typological features (such as shape), or linking typological and stratigraphic attributes, e.g. single strata or distinct functional areas (such as floor accumulations, rooms, burials – see below for this type of analysis). The easiest representation of these clusters is by means of tabulations that sort in decreasing order of frequency given constellations of attributes. It is important to note that these frequencies are updated automatically each time a new element, however minimal, is added. Here we will illustrate some broad range frequencies for objects and ceramics from the same unit A16.

Single attribute

The simplest frequency is found with *a single attribute*. Thus Fig. 3 gives the frequencies of *object definitions* (excluding sherds), Fig. 4 gives the frequencies for *ceramic wares* (with a grand total of 61,082), and Fig. 5 gives the frequencies for *overall vessel shapes* (with a grand total of 5,446 – the totals for shape sherds are obviously smaller than for body sherds). It appears that the Chaff Tempered ware (totaling 34,787 sherds, as we already saw in Fig. 2), is by far the most common, more than four times as common as the next ware (Fine Chaff, totaling 7,670). Jars and bowls together, in turn, constitute almost 75% of the inventory. It must be stressed that here, as in every other case, one can reach the lowest level of the individual element by clicking on the individual categories and then on the desired element listed in the lower part of the right hand side column (as in Fig. 1 and 2).

Multiple attributes

More complex frequencies are found when the parameters chosen reflect *multiple attributes*. The first example (Fig. 6) sorts vessel shapes by the two categories which we call "family" (e.g., jar, bowl, etc.) and "sub-family" (e.g., necked, whole mouth, etc.). The next example (Fig. 7) adds the "type," which is a number referring to a drawing showing a particular profile, e.g., of a particular necked jar or a particular deep bowl. As more attributes are added, the totals decrease: The highest percentage for family/sub-family is 34%, but the highest percentage when one adds a type is only 5%.

Correlations

An important difference between a database and the Global Record is that the former is a static juxtaposition of ordered data, while the latter develops an argument by, among other things, rearranging data according to chosen parameters. Hence it is that a database can only properly be "consulted" in order to construct an argument, whereas the Global Record can properly be "studied" in the sense that data are so arranged to suit an argument, in a non-linear fashion. Frequencies are a preliminary step in this direction. Correlations are a next step: they are comparisons of frequencies, in particular, complex frequencies with multiple and heterogeneous attributes. They are also generated automatically, each time the record is updated, according to certain preset parameters (which can be changed as the need arises).

Our policy is to analyze all sherds, except in most cases, those from topsoil layers, of which we retain only those that are typologically distinctive. For any excavation unit the totals range between 30,000 and 60,000 sherds. Our totals are high because we analyze the body sherds as well as the shape sherds. In most features the shape sherds are between 5-15% of the total. Here are the pertinent figures for unit A16:

total vessels and sherds	61,082	
total body sherds	55,490	90.84%
total vessels and shape sherds	5,446	8.93%
difference[2]	146	0.23%

It is important that the categorization system be site-wide and, even more importantly, that the analyses cover all chronological periods, in order to account for both the primary and secondary deposition of the ceramics. The secondary deposition of ceramics occurs often; earlier sherds are brought up into later strata through a variety of mechanisms including the digging of pits, burials, drainage systems, etc. and production activities such as the construction of pit kilns and holding tanks associated with pottery making. In addition the mixture can come from a single event or may be the result of a number of different events mixed accidentally. In all types of secondary deposition these arbitrarily stratified sherds are mixed with later ceramics contemporary with the stratum being excavated. More recently, it has become clear that two other important factors are influential in secondary depositions. 1) Ceramics from earlier periods can be retained out of an "antiquarian" interest in the past. While this is not an important factor statistically, its occurrence may skew thinking about the chronological placement of specific features. 2) Another influential factor, more prevalent statistically, is the imitation of previously made pottery that had already gone out of style or pottery not produced locally. The imitation can include both wares and shapes.[3] The emphasis on a unique system for analyzing all chronological periods in Mozan stresses the fact of the continuity of the potting tradition in Urkesh. Continuity in craft production is one of the conspicuous aspects of the material culture found at the site from the very beginning of the third millennium until the end of its occupation in the mid second millennium. Within the urban tradition of Urkesh we do not have a sharp break in the material culture even though we know from the historical record that outside influences were present. Another factor contributing to the continuity in the material culture is the fact that at this point there is no evidence for phases of abandonment. Even when new ways of decorating the local pottery appear, as in the Khabur period when pottery has painted decoration, ware types remain essentially the same. While the exterior has a different appearance because of the simple geometric painted designs, the wares continue to be made in a similar way.[4]

2 This number reflects sherds that have been included in the total count for ware, but are still being studied with regard to the shape, which is unclear.

