

THE USE OF CLAY SEALINGS IN ADMINISTRATIVE FUNCTIONS FROM THE FIFTH TO FIRST MILLENNIUM B.C. IN THE ORIENT, NUBIA, EGYPT, AND THE AEGEAN : SIMILARITIES AND DIFFERENCES *

The Analysis of the Material

Before considering specifically some of the results which we have already reached, we would like to mention briefly a few standards that should be maintained either when publishing clay sealings, or when considering the clay sealings previously published by other authors.

It is clear to us from recent publications of Tall-i Bakun A ¹, Susa ², and Nippur ³ that, in many cases, a thorough reexamination of all the already existing administrative material is necessary. We must be particularly careful of the excavations carried out at a time when the function and the meaning of some objects, now recognized as important documentation of the economic history of the ancient world, were not very well known. This, however, is not the only problem. Many archaeologists still handle this material without the necessary care.

The reverses of clay sealings are almost never shown in publications. Drawings and reconstructions of the use of sealings are ever more uncommon. Therefore, their description is completely useless, as it often results from an incorrect interpretation.

So, when this material is to be published, the place where each clay sealing was found should be specified, and photographs and drawings of its front, reverse and mould should be provided. If possible, a tentative graphic reconstruction of the sealed object should be given in order to show how each clay sealing would have been employed. If this information is lacking, it is hazardous and misleading to study and compare the given material.

Interpreting with prudence and caution is necessary in order to avoid introducing irreversible and unverifiable errors from the objects themselves into theoretical discussions of administration ⁴.

* Our conclusions relative to archives were reached after much helpful discussion with Prof. Gian Giacomo Fissore, University of Turin.

1 A. ALIZADEH, "Socio-Economic Complexity in Southwestern Iran during the Fifth and Fourth Millennia B.C. : The Evidence from Tall-i Bakun A", *Iran* 26 (1988) 17-34.

2 P. AMIET, "L'usage des sceaux à l'époque initiale de l'histoire de Suse", *Fragmenta Historiae Elamicae. Mélanges offerts à M.J. Steve* (1986) 17-24.

3 R. ZETTLER, "Sealings as Artifacts of Institutional Administration in Ancient Mesopotamia", *JCS* 39 (1987) 197-240.

4 The interpretation of the reverse, considered as the means to identify and define a sealed object, must be made only after having gone through the process of reducing the percentage of errors. This can be done by examining and comparing the highest number of clay sealings having similar prints on their reverses. Then, it is necessary to separate those belonging to the same object and put together the joining pieces reproduced on different clay sealings, in order to have the largest surface of sealed objects printed on clay sealings. If our chances of being correct are only about 50% (i.e. when a reconstructed shape still provides

When the correct information on the sites is published, as in the case of Tall-i Bakun, it is possible to reinterpret the sites, and even come to really revolutionary conclusions about the beginnings of urbanization. The study by Alizadeh is particularly interesting, because it reveals some further information: if the reverses of the clay sealings were analyzed in relation to the seal impressed on the front, it would be possible to recognize which seals sealed the same door, and if one or more officers were in charge of the same storeroom. Therefore we could know not only the number of officers, but also their activities or responsibilities.

Similar research was carried out by R. Zettler on the clay sealings from Nippur. He attained excellent results even though, as he says, he had to face several problems ⁵.

Clay Sealings and Storerooms

Let us now go into our subject by explaining the criteria we followed in our study of clay sealings. The study is based on geographical and chronological research, as extensive as possible ⁶, as well as an analytical investigation of each sample. We used two types of files: one for the sites, and one for the clay sealings at each site. After processing this data, collected mainly through direct research on the materials, we were able to verify the existence of a check and bookkeeping system following precise and enduring rules.

This system pertains to the distribution of goods (agricultural produce, raw materials, or manufactured articles) supplied for personal consumption, wages, or goods processing.

