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L'ARCHÉOLOGIE DE L'IRAQ DU DÉBUT DE L'ÉPOQUE NÉOLITHIQUE A 333 AVANT NOTRE ÈRE

Perspectives et limites de l'interprétation anthropologique des documents

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N° 580. – L'ARCHÉOLOGIE DE L'IRAQ : PERSPECTIVES ET LIMITES
DE L'INTERPRÉTATION ANTHROPOLOGIQUE DES DOCUMENTS.

TIME AND PROCESS IN AN URUK RURAL CENTER

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Résumé

Les archéologues sont très prolifiques lorsqu'il s'agit des « processus culturels », mais en général ils conçoivent le passé uniquement sous forme de séquences statiques. Cette contribution illustre une perspective dynamique fondée sur l'analyse d'une grande tranchée saisonnièrement stratifiée, correspondant à un habitat rural de la période d'Uruk. Après une brève discussion abstraite de nos conceptions du passé, et de nos définitions des phénomènes culturels, nous présentons nos recherches sur des systèmes régionaux du sud-ouest iranien au IV^{e} millénaire av. J.-C. Ensuite quelques aspects des processus de la consommation domestique, de la production agricole, et de la gérance de cette production, sont décrits. Finalement nous soulignons des méthodes adaptées à une perception plus dynamique des développements culturels dans le passé.

Introduction

It is commonplace for archeologists to say particular problems dictate particular field and analytical methods. It is less common to say one's perspective on the past dictate the data actually recovered. However, since perspectives define problems, and since methods dictate what be recorded as data and will be destroyed, the second statement can be derived from the first. By considering data from a single excavation in an unusual perspective, this will illustrate how this is so in actuality as well as in the abstract.

Archeologists have been changing their perspectives a great deal in recent years. Much of this change has involved the borrowing of conceptual elements from other disciplines. Fields as disparate as social anthropology, animal ecology, economic geography, linguistics, and cybernetics have been the donors. I believe that much of this borrowing was healthy; others may disagree. Perhaps we can agree that it is now time to attempt to build our own perspectives which, profiting from past mistakes, will best utilize the unique properties of the archeological record and provide more fruitful answers to the problems of historical development.

At present my own work is conceived in a perspective of interacting material and symbolic processes. 'Process' occurs when some set of elements are transformed into another set of elements. For example, 'production' is a process in which labor and materials are transformed into other

materials. Many changes of variables through time are not processes, as defined here. For example, 'centralization' may be an attribute or a consequence of other processes, but it is not itself a 'process'. No elements are transformed. The world of matter and energy is in a constant state of flux : no set of elements is precisely similar to any preceding set of elements. In contrast, the world of symbols can have continuity; the relations between denotata which result in meanings can continue from one time to another. In cultural systems, symbolic orders are used to define and channel material processes; continuity and permanence are created. However, material processes constantly diverge from their definitions. In cultural systems material and symbolic processes cannot continue without each other; however, they also contradict each other.

Such assumptions as the above, which contain the counter-intuitive implications that "durable" material things constantly change, while "ephemeral" symbolic things need not change, requires a lengthy treatment. For purposes of this paper however, such is not necessary. It suffices to say that if one is interested in such processual systems, one builds constructs relating continuous changes through time to discrete transformations in time. One must document past events on very fine time scales if one is to test the implications of such constructs.

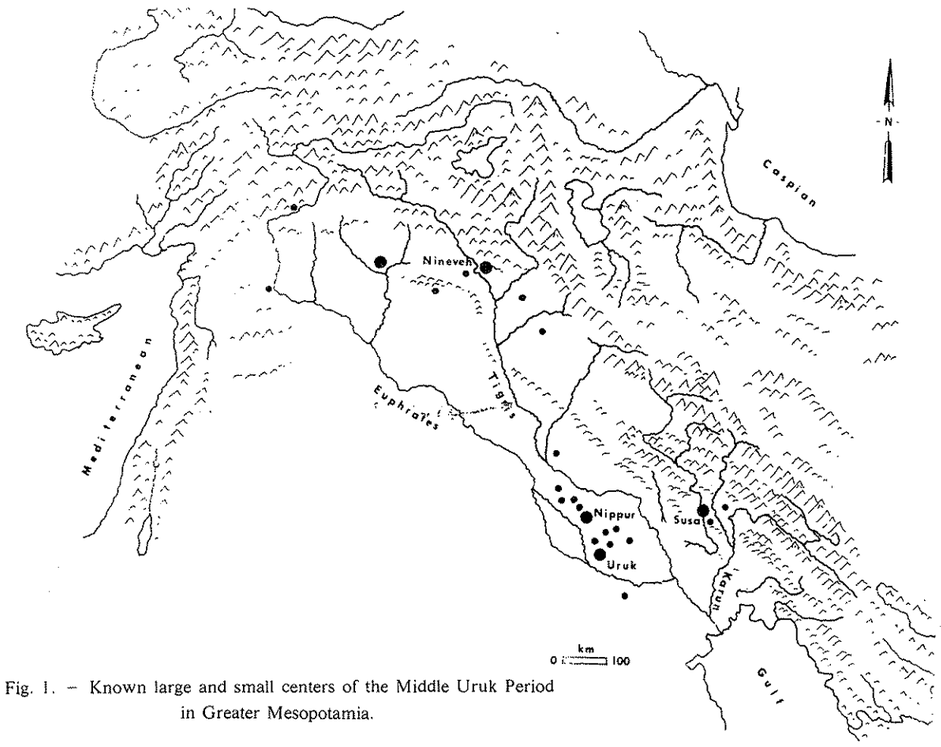

Fig. 1. – Known large and small centers of the Middle Uruk Period in Greater Mesopotamia.

The theoretical aspect of the development of complex cultural systems to which this study is relevant are those of the regulation of production and the extraction of products by controlling agencies. In particular it should be possible to make a test of propositions relating seasonal and annual variations in agricultural productivity with the timing and type of decision-making about the storage or transport of goods. However, we leave the full exposition of such propositions and tests for the final report on the work at Šarafabad.

Regional Research on State Development in Southwestern Iran

No matter what one's perspective, it is difficult to deny that there was a fundamental transformation in the cultures of Greater Mesopotamia during the fourth millenium B.C. In each of the component regions similar hierarchically organized societies emerged around such larger centers as Uruk, Nippur, Susa, Nineveh, and others (*Fig. 1*). In southwestern Iran, particularly in Central Xuzestan, fortunate circumstances have allowed a number of groups to work on different aspects of this transformation. The Délégation Archéologique Française under Jean Perrot has concentrated on the center of Susa and small settlements near by. Various American and Iranian groups have worked on the smaller settlements elsewhere on the plain.