3 These data were presented (by M. K.-B.) in a panel on apprenticeship at the annual meeting of the Society for American Archaeology in 2005. An expanded article on the same topic "Apprenticeship and Learning from the Ancestors: The Case of Ancient Urkesh", will be published in a volume on apprenticeship edited by Willeke Wendrich.

4 Khabur painted designs are applied to a variety of ware types so that the term "Khabur ware", though in common use, is not properly correct.

Comparisons between two units (A16 and AA)

We will consider the same data from A16 that have already been illustrated above, and compare them with a sample from strata in the Palace Area AA, with a view towards drawing from the statistics some conclusion with regard to function. We have already noted that the most prevalent ware in A16 (out of a total of 61,082 vessels and sherds) is the one called in our system CH for chaff tempered. This is a relatively coarse ware and represents 58% of the total. If we compare this with the AA sample[5] we can see that the A16 percentage matches the highest percentage found in the Palace Area as a whole, since percentages there range from 39% to 57%.

Fine chaff (FC) ware is made of the same clay as CH, but the vessels produced are smaller and thinner walled and have fewer inclusions. In the A16 sample, FC is 13% while in the AA area it ranges from 11% to 20%. In later strata, the types of vessels previously produced in CH are now also produced in another ware, namely RC, a ware made from iron rich clay with many calcite inclusions. In area A16 this represents 7% of the ceramics when the sub-types are included. Pebble tempered ware (P) is the main cooking ware represented in the excavations. In A16 7% of the sherds are of this ware; in area AA from 8% to 3% were Pebble Tempered ware suggesting that in neither context was cooking a primary activity.[6]

Comparisons among shapes within the same unit (A16)

Now that the general patterns of distribution of wares in A16 and AA have been presented, it is interesting to look more closely at the vessel shapes in the A16 dataset (with a total of 5,446 vessels and sherds). Jars and jar shoulders are the largest part of the sample at 50%. This appears to indicate that short to long term storage was more important in the contexts represented by these data than serving and eating of food which would be generally represented by small and medium bowls (32%) and drinking cups (11%). As we have seen above, cooking was represented in the sample but not heavily.

Among the jars (totaling 2,252 vessels and sherds), the most common are necked jars at 23%. Since the jars are made of clay which is heavily tempered (mostly CH ware), they are heavy to hold even empty. But their necked shape makes them easier to pour; while they are usually of a size requiring that they be held with both hands, their contents could be accessed either by tilting them while on their base or one hand could support the base while the other would steady the neck and more easily guide the outflow of the contents. Hole mouth jars tend to be larger and represent 12% of the A16 sample. However, few are so large that they could not, with some difficulty, be moved when empty. In looking more closely at the bowls, the deep bowls are 9% of the sample; these too must be used for short and medium term storage; many of the straight-sided bowls (3%) also could also be used for the same purpose.

Among the more open shapes such as bowls (for a total of 1,732 vessels and sherds), carinated bowls (11%) and round sided bowls (8%) are the most common. They are well adapted for serving and eating.

5 Buccellati/Kelly-Buccellati 2000: 171-181.

6 There may be a number of explanations for this fact but in most cases cooking vessels are not a large portion even of features identified as cooking areas. It appears that households did not possess large numbers of cooking vessels and that most households would have had a single cooking pot at any one time.

Bases of both jars and bowls are generally flat (30% including all categories of flat base) while the remaining bases are distributed in the categories of ring and disk bases; only eight sherds of rounded bases were found.

We can conclude, from this general overview of the A16 wares and shapes, that the area in all the time periods excavated tended toward activities connected with long, medium and short term storage and not toward either serving and eating or cooking.