Clay sealings on both door locks and containers belong to this system. The former are certainly the clearest evidence for the existence of a complex organization checking and recording goods distribution in the community. But also the latter, the container sealings, if they are carefully analyzed, can provide the same results. If two or more clay sealings from the same cluster show the impression of the same object (it is possible to recognize mainly vases and boxes, but also individual objects which left specific and clearly identifiable marks), then, also in this case, we have undeniable evidence of storing processes. In fact, the idea that clay sealings were mainly used during the transportation of goods, in order to guarantee their integrity during transport, is not entirely correct. This practice is well described in the texts, but it is difficult to detect in the archaeological record. An interesting illustration of how uncommon it is to find evidence for this practice is offered by the clay sealings bearing the seal of Ur Emush, one found in Lagash and one in Kish, and now kept in the Louvre Museum ⁷.

At any rate, such clay sealings were certainly not kept together with those employed in the goods management in the storerooms. But they must have been kept separately.

The clay sealings that we normally consider belong strictly to homogeneous groups reflecting homogeneous situations and are related to the distribution of goods within storerooms. These clay sealings are the basis of economic management in the centralized

two possible interpretations), it is better to leave out those clay sealings, and classify them as unrecognizable, as our studies should be based only on precise data.

- 5 A very important group, which could be reexamined, is provided by Karahöyük. It is interesting for several reasons, not only for the administrative material found with clay sealings. Prof. Sedat Alp, in a recent personal communication, stated that he is convinced the use of these clay sealings is the same as that at Phaistos. As a matter of fact, the material from Karahöyük shows more similarities to the clay sealings from Phaistos and Monastiraki.
- 6 We have learned from our colleague Dr. Gianni Poncini that in Kyoto there is a collection of Chinese seals and seal impressions on clay, dated from the end of the 2nd millennium to the 2nd century B.C. In China they used to affix seals on clay to close administrative documents written on bamboo. This use disappeared with the invention of paper under the Han dynasty (2nd century B.C.- 2nd century A.D.). From then on, only seals affixed on paper were used to make official documents.
- 7 E. FIANDRA, "Attività a Kish di un mercante di Lagash in epoca presargonica", *OA* 3 (1981) 165-174.

systems at any period. As we shall see, it is only the administrative tools that change in various periods and places.

At this point, we would like to note that clay sealings are not solely or entirely associated with the protection of goods, i.e., they do not function only to prevent theft : other methods were used for this purpose. A broken clay sealing, however, certainly proved a violation, but no clay sealing could have prevented it. Thus we must assume that the main function of clay sealings is to be found in a legal-administrative field. Therefore we need not necessarily find clay sealings in places where precious materials or stored goods were kept. We call such places "conservation" storerooms. On the other hand, the administrative function of clay sealings must have been strictly related to the "distribution" storerooms.

The checking of "conservation" storerooms, through the attachment of clay sealings, could be practiced differently and less frequently. "Conservation" storerooms were used as sources to supply those storerooms which were more closely connected with the clay sealings, that is to say the storerooms under constant supervision, which we call "distribution" storerooms.

From archaeological evidence we know that the rooms designated for this function were usually small and had a few, small containers : these storerooms were quickly and periodically refilled in order to allow a constant distribution of goods. They were scattered in different places within the same architectural complex, in order to better satisfy distribution needs.

Distributions were made by withdrawals from the pithoi, bags, sacks, or other containers which were constantly being brought by animals and/or bearers as represented on seals.

The purpose of this transitory storage was distribution into what could either have a passive value (for consumption) or an active value (production of commodities as a consequence of goods given as wages). This type of storeroom did not have an accumulation function, building up savings or reserve, but only distribution. Goods were checked and recorded during both loading and unloading. This brought about the need for economic archives for clay sealings and receipts, with particular care being given to the quality and quantity of the goods, as well as to the officers responsible for the operations.

The archives of one such storeroom were recently found in the Chantier A of Mari. Chantier A is a private place, in Asqudum's house, with "distribution" storerooms, recording offices and archives still containing distribution tablets as well as some clay sealings. According to Dominique Charpin, the management of these storerooms is very similar to the management of those found inside the palace⁸.