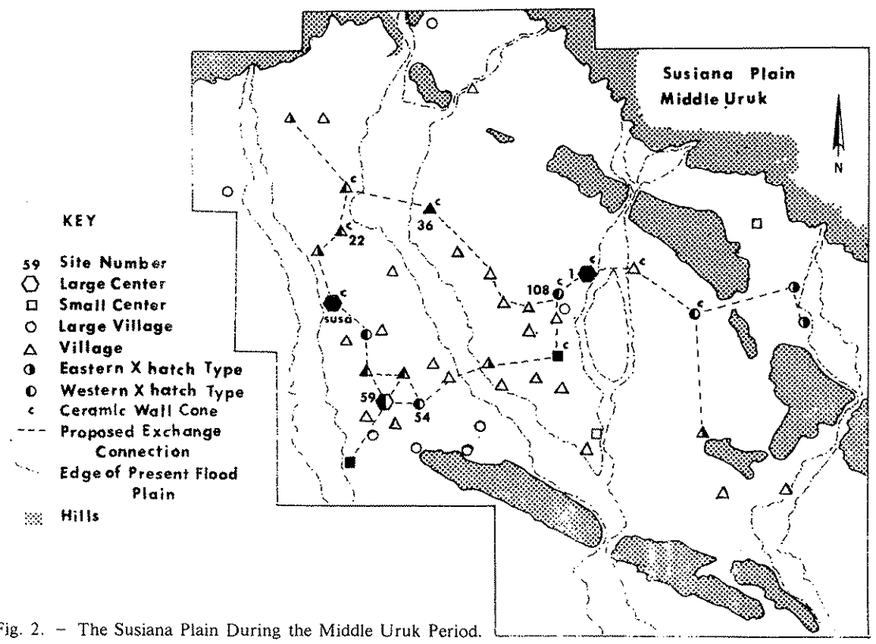

Fig. 2. – The Susiana Plain During the Middle Uruk Period.

Repeated archeological surveys have provided an increasingly detailed documentation of the developing regional settlement system. Gregory Johnson's assessment of the settlement pattern during the Middle Uruk period on the Susiana Plain is shown on *Figure 2* (Johnson, 1973 : 101-141, Fig. 24; Wright and Johnson, 1975 : Fig. 5). In brief, he argued that, by this period, a four level settlement hierarchy had developed as the locus of an administrative hierarchy which coordinated the flow of rural products, particularly agricultural produce, to larger centers, and the flow of center products, particularly craft items, to the rural settlements. If true, excavation should show the by-products of the interchange of material goods and information at various points in the hierarchy.

Excavations on a Rural Center

Tappeh Šarafabad (KS-36 : 3-8746-4518) was investigated because we wanted evidences of the activities conducted at a small local center. Šarafabad was thought to be such a center because it has clay cones, perhaps decoration on special buildings, and it is on a traditional route halfway between the Uruk period towns of Susa and Čoqa Miš. Also, it was in an ideal area for either rain-fed or irrigation-fed cultivation, and because of its location near the northeastern border of the plain, it had easy access to prime pasturage in the Valley of Andimeshk and beyond.

Our team examined the site in the autumn of 1970, and was impressed by the quantities of Uruk sherds on the surface. Had we undertaken a systematic surface study at that time we would have established that, in most areas of the site, Uruk sherds were mixed with later Elamite and earlier Susiana sherds, and we would have realized that most of the site had been disturbed. For better or worse, this was not done until we were committed to excavation.

We commenced excavation in January 1971 by preparing a contour map and taking a systematic surface collection. The mound proved to be oval, 130 meters by 100 meters, and to extend 11 meters above the plain (*Fig. 3*). Because of the buildup of irrigation sediments, the foot of the mound has been covered. There are probably more than fifteen meters of debris at Šarafabad, most of it of the Susiana phases. Next we opened four marginal trenches whose purpose was to establish the edge of actual architectural remains and to allow the training of local workers. Serious excavation began with the clearing of a sample of four-meter squares on the summit of the mound where Uruk sherds were concentrated. The three northern squares revealed Susiana deposits, and were immediately closed. The rest revealed Elamite deposits (Schacht, 1975). Much time was spent removing Elamite strata and architecture in the hopes that Uruk architecture would be found below. Unfortunately, Elamite terracing had cut deeply into Susiana deposits, destroying most of that which we sought. Finally, a series of geological tests were excavated in the fields around the mound.

The results were depressing. Instead of a broad exposure of buildings and features, there were Uruk deposits in only three small areas (*Fig. 3*).

1) On the south summit of the mound were portions of four rooms with several layers of Middle Uruk debris. This is termed the "Uruk Rooms" (UR). Doubtless they were but a fraction of the rooms once present.

2) At the west foot was a remnant with a wall and dumped debris from early in the Middle Uruk period. This is termed the "Uruk Dump" (UD).

3) At the east foot was a large refuse-filled pit, ten meters long, four meters wide, and more than four meters deep containing debris from late in the Middle Uruk period. The contents of what is termed the "Uruk Pit" (UP) are the primary focus of this paper. When the pit was first revealed by the meter-wide marginal trench, it was hoped that it would at least provide a large sample of ceramics and animal bones. As the trench was cut deeper, the pit also proved to contain carbonized grain and seal-