Comparisons between different accumulations in A16

Of further interest are the specific floor accumulation patterns. The ceramics found on the A16 paved palace courtyard were few. This was most probably due to the constant cleaning of the paving stones rather than any indication of activities in the area. But if we consider typological aspects of ceramics in other features, some interesting patterns appear. While not definitive, they do help us to focus on the possibilities of the system. From various types of A16 accumulations resting on floors we analyzed over 16,000 sherds, in addition various types of fills yielded over 14,000 ceramics and different layers gave almost 20,000 sherds.[7] Naturally, as in the case of the vessel typology, when the data set is further divided the numbers become smaller. But even with these smaller samples some patterns emerge. This is the case, for instance, when a question is asked regarding the ceramics in the contexts determined as "accumulation type A". This type of accumulation is defined in the Urkesh Global Record as "occupation immediately above a floor surface", so it is generally encompassed in the concept of a "living floor". In A16 there are five (f50, f64, f81, f123, f126) of these identified in Phase 5c, dating to the Khabur period. One of these accumulations (f64) contained only body sherds (Fig. 8a). When the shape sherds of the other four features are examined, while the numbers of examples are small, the resulting distributional patterns are interesting (Fig. 8b). Features f81 and f126 are accumulations above a floor in an outdoor area that contained a tannur and a broken cooking pot. Both features included a high percentage of jars (13% and 15% respectively) when all the diagnostic sherds are considered.[8] Feature 123 is located in a different outdoor area but also contained 13% jar shapes.[9] In this case the outdoor area is located just outside an eroded burial (a1). However, when the accumulation A above the floor inside this burial (f50) is analyzed, then we find only 4% jar sherds.[10] Based on these patterns a suggestion can be made: that the outdoor food preparation areas in Phase 5c included a large number of jars and that there was a similar pattern outside the eroded tomb, a1.

If the numbers and types of diagnostic sherds from Phase 5c found in accumulations type A are compared to the shape sherds stratified in other types of deposits with a higher volume but dating to the same phase, a different distribution pattern can be observed. For example, feature f84 (Fig. 8c) was part of the collapsed walls mixed with sherds in this phase; it contained a high number of ceramics (1,720 sherds of which there are 144 shape sherds). In this

7 A layer is defined in the Urkesh Global Record as a "horizontal deposit with sharp lower and upper boundaries".

8 The percentages are based on the total number of shape sherds in the feature. Feature 81 contained 18 jar sherds while feature 126 had six jar rims and jar shoulders.

9 This feature had 46 jar and jar shoulder sherds.

10 An accumulation A in a burial may have resulted from a use during the preparation of the tomb and in this case the accumulation may have spread more widely as a result of the erosion of the tomb.

fill only 6% are jars with few bowls and cups. An accumulation type B,[11] f24, has a high number of sherds (465 total sherds including 23 shape sherds) and it too contained only 4% jar sherds again with few bowls and other vessels (Fig. 8d).

Even though the numbers are small the patterns observed can suggest other lines of reasoning in looking at A16 or other areas of the excavation. For instance, the outdoor cooking areas from other parts of the excavations can be compared with those discussed here which may generate hypotheses on how the food preparation locations functioned in detail. With the total data analyzed and available in a variety of formats through the Urkesh Global Record, a large number of questions can be asked of the data and then researched very quickly.

Conclusions

The Urkesh Global Record is so designed as to allow an organizational flow that maximizes the usefulness of the countless observations made during the process of excavation itself, and then during the follow-up analysis of the material. A significant problem inherent in the process from which the archaeological record typically emerges, is in fact organizational. Traditionally, much time is spent in cataloguing and ordering data that have been collected long before, and from that ordering one then derives a variety of sorts and constructs a final argument. With the Global Record, the ordering, and the consequent argument, are built into the very moment of the initial observation. It is in this respect that the system affords an immeasurable saving of time: It does not reduce the time needed for the initial observation, but it cuts out all the intervening time that impacts so heavily on the publication progress. In other words, the Urkesh Global Record carries the data from a simple and easily learned input, automatically and thus instantly, to a constantly updated browser edition.

Besides this practical advantage, two important conceptual consequences must be highlighted. The first is that such a consolidation of the initial observations is the best guarantee we have for achieving a higher degree of objectivity. There is no filtering of the initial observations, no replacing of these observations with mere memory (memory is present in the Global Record, but it is earmarked as such through the constant presence of the date when the individual entry is made).

The second conceptual consequence is the impact that the system has on strategy. As the record is built up, decisions about the progress of the excavation are well informed rather than impressionistic. In fact, the record that is available in its final shape to the outside scholar is the same that is available, incrementally, to the excavator.