Lastly, there are the "transformation" storerooms, dealing with the processing of goods and materials. These include kitchens and places used to keep fermenting liquids. These storerooms are only marginally involved in the bookkeeping system, perhaps by way of clay sealings affixed on doors.

Accounting

When we examined the administrative material in use in the storerooms mentioned above, we were able to reconstruct the bookkeeping system which controlled distribution. In particular,

8 D. CHARPIN, "Les archives du devin Asqudum dans la Résidence du 'Chantier A' ", *MARI* 4 (1985) 461. The work by Charpin is very interesting to us, because, from his study of these archives, he arrived at the same conclusions as ours. The administrative principles in public and private management were the same. The only difference was very subtle, and was based on both basic texts and summary texts. Many tablets, even from private archives, were crossed out with a red ochre sign, after basic tablets had been copied and included in the summary documents. The need for careful and precise management soon gave rise to the origin of a science of bookkeeping, which was equally adopted by public and private units. The reason why its regulations never changed in their basic principles is that bookkeeping originated from practical needs.

we realized that it was based on the principle of a balance between reciprocal interests, that is to say, whoever receives the goods has an interest in ensuring that the amount received is not less than the amount recorded in the document. Similarly, whoever delivers the goods has an interest in ensuring that the amount to be delivered is not more than the amount specified on the receipt.

In any period, the main documentation proving a transaction is the clay sealing, that is a lump of clay bearing the impression of a seal, no matter what the specific function of the clay sealing was. It could either be placed directly on objects, or used as a guarantee of a document's authenticity.

In the beginning, before writing was used, the clay sealings had several functions : goods were registered and stored by means of the sealings as bookkeeping tools. At this time, other bookkeeping systems which employed calculi, numerical tablets, tokens, and counters, together with clay sealings were in use. Sometimes the clay sealings have holes which must have a simple numerical function. As far as we know, this was found at Arslantepe⁹, Shahr-i Sokhta¹⁰, Phaistos¹¹, Mallia¹², and Monastiraki¹³. At Arslantepe, for example, we found some clay sealings with the same kind of hole made by a reed or a stick as found on the so-called counters. Moreover, on the impression of a little seal from Monastiraki, we discovered four very small holes, similar to those found in some Linear A tablets. These holes seem to have been made by a stylus also used for writing.

In this case the amount of goods implied in the transaction was probably different from the norm. In fact, since clay sealings first existed without the presence of writing, we can assume that the amount of goods must have already been fixed and therefore known. Changes in quantity were possible on the responsibility of the person in charge of the distribution and sealing. Therefore filed clay sealings could also prove not only that the operation had taken place, but also that the amount had been withdrawn from the storeroom.

The system of fixed amounts lasted until later times. In fact, the Sumerian term *sa-dug* means, according to Gregoire, "fixed, and perhaps daily ration"; and so *sa-dug -digir-re-ne* is "the ration of the god, which also is fixed (and may be daily)"; and *sa-dug -ezem(-ma)* is the "fixed ration of religious holidays"¹⁴; the corresponding Akkadian term to *sa-dug* is *sattukku*.

We showed our unexpected results from the study of the clay sealings from Arslantepe to our consultant of modern accounting, Prof. Renata Ferrero, and we found it amazing that she could immediately classify our group of documents, and recognize them as fitting perfectly into the categories of documents that are still used today in common storeroom management.

In fact, storeroom accounting, now done on computer, and once done on clay sealings, is based on original documents : bills which prove the charge and discharge of goods.

A summarizing document is written on the basis of the notes of charge and discharge. This is equivalent to the modern file of the storeroom. That is to say that records of charge and discharge are kept for each kind of goods.

To sum up, the bookkeeping of the storeroom is kept through notes of charge and discharge, which are the basis of both the bookkeeping and file of the storeroom, and can always provide an up-to-date accounting.