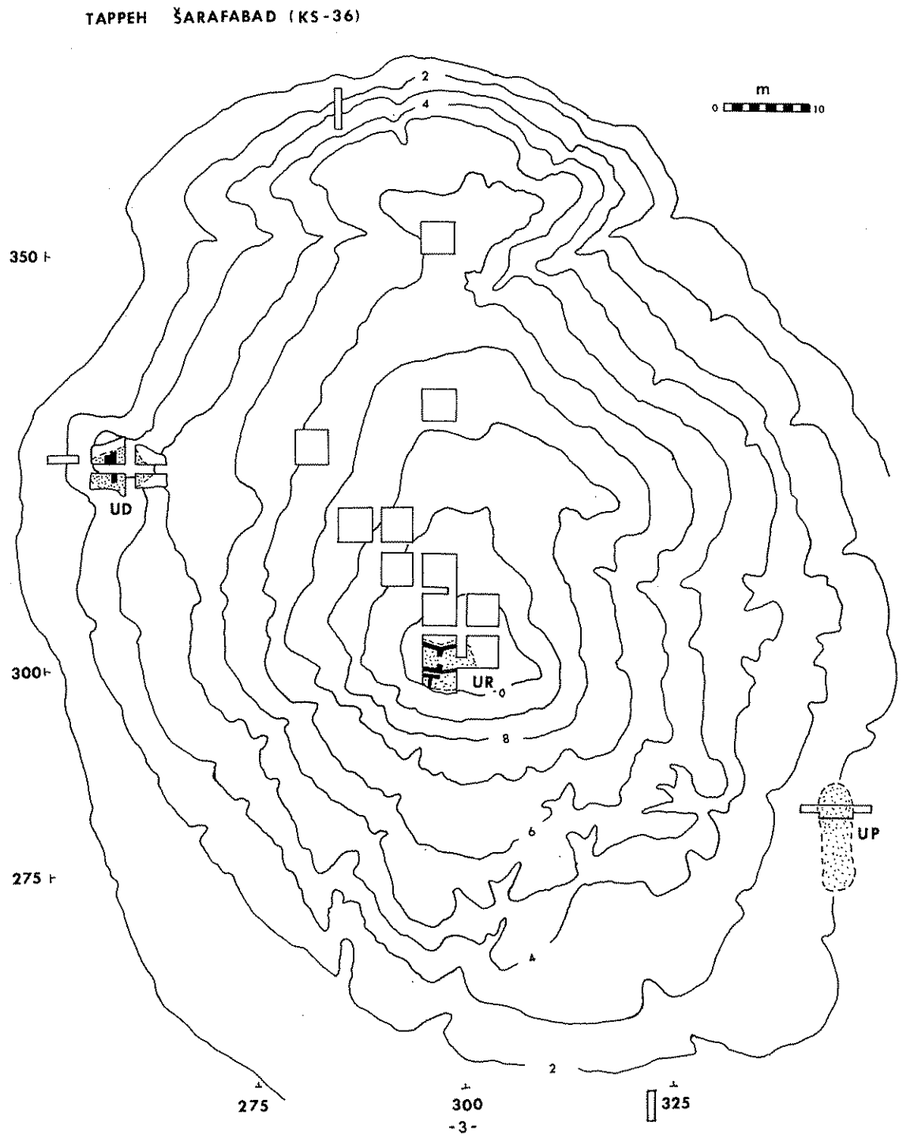

Fig. 3. – A Contour map of Tappeh Šarafabad. The Stippled areas are excavated *in situ* Uruk deposits.

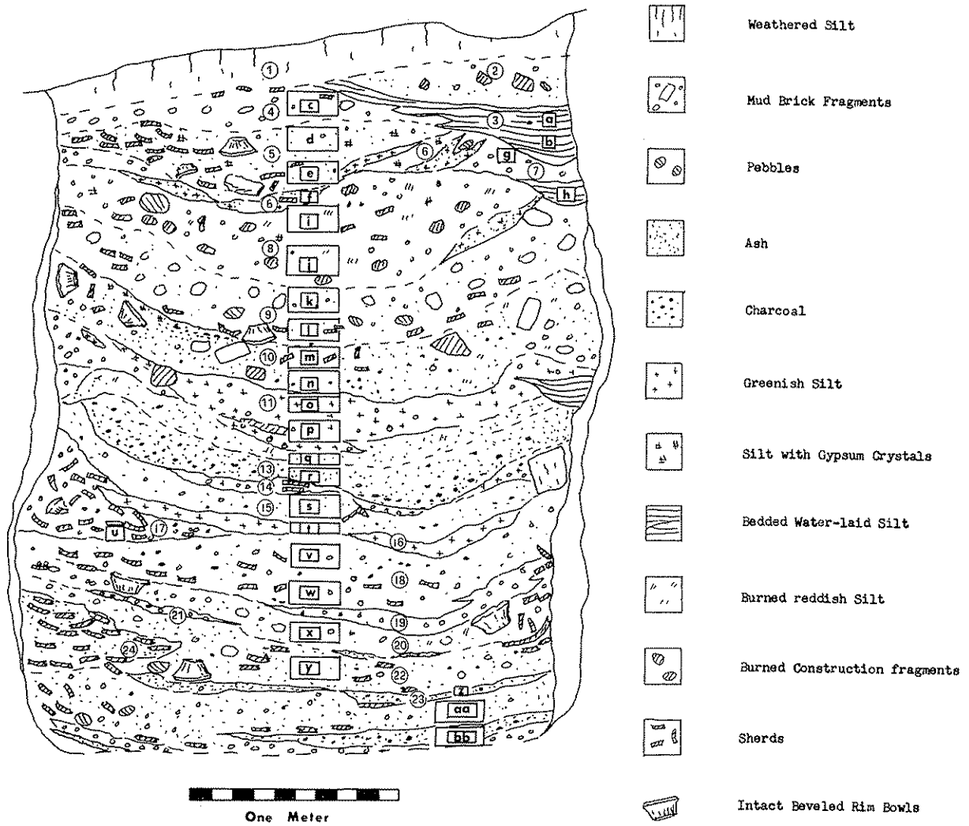

Fig. 4. – Section of Uruk Pit at Tappeh Šarafabad. Layers are indicated by circled numbers and pollen samples by letters in rectangles.

impressed clay items. Furthermore, the section of the marginal trench revealed a complex stratification within the pit. A second slice .50 meters wide was removed lens by lens, and flotation and pollen samples were taken (*Fig. 4* : A to BB) in the hope that seasonal changes in activities could be demonstrated. The analysis of the contents of the pit has been time-consuming, but it has not only produced evidence of seasonality, it has helped us to think about cultural systems and their archeological records in new ways.

In retrospect, we wish that we had put more of our resources into work on the Uruk pit, rather than into the search for architecture. We did not reach the bottom of the pit, and though our screened samples contained hundreds of kilograms of sherds, we did not obtain enough carbonized seeds, chipped stone tools, or sealed objects to undertake comprehensive analyses. Our results thus show what one can learn if one asks certain questions of data recovered in a certain way, but these results are illustrative and not definitive.

Briefly, the following methods, developed during previous excavations were routinely followed at Šarafabad :

1) All material was recovered from measured volumes of geologically defined strata. This permits us to express the occurrence per cubic meter of any type of garbage, correcting for differences in absolute amount axcavated without recourse to percentages.

2) Most volumes of debris were dry-screened through .5 centimeter mesh. Water screening would have been more thorough, but water was precious and we did not want to risk the loss of unbaked clay sealings.

3) All material was weighed and counted in order to establish the average size of various artifact classes, a presumed correlate of the method of garbage disposal.

4) All diagnostic material was measured, each class of measurements to be used to answer specific questions.

The pit contained from older to younger, the following stratigraphic groupings (*Fig. 4*).

1) Layers (26) to (25) were composed of silt with lenses of sherds and charcoal flecked ash.

2) Layers (24) to (18) were composed of ashy silt with small mud brick fragments and lenses of sherds.

3) Layers (17) to (10) were deposits of ash and charcoal alternating with those of greenish silt, neither of which had mud brick fragments; there was one lens of water-laid silt on the west edge of the pit.

4) Layers (9) and (8) were composed of mud brick fragments and silt with lenses of sherds.

5) Layers (7) and above were weathered silts with some residual ash and charcoal; there were two lenses of water-laid silt on the west side of the pit.