Thus the Urkesh Global Record provides an altogether distinctive type of archaeological publication, an alternative to the traditional final report. It is a uniquely digital enterprise, not just in the sense that it is available through the electronic medium (as for other archaeological publications, whether as PDF files or as databases), but in the specific sense that it is born digital and can effectively be used only online.[12] We have illustrated here a few of its characteristics as they pertain to ceramic analysis, but clearly its merits extend to all aspects

11 A type B accumulation is defined as an accumulation above another accumulation, without distinct floor surface underneath, but well defined in terms of layering of the matrix and distribution of inclusions.

12 It is found at the address www.urkesh.org (31.1.2008) under Record. Currently still in development and open only to the staff, the site will be open for free general access in the near future.

of stratigraphic and typological analysis. As we expand our publication effort to include old excavation units, and as we strive to publish new excavations within months of the conclusion of field work, we trust that the practical usefulness, and the conceptual significance, of the system may be appreciated to its full extent.

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13 For a bibliography of the Urkesh project, with most titles available in digital format, please see our website www.urkesh.org.

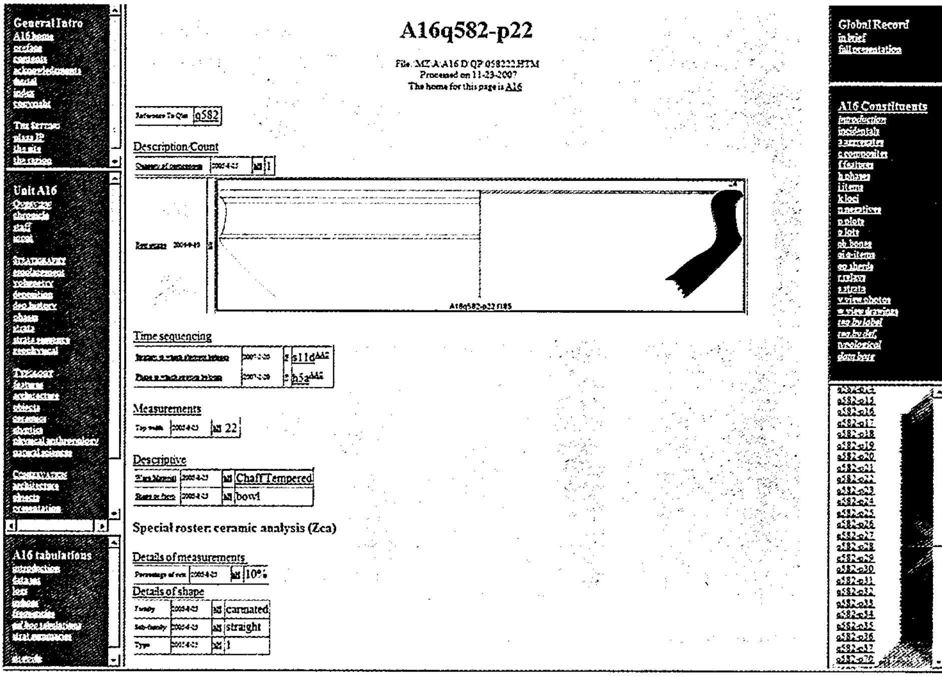

Fig. 1: Sample page for individual sherd

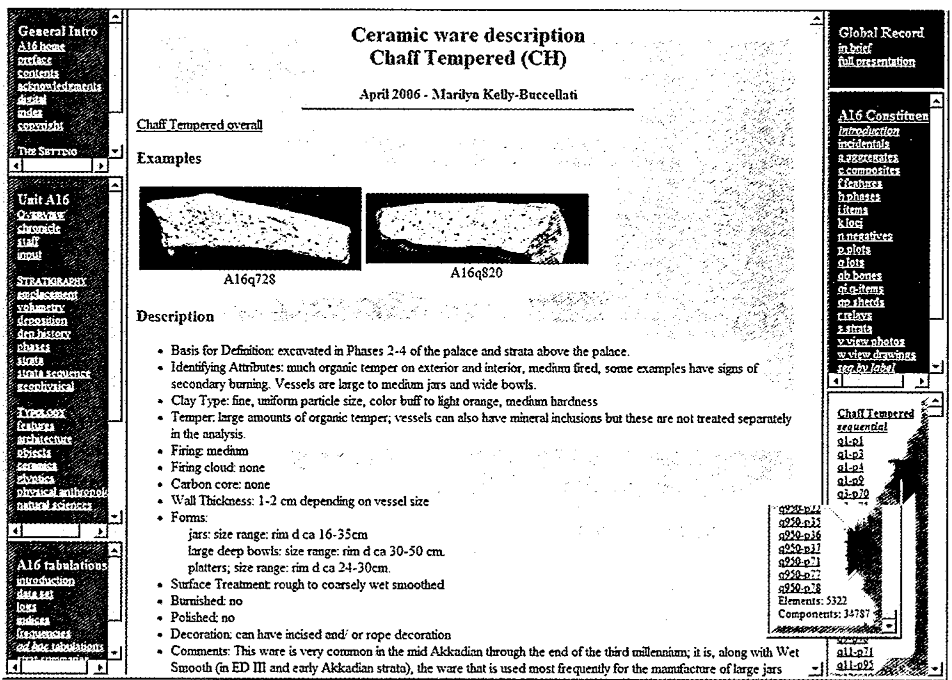

Fig. 2: Sample description of ware, with complete list (lower right) of all sherds belonging to this ware