9 P. FERIOLI, E. FIANDRA, "Clay sealings from Arslantepe VIA : Administration and Bureaucracy", *Origini* 12 (1983) 480.

10 Clay sealing inv. no. 961 : it bears 13 holes on the seal.

11 I. PINI, *CMS* II 5 (1970), no. 299, inv. no. 690.

12 J.-Cl. POURSAT, *Fouilles exécutées à Mallia. Le Quartier Mu II (ÉtCrét XXVI, 1980) 207, R3 (261) and probably p. 207, R8 (208).*

13 Clay sealing Mo II0 : it bears 4 very small holes on a seal impression.

14 J.P. GREGOIRE, *Archives administratives sumériennes* (1970) XII.

As for Arslantepe, we have a specific example of this simple bookkeeping system. The bills of lading are very likely to be represented by the clay sealings on doors (knobs and locks), which we found separate from the others. The bills of discharge are represented by the clay sealings on the containers.

Moreover, the filing regulations are based on a sequential collection of documents which attest to all the withdrawals. In this case, the file is represented by the separate groups of clay sealings, which prove the completion of the operation. So, estimates of the distributed goods, stocks, surplus, etc. could be done, when needed, by simply checking the groups of clay sealings carefully kept in the archives.

Writing does not change the system of management of the storeroom. Written documents support and integrate the legal value of clay sealings by describing the bookkeeping operation. These documents are then kept indefinitely in the archives, while clay sealings are thrown away. Slowly, these documents completely replace clay sealings.

Filing

From the study of the clay sealings from the room A206 at Arslantepe, we discovered the existence of complex criteria for filing, dating back to the 4th millennium B.C.

In fact, as we have said, clay sealings only testify to the existence of a transaction, but not to the time when it took place. Moreover, two clay sealings with the same seal, placed on the same objects, could not be distinguished : they only showed that the same person had received the same goods twice, according to a legally correct procedure. In order to keep a chronological order, there was no other way than to keep the clay sealings successively grouped, referring also to the kind of goods and to the people involved in the operations.

This conceptually perfect system required a great deal of precision in practice : it did not tolerate error and it could not prevent tampering; it also only provided a relatively short-term filing. Nevertheless, it was the only system that could be used without writing. Particular precautions were taken in order to reduce the risk of errors or tampering. The same kind of precautions were also taken in later times, after the beginning of writing ¹⁵.

The different numbers of clay sealings, and also the different manner by which they were found, raises for us the question whether the hundreds of clay sealings, found scattered in different places as for example at Jebel Aruda ¹⁶, Shahr-i Sokhta ¹⁷, Mari ¹⁸, and recently Tell

15 Tablets were divided and kept in containers with straw lids, closed by small clay sealings (see among others N. SCHNEIDER, "Die Urkundenbehälter von Ur III und ihre archivalische Systematik", *Orientalia* IX [1940] 15-16; M. LAMBERT, "Deux étiquettes de panier", *RA* 63 [1969] 97-100; H. FRANKFORT, *Cylinder Seals* [1939], 2; *ARMT* X, 12; XII, 82). Also clay sealings must have been divided and kept in the same way. In fact, also at places where there was no writing, such as Arslantepe, this kind of clay sealing is present : it closed straw lids, which were placed on pots or baskets possibly containing clay sealings.

16 G. van DRIEL, "Seals and sealings from Jebel Aruda 1974-1978", *Akkadica* 33 (1982) 34-62.

17 P. AMIET, M. TOSI, "Phase 10 at Shahr-i Sokhta : Excavations in Square XDV and the Late 4th Millennium B.C. Assemblage of Sistan", *East and West* 28 (1978) 31.

18 D. BEYER, "Stratigraphie de Mari : Remarques préliminaires sur les premières couches du sondage stratigraphique (Chantier A)", *MARI* 2 (1983) 52-55; BEYER, "Nouveaux documents iconographiques de l'époque des Shakkanakku de Mari", *MARI* 4 (1985) 174; BEYER, "Scellements de portes du palais de Mari", *MARI* 4 (1985) 375-385.