What might lead to these differences ? During the long hot summers in lowland Xuzestan, there is much construction and reconstruction of mud-brick buildings because the mud cures well in the heat. It is impossible to make effective mud bricks and mud plaster during the cold rainy winters. On the other hand, during the winters in lowland Xuzestan, one builds many fires for warmth, while during the summers with temperatures near 50 °C every day, one builds as few fires as possible. Knowing well these verities of life in Xuzestan, we suspected that we had found seasonal stratigraphic alternations even before excavation was ended. The archeo-geological evidence indicates that Layers 26 through 18 represent a summer and perhaps the end of the preceding winter; Layers 17 through 10 represent a winter; and Layers 9 and above represent a summer and some part of the succeeding winter. A test of these ascriptions is provided by the evidence of the age of sheep-goat mandibles, as indicated by tooth eruption rather than wear. Assuming birth in November to January (a strategy congruent with local climatic stresses), the five mandibles from Layers 24 to 18 were butchered in June to October, the three mandibles from Layers 17 to 12 were butchered in November to January and the two in Layers 8 to 7 were butchered in September and October. These butchering dates conform precisely to the proposed seasonal ascriptions.

Given that the pit was filled by a series of brief stratigraphic incidents during the course of several successive seasons, how can these data be used to document Šarafabad's place in the Middle Uruk regional system ? I will consider domestic activity, plant and animal use and administrative activity. Because of limitation of time and space, I will not consider the production and distribution of craft items.

Domestic Activity

The maintenance and reproduction of minimal social units in any human community depends in part upon the production, exchange, and consumption of material items. At Šarafabad there is little evidence of the architecture and fixed features which would indicate differentiation among boundaries between, and the scale of, such activities in each such unit. However there is evidence of the immediate by-products of certain aspects of ongoing household consumption. Ceramics, the most commonly recovered artifacts at Šarafabad, can be viewed as the by-products of the storage, preparation, and consumption of food, a crucial social act. Recently ceramic frequencies have been used as direct indications of the performance of different activities (Hill, 1970). However, this has usually been done without considering that types which break more often will become relatively more frequent as deposition continues at a given locus (David, 1972). This problem of differential breakage rates can be mitigated by considering counts of vessels represented by rims in each cubic meter as in *Table I*. The correlations between vessel types are shown in *Table II*. There are strong positive correlations between the densities of bevelled rim bowls and conical cups, suggesting use in similar activities. There is also some degree of correlation between these and the smaller expanded rim jars, which are often spouted. The sizes, shapes, and special appendages of these vessels suggest that they are concerned with the serving of foods and liquids. There is also a strong correlation between large jars with expanded band rims and small round lip jars. As will be subsequently discussed, some of the former were probably sent to the settlement with sealed contents. However they were doubtless put to other uses before they were broken. The coarse-bodied round lip jars are the only ones to consistently exhibit fire clouding

TABLE I
Šarafabad vessel rims/cubic meter

	Layer	No.	Large Round Rim Jar	Small Round Rim Jar	Band Rim Jar	Medium Round Rim Bowl	Conical Cup	Bevelled Rim Bowl Rim	Small Expanding Rim Jar	Medium Flt. Rim Bowl	Small Ledge Rim Jar	Large Flt. Rim Bowl	Volume
W	(5)(6)	186	13.7	9.1	4.6	9.4	4.6	419	4.6	4.6	4.6	0	.303
	(7)	187	9.5	33.3	14.3	9.5	23.8	1852	14.3	0	4.8	0	.[illegible]
S	(8)	189	0	4.8	0	2.4	7.3	1089	9.7	0	2.4	2.4	.[illegible]
	(9)	191	17.8	17.8	11.9	3.0	20.0	1626	20.8	0	11.9	3.0	.[illegible]
	(10)	192	0	7.2	2.4	0	2.4	555	21.9	4.8	4.8	0	.[illegible]
	(11)	193	3.8	15.1	3.8	3.8	0	235	15.1	0	0	0	.[illegible]
W	(12)	194	9.6	9.6	0	0	0	351	14.4	0	0	0	.[illegible]
	(13)	244	0	6.1	0	0	12.2	573	6.1	0	6.1	0	.[illegible]
	(14)	245	6.6	6.6	6.6	6.6	6.6	428	6.6	0	0	0	.152
	(15)	246	12.5	0		0	4.2	929	4.2	0	4.2	0	.[illegible]
	(17)	249	0	22.0	11.0	5.5	38.5	3621	22.0	0	0	11.0	.182
	(18)	248	11.1	18.5	7.4	3.7	33.3	1626	11.1	3.7	3.7	0	.270
S	(19)	250	11.4	5.7	0	0	11.4	1543	11.4	5.7	0	0	.175
	(20-21)	251	7.8	0	0	3.9	19.5	2199	15.6	15.6	7.8	7.8	.256
	(22-24)	252	0	0	0	12.1	28.2	3024	24.2	4.0	8.1	0.	.[illegible]
W	(25-26)	253	12.5	9.4	3.1	9.4	12.5	1586	15.6	0	3.1	10	.[illegible]

TABLE II
Šarafabad vessel rims/cubic meter

2	---							
1	.18	---						
5	.24	.84	---					
7	.02	.22	.47	---				
6	-.06	.25	.38	.48	---			
9	-.09	.05	.19	.40	.92	---		
3	-.29	.21	.16	.27	.37	.50	---	
4	.06	-.26	-.01	.16	.35	.40	.20	---
8	.15	-.31	-.17	-.02	.13	.22	.24	.41
	2	1	5	7	6	9	3	8

Spearman's Rho
N=16

r @ .05 = .42
r @ .01 = .60

and charred cooking debris, and must have been commonly used for stewing foods directly over the fire. Several shattered complete examples of these two types of vessels were found together in ashy debris on the floor of one of the few preserved Uruk rooms at Šarafabad, further supporting the association. I suggest that these vessels were used in food preparation. It is notable that large round rim jars do not correlate with other forms though they also exhibit evidence of cooking over a fire. It is possible that they were used in cooking of another type, perhaps for different recipes or for larger groups of people.

If the seasonal ascriptions suggested in the preceding section are correct, then the various associations of vessels and the suggested cooking and serving behaviors show no seasonal association on *Table I*. The occurrence of the few large bowls only in summer layers is the only such seasonal association. There is, however, a year to year difference of note. In the lower third of the pit, the average density of bevelled rim bowl is much greater than that in the upper two thirds. In general, bowls are being broken at a much greater rate than other vessels. Assuming that the 5 % of the pit in our second slice is representative, that the excavated portion of the pit represents 2 1/2 years, and that there were twenty families dumping garbage in the pit, then one can estimate the number of vessels broken by each family in one year. In a year, each family would discard about 12 large round rim jars, 16 small round rim jars, 25 smaller round rim jars, 25 smaller expanded and ledge rim jars, 6 large

TABLE III
Šarafabad tools

	Layer	Grinding Stones	Unbaked Clay Whorls Small	Unbaked Clay Whorls Large	Oblong Stones	Sickle Blades Chert	Sickle Blades Clay
W	5 6 7	1					1
S	8	2			1	2	
	9	1			1		
W	10	1	1	2	3	2	1
	11					3	
	12	2				1	
	13	1				1	
	14						
	15	1					
	17	1					
S	18	2			1	3	
	19			1	2		1
	20-21	2	1	2			
	22-24	1	3	1			
W	25-26	1		1	1		

expended bend rim jars, 18 conical cups and 9 other bowls. In contrast to these high but reasonable breakage figures, in the first year each family discarded about 280 bevelled rim bowls and in the second year each family discarded about 200 bevelled rim bowls. If these are food serving bowls, they must have been routinely discarded like the "paper cups" of our civilization. If these are votive vessels, religiosity was rife. Needless to say, these estimates could be altered by altering the three initial assumptions. The disparity between bevelled rim bowl use and other vessel use would, however, remain. This disparity must be accounted for by any proposition regarding the use of these bowls.