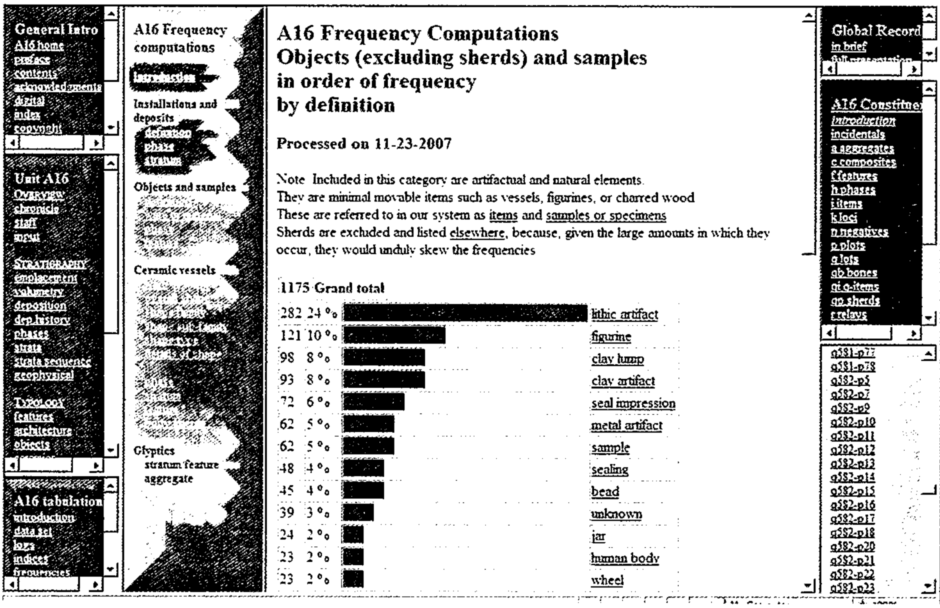

Fig. 3: Sample frequencies of objects and samples

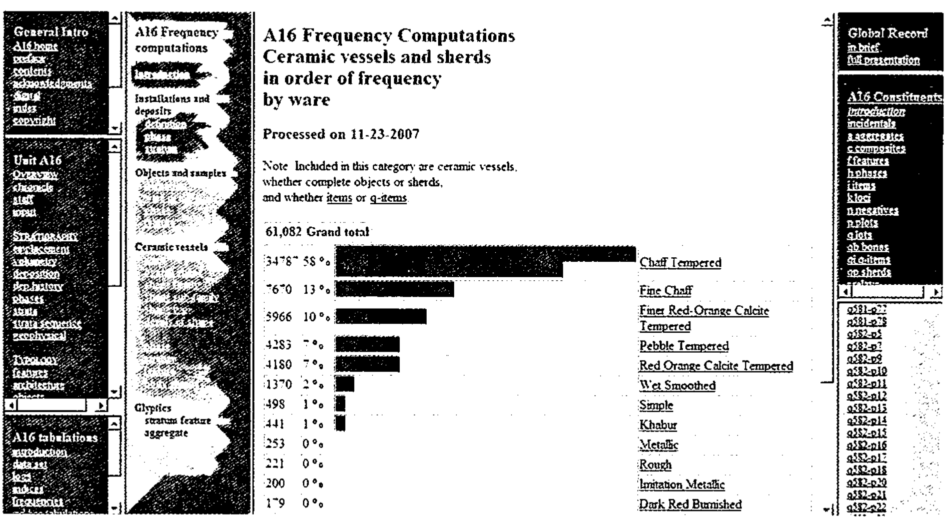

Fig. 4: Sample frequencies of ceramic wares

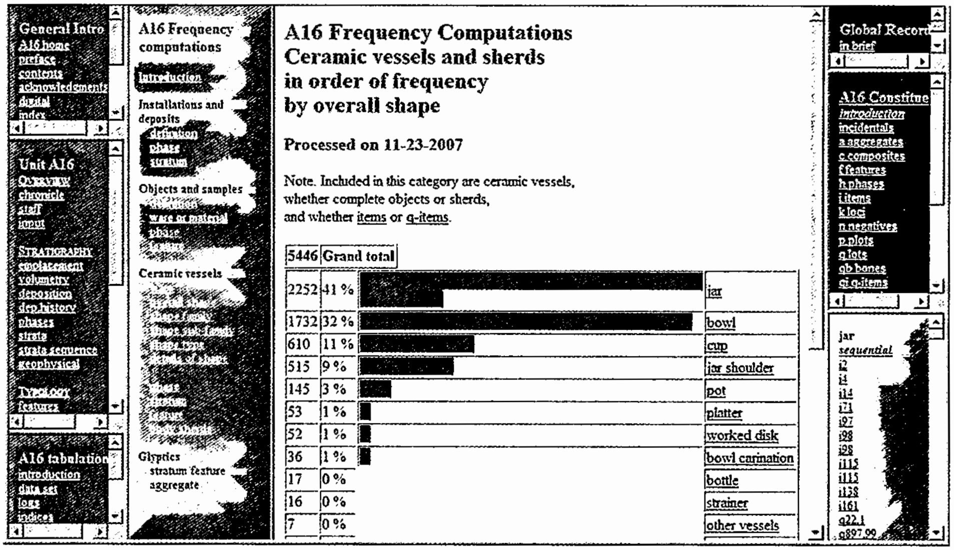

Fig. 5: Frequencies of ceramic shapes