Leilan ¹⁹, and the thousands from Arslantepe ²⁰, Ur ²¹, Phaistos ²², and Uronarti ²³ scattered with the debris, represented different types of filing systems, or simply different phases of the same system. This last hypothesis seemed to be the most likely for us.

In fact, we already knew that clay sealings, once removed from the object, were kept until the end of the administrative period. Then, after the necessary controls and final bookkeeping, they were discarded in such a way that they could not be reused. But, in order to ensure the correct sequence of procedures, archives reaching completion but still in operation had to be found. This phase would have just preceded the final disposal of the clay sealings. A short period of time separated these two phases : just enough time for final controls, inventories, and accounts.

When the German expedition in Shek Hamad headed by Hartmut Kühne found, between 1980 and 1982, thousands of clay sealings, together with tablets related to the distribution of barley, we had the evidence that our hypothesis was right. The clay sealings and tablets came from a room situated on the upper floor, above the storeroom with barley still on the floor.

However, the study of clay sealings from room A206 at Arslantepe provided the most important results. The excavation carried out in 1980 by Alba Palmieri and Marcella Frangipane brought to light a small rectangular room near the entrance of the palace. It contained thousands of clay sealings mixed with ashes, clay, and other kinds of waste, such as bones and potsherds. It must have been an archive such as those from Ur, Phaistos, and Uronarti, which had been finished with and then discarded. In this way, those clay sealings could not be used again for another administrative period.

A meticulous analysis of the levels, thanks to an accurate excavation, showed for each level which clay sealings and how many of them bearing the same seal had sealed the same object. The analysis also revealed that the clay sealings within the same level were not grouped according to the kind of object which they sealed, nor to the type of seal. The recurring feature in each level was the similar number of transactions as represented by the number of clay sealings found therein. In fact, the same number of withdrawals were made in each level. That is to say, the withdrawals followed one another chronologically and were numerically almost invariable in each stratum, even if the containers used for the withdrawals or owners of the seals would change. This was an accurate and precise transposition of an archivistic procedure which was based not on the object nor on the seal, but on the operation of withdrawal.

So, room A206 at Arslantepe gave us the original arrangement of the clay sealings in the archives, now stratified in reverse order and vertical position. This arrangement, although partially modified because of final calculations, had been so well maintained, that even after the disposal of the material, we were able to reconstruct it.

From the physical nature of the levels and the position of the room near the entrance of the palace, we inferred that this was not a recurring (i.e. monthly) disposal, but rather a final discard of the archives performed in the short period of time which was necessary for checking final accounts and taking inventories. This hypothesis was supported by the presence of objects

19 D. PARAYRE, "Empreintes de sceaux à Tell Leilan", *NABU* 4 (1987) 71.

20 M. FRANGIPANE, A. PALMIERI, "A Proturban Centre of the Late Uruk Period", *Origini* 12 (1983) 414.

21 L. LEGRAIN, *Ur Excavations, Seal-impressions* (1936).

22 E. FIANDRA, "A che cosa servivano le cretule di Festos", *Πεπραγμένα τοῦ Β' Διεθνoῦς Κρητολογικοῦ Συνεδρίου*, A (1968) 383-397.

23 G.A. REISNER, "Clay sealings of Dynasty XIII from Uronarti Fort", *Kush* 3 (1955) 29-69. Actually, both phases of filing were found at Uronarti : the discarded archives containing 4543 clay sealings were thrown in the debris under a floor, and many other groups of clay sealings were found in several rooms of the fort. They were in the process of being collected.

used for calculating only in the topmost levels, as if this material had been discarded last, at the end of the reckoning.

In our opinion, the whole group of clay sealings from Arslantepe refers to a period of time corresponding to one year. In fact, the significant levels, each referring to about a month, are a dozen. The number of transactions recorded in each level is given by all the clay sealings, including those removed before being dry. This can support the idea of several daily withdrawals ²⁴.