Turning to domestic activities represented by artifacts other than vessels, one notes in *Table III* that grinding stones occur without seasonal pattern throughout the pit's sequence. Note, however, that the multiple occurrences of grinding stones are in layers without high densities of cooking vessels, suggesting that grain grinding took place in areas separate from – and separately cleaned from – cooking areas. A domestic activity with a definite seasonal preference is thread spinning. Unbaked clay whorls – which would be destroyed if not deposited shortly after use – are concentrated in late winter-early summer levels, times when wool and plant fibers would both be available. Finally, an artifact of unknown but probably domestic use – the oblong stone, polished and sometimes with a flake struck from one or both ends – is also discarded in late winter and summer only. This evidence may help in establishing the uses of these artifacts.

Plant cultivation and Animal Husbandry

We would have direct evidence of agricultural production only if we excavated the fields and pastures themselves. Most of the Šarafabad data are by-products of processing and preparation activities following production. We do, however, have certain reference information relevant to agriculture. Soil tests on the plain 300 meters north of Šarafabad have revealed plow marks of the third millenium. Similar tests as KS-102 revealed Susa A plow marks. Plowing, rather than digging stick or hoe cultivation, is likely. The fauna indicates that some of the cultivated ground near Šarafabad was irrigated; the hedgehog and the mongoose prefer to live near irrigated gardens and orchards. The plants themselves indicate both irrigated and non-irrigated crops were grown. The lentils, if locally grown, were most likely irrigated, but the linseed from Šarafabad ranges from 2.2 to 3.5 mm in diameter, well within the range which Helbaek (1969 : 408) has reported for rain-fed flax.

The seed identifications from the Šarafabad Uruk pit are on *Table IV*.

TABLE IV
*Šarafabad plant remains (.01 M³**)*

	Layer	No.	Hordeum Seeds	Tritium Seeds	Tritium Glumes	Lens	Linum	Weeds*
S	9U	237	0	0	3.3	3.3	1.1	1.1
	9L	238	1.1	0	0.6	5.0	0	1.1
	10U	239	23.6	0	8.2	11.0	2.8	22.6
	10L	240	5.5	0	0	8.8	5.0	5.5
W	11	241	1.1	0	0.6	0	0.6	2.8
	12U	320	3.3	0	133.1	3.3	0	19.8
	12L	321	3.3	1.1	19.2	5.0	0	12.1
	16	322	3.2	0	14.9	0.6	0	12.1
S	18U	323	3.3	3.3	11.6	3.3	0	12.7
	18L	324	0	0	8.8	1.7	1.1	3.3
	20	325	0	0	5.0	0.6	0	2.8
	22	326	1.1	0	0	0	0	2.8
W	25	327	1.1	2.2	5.5	1.1	0	6.6
	26	328	11.1	0	0	5.0	0	34.1

* The weeds include Avena, Bromus, Lolium, Phalaris, Gramineae indet., Medicago, Trigonella, Cruciferae, and Galium.

** All floatation samples had a volume of .009 cubic m. except 322 which had only .0054 cubic m.

These remains probably represent the by-products of grain cleaning, food preparation, and animal foddering, and so should not be taken as direct evidence of production (Dennell, 1976). In particular, samples with large quantities of wheat glumes and weeds – the sample from layer 12, Upper, is an outstanding example – are probably by-products of the cleaning of stored wheat, an activity which takes place sporadically throughout the year. On the other hand, samples which contain quantities of barley seeds and weeds – the samples from layers 10 Upper and 26 are outstanding – may represent fodder for animals and may indeed result from the burning of dung. Such samples occur in pit layers ascribed to the winter season, when such foddering would occur. If these interpretations are correct, then to simply total up the seeds of different species and calculate percentages would be misleading.

Further evidence of agricultural production is given by the chipped stone technology. *Table III* shows that chipped stone sickle blades tend to occur in groups. These may represent periodic replacement of the sickle teeth in the home. On the whole, sickle blades are rare; perhaps during the harvest proper, repair occurred in the fields or in some other area whose garbage did not reach the pit. There is a concentration of repair incidents in late winter, just before harvest; the rest are in mid-summer, just after harvest. This is precisely what one would expect.

TABLE V

Šarafabad : densities of identifiable bone (n = raw counts)

	Sheep-Goat	Cattle	Pig	Gazelle	Sheep*	Goat*	Volumes m^3
Summer I Layers (24) - (18)	141.70 n=418	20.3 n=6	1.36 n=4	0.0 n=0	13.22 n=39	10.51 n=31	3.95
Winter I Layers (17) - (10)	94.57 n=557	1.53 n=9	1.02 n=6	0.51 n=3	5.94 n=35	3.56 n=21	5.89
Summer II Layers (9) - (7)	34.32 n=30	2.29 n=2	0.0 n=0	0.0 n=0	1.14 n=1	2.29 n=2	.87
Winter II Layers (6) - (4)	54.67 n=120	5.47 n=12	4.56 n=10	0.0 n=0	3.64 n=8	1.37 n=3	2.19

* Bones in this category also included in sheep-goat

The bone identification from the pit are on *Table V* The vast majority of the animals are sheep and goat, most being the former, all of which were domestic as indicated by the horn cores. The cows are domestic, given the size of their remains; however, the pig may be either wild or domestic and the rare gazelles are certainly wild. Note that the unusual small mammals and non-mammalian remains are not yet fully studied.