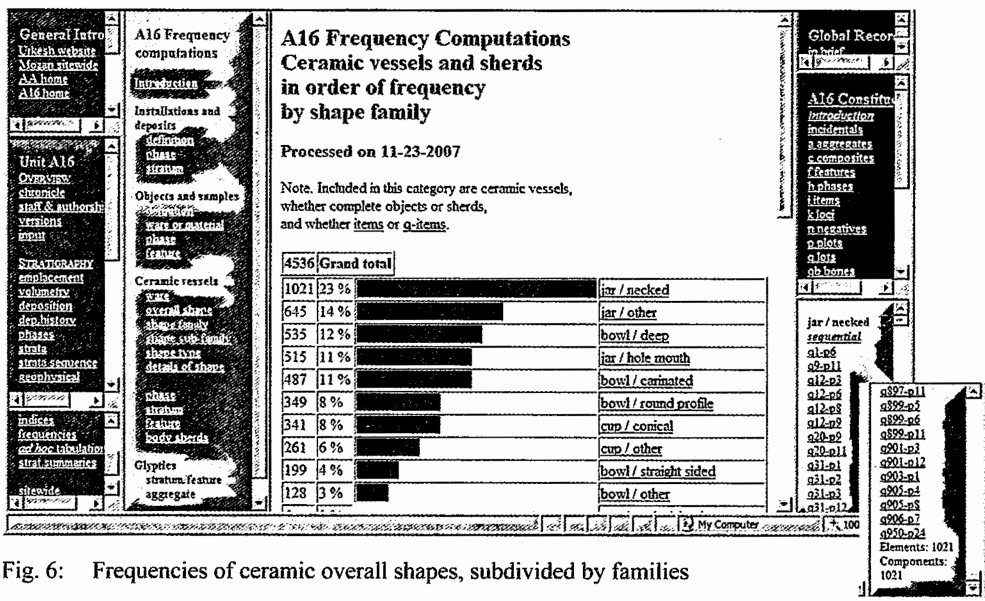

Fig. 6: Frequencies of ceramic overall shapes, subdivided by families

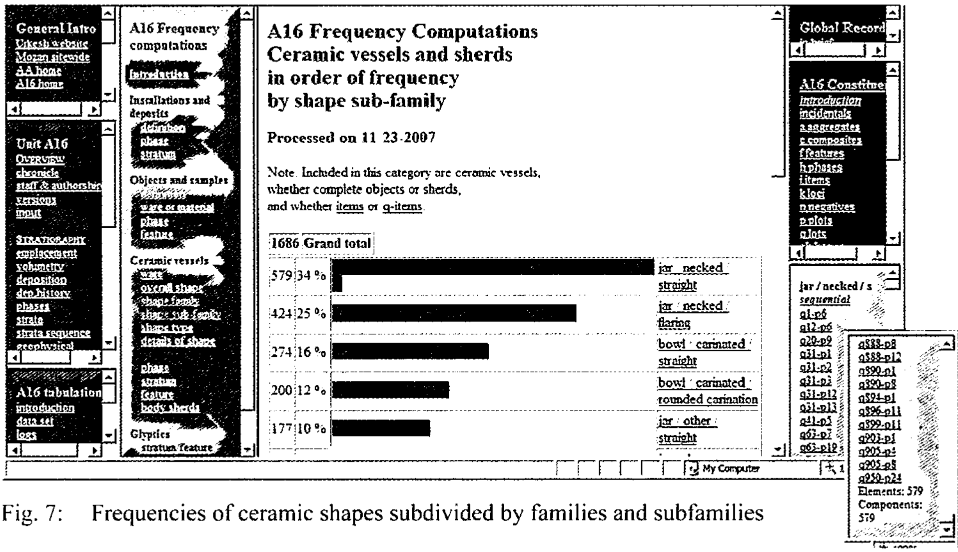

Fig. 7: Frequencies of ceramic shapes subdivided by families and subfamilies