An unusual situation occurs only in the two deepest levels : almost all clay sealings were door closures and almost every door was sealed by the same seal. This type of seal is rare in the other levels, where, except for two cases, it appears only on containers. This shows that, for a certain period of time, the owner of this seal was responsible only for the door of the storeroom. He was in charge of periodic controls of the contents of the storerooms and/or their restocking. In any case, it is obvious that these clay sealings could not be stored together with those relating to the withdrawal of goods. The clay sealings dealt with two kinds of bookkeeping, which had to be checked and considered separately in the final accounts.

This practice was confirmed in 1980 by the discovery of about thirty clay sealings, found in two passage-ways near the doors of some rooms at Mari ²⁵. One of these rooms was probably a workshop, because it still contained several pots made of unbaked clay, probably waiting to be fired. These clay sealings then confirm the practice of separating those indicating the opening of a door. The clay sealings from Mari belong to a phase of collection and filing which was still in progress. This stage precedes the phase of conservation in actual archives, as well as the final phase as found in room A206 at Arslantepe.

Therefore, the archives from the Arslantepe storeroom had not only to respect the sequence of successive administrative operations, but also to assure that each individual document became part of the filing system. The importance of the system is indicated by the continuous and constant preservation of every piece of information. The grouping sequence of clay sealings points out the important meaning of these codified procedures. It suggests that precise rules were applied to the distribution of goods. The placing of the different groups of clay sealings was planned before creating the periodic archives, so that they could always be checked, even without the presence of writing.

A similar system must have existed in Nubia and Egypt, dating not only to the 2nd millennium B.C., but also to later periods. In fact, not only do we know that the number of the discarded clay sealings from Uronarti is more or less similar to that from Phaistos or Arslantepe, but also we have the text of the papyrus E3226 from the Louvre Museum ²⁶. This is a document summarizing an administrative period of the time of Thutmosis III, going from the year 28 to the year 35 of his reign. This period of time is divided into seven parts. So, here also we have financial periods of about one year.

24 Besides deformed clay sealings, removed before being dry, further evidence for daily collections comes from the tablets from Ebla, which refer to withdrawals from the same storeroom bearing the same date.

25 D. BEYER, "Stratigraphie de Mari : Remarques préliminaires sur les premières couches du sondage stratigraphique (Chantier A)", *MARI* 2 (1983) 453-462; "Nouveaux documents iconographiques de l'époque des Shakkanakku de Mari", *MARI* 4 (1985) 173-189; "Scelllements de portes du palais de Mari", *MARI* 4 (1985) 375-385.

26 M. MEGALLY, "Recherches sur l'économie, l'administration et la comptabilité égyptiennes à la XVIIIe Dynastie", *IFAO, BE* 71 (1977) XXVII-XXVIII.

Clay Sealings and Tablets

With the coming of writing, written documents stating the type and quantity of goods, the names of receivers and responsible officers simplify the distribution system and make it more complete.

However, these documents had a different legal role and function than clay sealings. They were secondary, not original documents, as the clay sealings had been which had directly indicated the opening of containers; written documents only describe this operation. A recent finding from the Sudan corroborates this interpretation. Clay sealings from doors and containers were used for the administrative management of a Meroitic palace at Gebel Barkal ²⁷. There are no traces of written notes, even if the clay sealings are dated to a late period, following the introduction of writing. Regardless of a chronological difference between these findings and those at Uronarti ²⁸ and Kerma ²⁹, the same system is in use, and again clay sealings are employed in the centralized management of goods.

When a written document had to have a definite legal value, it was sealed. But when it was a simple written record to be filed, it sufficed that the scribe, who wrote it and often signed it, assumed responsibility.

There is thus a difference between sealed and non-sealed tablets, but it is neither a difference in registration nor in administration. Sometimes the authentication of the documents was not needed even though they kept their legal value. Two documents bearing the same text were found at Umma ³⁰, but one was sealed and the other was not. The latter shows that there was a witness who weighed the goods, and thereby checked the transaction. For this reason a seal did not have to be affixed to the document.

A similar situation is found, for example, in urban documents coming from medieval municipal times. Some were issued in a single copy having typically a notarization form. Others, especially those for use in internal administration, had no authentication, and were produced in series, and recorded in registers. These documents assumed their legal validity by being in the municipal files ³¹.