The aggregated samples from layers 24 through 18, representing a summer, and from 17 through 10, representing the following winter, are sufficiently large to demonstrate striking seasonal variability in sheep and goat herd cropping. During the summer, the major groups of animals killed were less than one year of age (*Fig. 5*) Since the Šarafabad "summer" ends during October, these are being killed just before the birthing season, most probably at the ages of 6 to 12 months. Since these could forage on their own, they would have been no burden on the ewes, but their early consumption would reduce the requisite labor for overseeing the herds during the forthcoming lambing season. Of the sexed skeletal elements all – two of sheep and 3 of goat – were male. During the winter, older animals were killed. Of the sexed elements, one – a sheep – was male; in contrast, three (a sheep

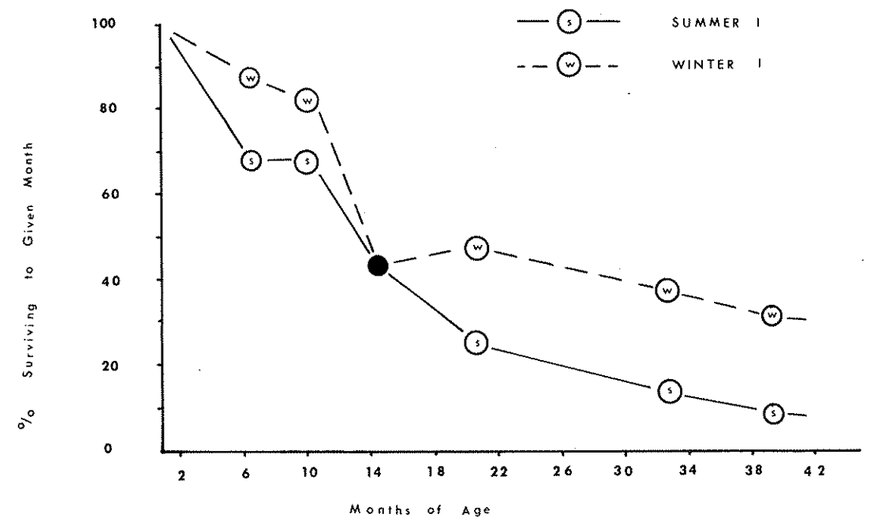

Fig. 5. – Summer and Winter Mortality Curves for Sheep and Goats from the Uruk Pit at Tappeh Šarafabad.

and two goats) were female. We suggest that females who did not successfully breed were being eliminated. These complementary seasonal strategies indicate local consumption from a local herd, at least in part. However, we cannot ascertain what proportion of animals are leaving the settlement. We can only say that management for optimal meat production, with most butchering at 18-24 months, regardless of labor cost, is not in evidence.

Administrative Activity

Seals and sealings have traditionally been a source of information about iconography. However, the evidence of sealings can be combined with that of the form of unbaked clay artifacts to documant the ways in which the production activities at a community like Šarafabad were controlled.

While many unbaked clay items are trivial – for example, oval pieces trodden into the floor – or yet lacking in meaning for us – for example, discs with small holes around their perimeters like a child's "tinker toy" – others are known by-products of the system of authorizing and regulating the movement of goods and labor.

1) Counters : spherical, conical, and cylindrical shaped pieces occur. These are believed to represent different numerical units, which can be combined to signify any number (Amiet, 1972 : 69-70; Vallat, 1977). Two other larger cylindrical pieces were impressed with simple stamp seals (*Fig. 6* : 1,2); use as mnemonic devices to identify incoming sealed goods or as identification symbols for messengers or laborers are possibilities.

2) Cups : These are semi-circular, hollow, unbaked clay objects. They range in diameter from 5.5 to 9.5 centimeters, with wall thicknesses from .85 to 2.20 centimeters. Had they been closed up around a set of counters when still plastic, they would be similar in size to the spherical bullae so common at the larger centers. This interpretation remains tentative until these items are found in primary context on floors with other elements of the technology of information transfer.

3) Locks : These are byproducts of a technique for sealing boxes and doors (Fiandra, 1968, 1975). The door or box top and the wall, door jamb, or box side each have a wooden peg or knob; these are side by side when the container is closed. A cord can be wrapped around the two pegs and tied. The tied pegs can then be covered with mud and sealed. The container cannot be opened without breaking the seal or cutting the cord. Unfortunately, doing the former usually breaks the lock into tiny pieces, making identification difficult. The Šarafabad locks were on pegs ranging from 1.42 to 5.00 centimeters, with a median of 2.08 cms in diameter. The cords range from .21 to .90 cms in thickness, with a median of .37 cm. In three out of eighteen cases the peg was fixed in a mud plaster and in one case it was fixed in a rough wood surface, rather than a smoothed surface. All these instances suggest use on doors rather than as box locks.

4) Bale and basket sealings : These are small pieces of clay pressed against the knot in a cord wrapping up a small container made of reed matting, basketry, or cloth. Mats are used today to wrap dates, and cloth to wrap spices and dried herbs; however, until carbonized bales are found in primary context we cannot ascribe uses to such containers from the past.

5) Jar sealings : Two types occur. Clay was force into jar necks creating a conical stopper. In contrast other sealings were attached to the necks of larger jars. In some of these cases the mouth was covered with a cloth or membrane held around the neck with a cord, and the sealing was placed over the cord's knot.

Examination of *Figure 7* shows that counters and cups were discarded in late winter and summer, the time of harvest and threshing, when crops would leave the site. Locked rooms are broken open primarily in mid- to late winter. This span would include both the time when seed would be distributed and the time when domestic grain stocks might run out and institutional or community stocks might be needed; bales and jars are received throughout the annual cycle, but there seem to be more openings of such small containers in late winter, the time of first fruit ceremonies in Mesopotamia and traditionally the time when dependents received gifts from their overlords. There are some possible year to year changes as well : cups seem more common during the first year represented in our clearance of the pit, while locks seem more common during the second. Perhaps such variations reflect year to year variations in the agricultural economy, with more transport the first year and more local storage the second. More samples of annual deposits will be needed to assess this proposition.

Given the evidence of seasonal changes in the use of sealing technology, we can consider the seals and seal impressions themselves. These can be discussed in five groups :

1) The only Uruk seals found at Šarafabad are hemispherical stamp seals with simple designs of drilled dots, perhaps zoomorphic. One is of calcite and the other is perhaps of chlorite. Impressions of similar seals are known only on two cylindrical pieces (*Fig. 6 :* 1,2).

2) There are a number of impressions of two different seals with a similar design of a kneeling anthropomorph above whose back is an animal representation. In one case (*Fig. 6 :* 3) this represents a single fox, distinguished by its long bushy tail. In the other (*Fig. 6 :* 4), this represents two dogs, distinguished by their curled tails. The former oval seal was impressed on a bale of unknown type and a small cloth wrapped bale, both discarded during the first year, and on a lock discarded during the second year. The latter rectangular seal was impressed on a basket sealing and a lock discarded during the second year. Since a storeroom can remain locked for a year or more, it is possible that seal 3 was used only during the first year and seal 4 was used only during the second. While it is possible that

Fig. 6. – Cylinder and Stamp Seal Impressions from the Uruk Pit at Tappeh Šarafabad (actual size).

two figures with similar tasks had similar seals, it is simpler to presume that the bearer of somewhat damaged seal 3 had it replaced with a similar though more elaborate seal. Further examples of this kind of relationship are needed. The use of these seals on locks indicates that the seal-bearers or bearer was actually on the site. The bales could have been sealed on the site, or they could have come from a center. On-going neutron activation studies of the sealing clays by M. James Blackman may demonstrate whether the bales were sealed at Šarafabad or shipped from elsewhere. If the latter, then we have evidence for a travelling official, present at the small rural center at certain times for specific purposes.