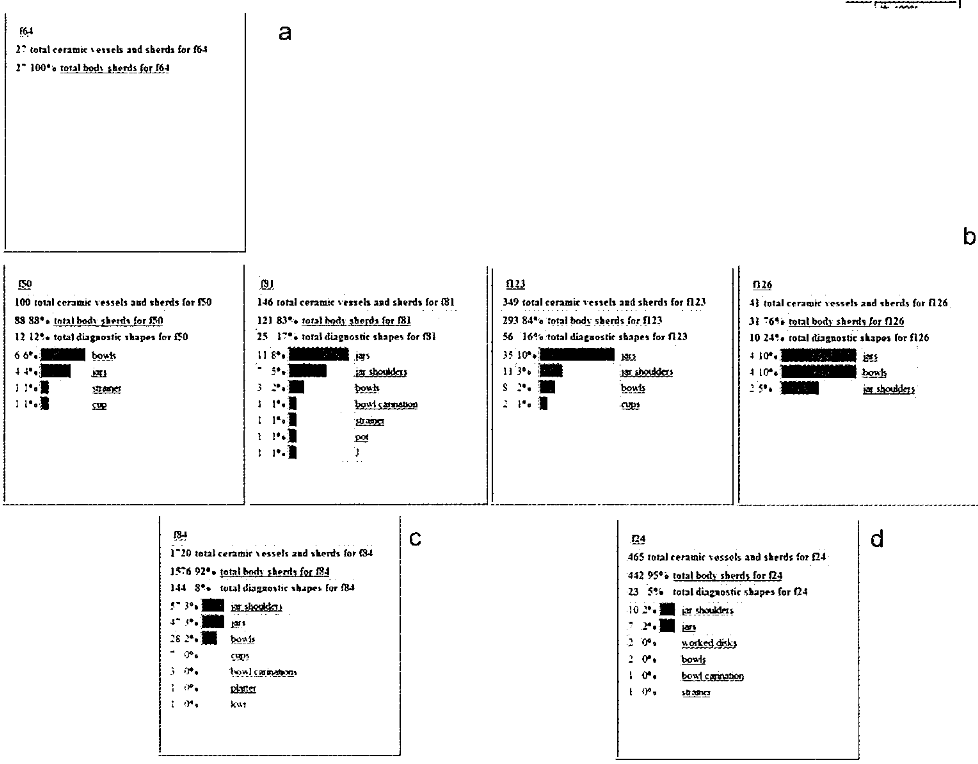

Fig. 8: Comparisons of ceramic shape distribution (from unit A16, phase 5c)
a. An accumulation of type A without shape sherds
b. Four accumulations of type A with shape sherds
c. Brickfall
d. An accumulation of type B