At sites where writing was done on materials other than clay, such as wood, papyrus, parchment, bamboo, etc., clay sealings were used as we now would use sealing-wax, either placed on the string tied around many different kinds of documents or hanging from this string. The seal on these clay sealings had an authenticating function, and corresponds to the seal affixed on oriental clay tablets.

So, we have a change in the physical type of clay sealings; but not in the value of the combination of seals and documents which is equivalent to the original value of clay sealings, that is, as original documents of proof.

There is an intermediate phase between the first use of clay sealings on containers, and later employment on documents. This is particularly evident during the 3rd and 2nd millennia B.C. The clay sealing has the same appearance and value, but it is combined with a written document describing the performed operation. This document is then authenticated by the seal of the person responsible for the supervision of the operation (who was not necessarily the same person as the one responsible for the withdrawals). Tablets do not replace clay sealings within the financial period, but only after the final calculations, when the clay sealings are discarded at the end of the administrative year. Thereafter, these parallel and concomitant documents take the place of the clay sealings, which had represented the transactions of the

27 Verbal information from Prof. Irene Liverani.

28 G. A. REISNER (*supra* n. 23) 26.

29 G.A. REISNER, *Excavations at Kerma, Harvard African Studies* 5 (1923) 28.

30 S.T. KANG, *Sumerian Economic Texts from the Umma Archives* 2 (1973) 295-296.

31 Verbal information from Prof. Gian Giacomo Fissore.

given year, and become the sole existing record of all the transactions. They are then preserved in neat files.

In some cases the integration of clay sealings and writing never takes place, not even in much later times (as, for example, in the Meroitic palace). Actually, as we have already said, apart from the innate limits in the conservation of archives of clay sealings, which cannot last more than one administrative period, this system is perfect and does not require the employment of writing. What is really further necessary are calculations, and, as we now know, they were known from earlier times.

As for clay sealings on documents, we must say that it is most difficult, if not impossible, to distinguish the category to which they belonged. Some information may come from the place of discovery, or the associated material, or, above all, from the inscriptions that were sometimes written on them.

At any rate, the document, regardless of what topic it was about, did not hold any value if it was not authenticated and legalized by a seal. On the contrary, clay tablets in association with clay sealings on objects, could either be sealed or not sealed.

Conclusions

At this stage of our studies we believe that, with regard to the management of the distribution of goods, the various documents concerning transactions—such as 1) clay sealings placed on containers; 2) clay sealings associated with tablets; 3) documents made of various materials, sealed by a clay sealing—can change in physical appearance, without changing the practices of the management. However, research concerning ancient administration is far from being complete, due to a lack of precise data from the older excavations, and sometimes even from the more recent ones.

Piera FERIOLI and Enrica FIANDRA

Response by Bonnie MAGNESS-GARDINER

Sealing as a means of protection and as a means of administrative control has an exceedingly long history and the preceding statement of principles by Fiandra and Ferioli is a welcome addition to their body of work on the function of sealing in the Near East and the Aegean. Fiandra and Ferioli rightly point out that the use of sealing for security during the transportation of goods is much better documented in texts than in archaeological contexts. However, at some sites the context, design and inscription on the sealings indicate that contribution records were kept (at least temporarily) in this form. At Acemhöyük, for example, collections of bullae were found in contexts that suggest they were deliberately stored, and a number of impressions were made by Syrian and Assyrian royal seals indicating that the bullae represent incoming items, not distribution¹. As V. Aravantinos demonstrates elsewhere in this volume, the inscribed sealings from Thebes had a similar function.