3) At least one other seal was also used to seal door locks at Šarafabad. This was a small cylinder seal with three tiers of three or more animals (*Fig. 6 :* 7). This lock was discarded in the second year.

4) Three seals with juxtaposed animals were impressed into jars and bale sealings. One showing two animals foot-to-foot (*Fig. 6 :* 6), probably a rectangular stamp seal, is on small fragments of mat-impressed bale sealings from both the first and second years. A second showing two tiers of animals facing right (*Fig. 6 :* 5), perhaps a cylinder seal, is on a jar mouth sealing from the first year. A third seal with one tier of animals facing left (not illustrated), definitely a cylinder, was impressed on a jar mouth sealing discarded during the second year.

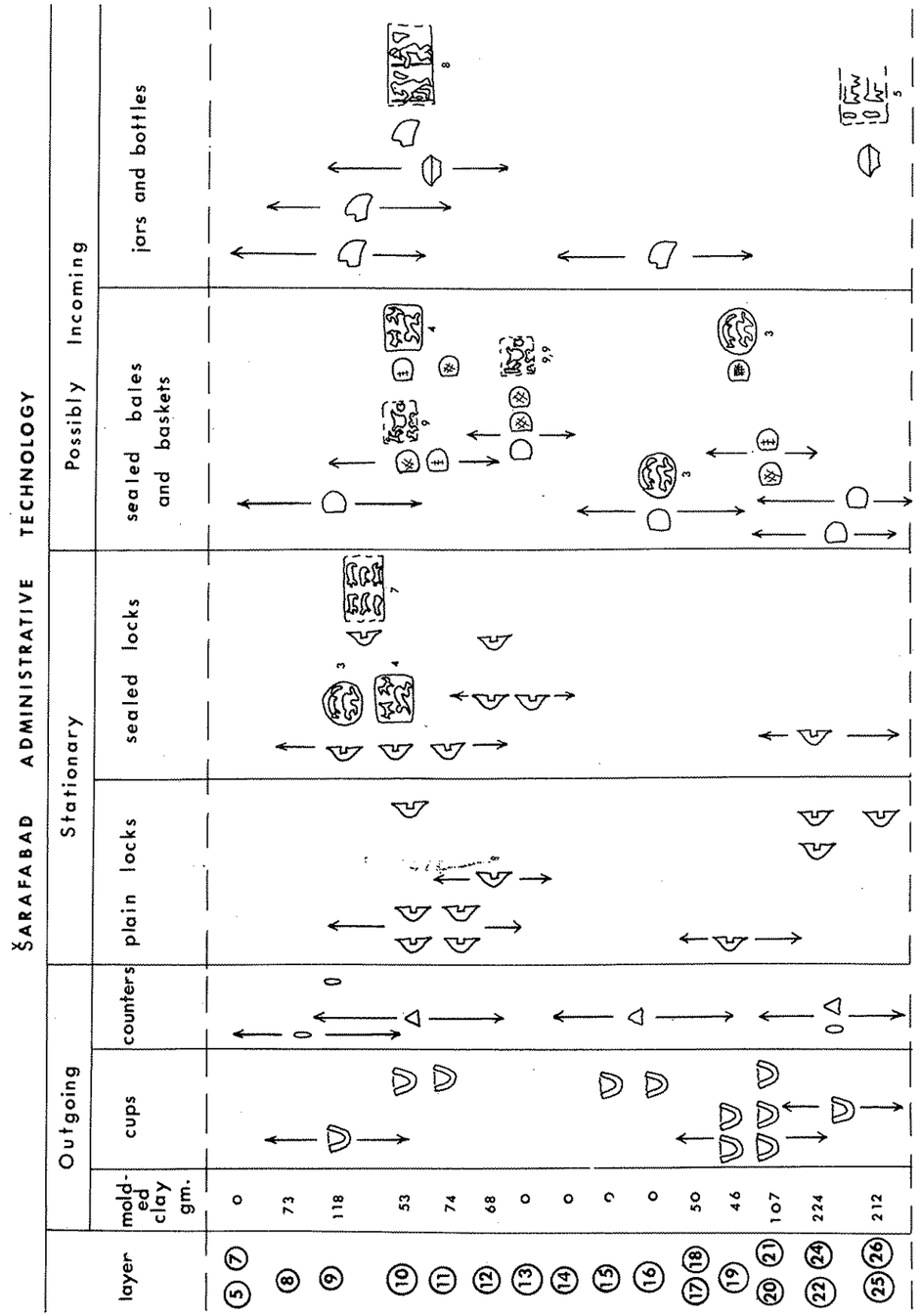

Fig. 7. – The Stratigraphic Distribution of Items of Administrative Technology in the Uruk Pit at Tappeh Šarafabad.

5) There are two seals with representations of human activity. One, showing a scene with two tiers of people sitting around jars (*Fig. 6 : 9*), parhaps a cylinder seal, was impressed on sealings on three bales, two definitely mat-wrapped, all discarded during the second year. The other showing a row of bearded men marching leftwards with staffs and backpacks (*Fig. 6 : 8*), definitely a cylinder seal, was impressed onto a sealing on the neck of a band rim jar.

There are several other fragments about which little can be said.

To summarize, at Šarafabad, most door locks and many containers are sealed by one or more individuals with iconically similar stamp seals. However, some containers were sealed by other stamp seals, and both containers and at least one door lock were sealed by various cylinder seals. The jars were apparently sealed only by cylinder seals not otherwise attested on bales or locks at Šarafabad. The doors were opened at times of planting and subsequent cultivation, perhaps to provide seed grain and supplementary food grain. Containers and jars reached Šarafabad and were opened throughout the year but were most commonly opened in late winter, a traditional time of celebration. At this time and later, counters and cups were discarded, suggesting that spherical bullae were leaving the site, presumably with agricultural products such as wheat, linseed, and lentils, en route to larger centers for consumption or storage.

Conclusion

The Šarafabad pit can be dismissed as a single garbage-filled hole on an insignificant site. After all, what good is a 5 200 year old "Piers Plowman", an agricultural calendar not greatly different from that of a few years ago, before the impact of modern "agro-industry" ? One could simply say, "So what, couldn't we have presumed all these activities occurred, knowing what we do about the larger centers ? " The immediate answer to this question would be, "Yes, however these would be only untested propositions". Our work provides one test of such propositions, and beyond that, a test of an aspect of Johnson's propositions about Middle Uruk settlement and administrative hierarchies and a test of our own propositions about variations in production and regulation.

However, at least for the authors, the lessons to be drawn from the analysis of the pit are more profound than those about one area's rural agricultural calendar or one region's economic and political organization. When most of us excavate and analyze archeological sites, we treat our plans as maps of an instant in time, the frequencies of pottery as typical of some average kitchen, the frequencies of seeds as typical of the average diet, and the designs on seals as an indication of ideologies or styles. In our wish to see excavated sites as "communities", "social structures", or whatever, we forget that the archeological record is a palimpsest of the by-products of various activities. An actual processual perspective forces one to avoid such pitfalls; however, to use such a perspective requires many methodological changes. *First* one must actively seek short-term refuse accumulations such as pits and middens, as well as architecture. Most of us – including the authors – have avoided such features, though they are relatively common. *Second,* one must recover representative volume-controlled samples from all primary and secondary deposits. The presently widely-used methods of lot and registry recording often prevent one from doing the types of studies presented in this paper, because neither the complete inventories, nor the volumes are recorded. *Third,* one must retain such samples permanently so that there can be repeated cycles of analysis to handle newly raised questions. Though we all long ago have learned that the typologies of yesterday are usually inadequate for the questions of today, we continue to discard most of what we excavate. Only when these and other methodological innovations are widely practiced, will we be able not merely to document past artifact inventories, but to document and explain past cultural systems.

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COMMENTAIRES

F. Audouze : How do you know that you have sampled 5 % of the pit ?

H.T. Wright : The surface exposure of the pit is ten meters in length. The ceramic statistics are based on the .50 meter wide slice of the pit excavated in discrete natural layers. This slice therefore contains 5 % of the pit's full. It is perhaps not a representative sample; a random sample of three or four such slices would be better. However, it is the best sample available.

F. Audouze : Why do you assume that twenty families were discarding pottery into the pit ?

H.T. Wright : I estimate there was about .5 hectares of Uruk architectural area at Sharafabad before the Elamites terraced the mound and destroyed most of the Uruk levels. Using the recent Susiana constant of 200 people per hectare, I infer a population of about 100 people or, given five people per family, about twenty families. I use this figure in an illustrative fashion because there are several possible problems about such an estimate :

1) The Susiana constant may be too high. Most ethnographic data from Southwest Asia indicate a constant close to 100 people per hectare. Knowledge of Uruk Period village architecture should clarify this problem.

2) If, in fact there were fewer people at the site, then the breakable rate for ceramics would be improbably high. Assuming 100 people on the site each person is breaking 2 to 3 jars and 5 to 6 ordinary bowls per year. These rates are higher than those reported by Nicholas David for the Fulani of West Africa and by George Foster for the Tarascans of Mexico. However, both Fulani and Tarascan ceramics are carefully made and well-cared-for in the household, while Uruk pottery is mass-produced and often distributed to households with manufacturing imperfections. Therefore the estimated high breakage rates are not impossible.

3) Perhaps, however, future architectural studies will support a lower estimation constant for Uruk rural sites. Then we must consider the possibility that impermanent residents such as nomadic herders, or temporary agricultural field laborers, contributed their garbage to the pit. Both of these possibilities can, in principal, be tested with data from the pit itself.

Note that each of the propositions in the arguments above can be drawn from general theoretical conceptions and/or specific ethnographic knowledge. However, I will not accept any element of such arguments until the entire construct has been tested with independent classes of evidence from the pit itself. Thus, while certain propositions may be suggested "by analogy with" recent ethnographic cases, I do not think we use "analogical arguments". If this distinction is correct, then the word "analogy" has been misused in several previous discussions in this colloquium.

M. Tosi : Concerning also Henry Wright's presentation and more specifically the question of the use of seals in the ancient Near East, I should like to recall, as you have just done the imaginative work of E. Fiandra (1).

The problem presents two different aspects : the determination of the surfaces, i.e. the parts of rooms, or the mobile containers, on which the sealing was stucked on, and the way seals were handled by people at different times and places. Fiandra's functional analysis has been an apt approach to the first aspect. Technically it has been carried out by casting in fine plaster the residual impressions on the back of the sealing, thus

(1) Fiandra E. (1975), "Ancora a proposito delle cretule di Festos : connessione tra i sistemi amministrativi centralizzati e l'uso delle cretule nell'eta del bronzo", *Bolletino d'Arte del Ministero della Pubblica Istruzione, 1-2, Roma, pp. 1-25.*

recording even fine details of the surface that was in contact with the clay. At Shahr-i Sokhta this kind of evidence from period II (c. 2700-2400 BC) results in well beyond 80 % of the sealings could be reliably identified, and close to 60 % of them provides impressions of strings coiled around wooden pegs set into a wall or a door jamb revealing the extensive use of a device to lock storerooms. Fiandra has been tracking this from Lerna in Peloponnese to Buhen in Nubia and Lothal in Kathiawar. The rest of the identified impressions is made of sealings broken from all kinds of mobile containers : pots, sacks, boxes.

The second aspect of the question can only be properly answered by a specific reading of texts dealing with aspects of administration because archaeological evidence alone might be highly misleading. The best evidence so far has been recorded, according to Fiandra, from Middle Assyrian letters detailing orders to distant agents, particularly pedantic for what was concerned with the number and use of seals during the opening and re-locking of storerooms (2). This is only an example. On the other hand some of the letters provide already some interesting suggestions. In text *VAT* 9033 from Aššur (Saporetti (1970 : 146) Ellil-ašared sends his own seals to open a storeroom through his agents. We often find sealings bearing impressions from two, sometimes three different seals but this as well as other texts suggest that the same man was the owner of more than a seal and that several of them were used for the same operation. Archaeologically speaking, for the much earlier protoliterary periods of Mesopotamia and Iran, these evidences would contrast with the widely accepted hypothesis that different seals on the same *bulla* mean an agreement or joint responsability by different entities. It is after all still possible we are dealing with a very circumspect dealer : business in the early days was at least as tough as now.

H.T. Wright : In a forthcoming paper in *Cahiers de la Délégation Archéologique Française en Iran,* n° 8, Alain le Brun and François Vallat discuss this point very well, using new evidence of sealed objects from Susa.

If I may change the topic, I would like to emphasize several points about elementary methods :

1) Recording : The type of study I have undertaken requires that the volumes of each deposit excavated be carefully recorded. Volume estimates derived from field plans and sections are not very accurate.

2) Recovery : Standardized recovery techniques are obligatory. At Šarafabad we screened the deposits dry through a half-centimeter mesh. Water screening might have recovered more, but it would have destroyed the sealings.

3) Sample Retention : Most excavators in Southwest Asia have retained only small and non-representative samples of ordinary garbage for future re-analysis. Obviously we cannot keep ten tons of sherds, etc... each year, but large representative samples of diagnostic pieces must be kept. If we are to study cultural process on a regional scale, we will have to find institutional means to insure the protection of such samples. In southwestern Iran most of those who work on the first complex societies of the Susiana Plain – Le Brun, Dollfus, Johnson, myself, and others – are storing such samples at Susa in an effort to avoid having to ask the complex questions of tomorrow of the inadequate date of yesterday.

(2) Saporetti C. (1970), "Bibliografia delle lettere private medio-assire", *Annali dell'Istituto Universitario Orientale,* XXX (N.S. XX), pp. 141-152.