The point is that sealings can function in almost every aspect of administration, and the problem is to determine how individual sealings from a particular site function within the local administrative system. Fiandra and Ferioli focus here on the use of seals in a system of distribution, proposing archaeological correlates for two types of storage, "conservation" or long-term storage, and "distribution" or short-term storage. They suggest that the means for distinguishing accountability from simple security is the repetition of a single seal or group of seals, while the means for distinguishing long-term from short-term storage is the frequency with which the same containers (doors, bags, boxes, etc.) were opened. I suggest that the repetitive use of a single seal (or group of seals) simply indicates the presence of local administrative control, not necessarily one that documents the distributive system. A hoard of sealings impressed with a single seal could have been collected for the purpose of recording income, not distribution, if, for example, the seal owner was the official who went to the countryside to select, seal and return with tax contributions. This is the case in Larsa² and at Mari³ in the Old Babylonian period. The frequency of opening and resealing the same container seems to me a better indication of the presence of accountability for distribution.

I agree with Fiandra and Ferioli that a reciprocal interest by receiver and donor in verifying their transaction is central to all systems that demand accountability in the circulation of goods. As the items are transferred from one person to another, so is the responsibility to account to a higher authority for those goods. The degree and nature of the accountability required seems to vary considerably from site to site, and period to period. In general, however, as society and administrative systems become more complex, the information required for accountability becomes more extensive. Container sealings in the Near East are rarely inscribed and thus severely limited in the amount and kind of information they convey.

1 For a full description see, N. OZGÜÇ, "Seal impressions from Acemhöyük", in E. PORADA (ed.), *Ancient Art in Seals* (1980) 61-70.

2 W.F. LEEMANS, *Legal and Economic Records from the Kingdom of Larsa* (1954).

3 B. MAGNESS-GARDINER, *Seals and Sealings in the Administration of the State*, Unpublished PhD dissertation, University of Arizona (1987) 220-225.

With a collection of broken sealings one would know only the identity of the individual making the withdrawal but not what or how much he withdrew. I do not think that the assumption of fixed amounts for deposit and withdrawal is justified, particularly as writing so quickly replaced sealings and bullae as a means of recording commodity transactions with a great deal of precision. Certainly in the more complex administrative systems developed in the third and the second millennium B.C., written documents, sealed and unsealed, take over the function of container sealings as a means of keeping track of an institution's property. And, while seals are used to authenticate administrative records and to prevent the alteration of contents, seals are not absolutely required to make the records complete: the use of seals on documentation of internal circulation of goods is far too sporadic to be a fundamental requirement of all institutional accounting systems. The use of sealing to acknowledge responsibility of the sealer is certainly widespread, but the precise nature of the responsibility acknowledged and the instances in which such an acknowledgement is required vary greatly from one system to another. With Fiandra and Ferioli's work we are much closer to establishing the range of possible functions for sealing within administrative systems, but much work still needs to be done to reconstruct the function of sealing in administrative systems present at individual sites.

Discussion

Fiandra :

Sealings are kept for a certain limited length of time only. We have never found an archives of groups of sealings which we could identify as transport sealings. We have covered so much geographical and chronological territory, even up into China and Korea, that we decided to study only the deposits of sealings in the distribution storerooms. We have tried to identify an archives in the collections of sealings, but we have not yet been successful. We therefore decided to focus on the function of the storerooms and develop terminology that would define different kinds of storerooms. In fact we could simply have used the terms "short-term" and "long-term" to define the general functional differences. In what we have called a "distribution storeroom", there would be foodstuffs which were consumed daily and then metals which could stay there a longer time. Our study is comprehensive and includes Egypt, because no one ever bothers to study the Egyptian material. We hope that this lays the foundation for more specialized studies, for example, of the relationship between the design on a seal and the use of the sealing made with it. We must now proceed to work together and exchange information because we are working on an enormous mosaic, which is composed of many small tesserae, some of which each of us holds.

Palaima :

I would like to address the problem of long-term storage systems raised by Fiandra and ask John Bennet to comment on storage outside the main centers in the Aegean countryside. We have good evidence in the Linear B tablets from Knossos for large amounts of grain stored at regional centers. Does Bennet think that in fact the Cretan system was similar to the Ur III system that Magness-Gardiner was describing, i.e., a system in which storage places are distributed in the countryside near workshops and near places of production? Thus rather than being brought into a central palace, agricultural produce would be distributed from local collection points. This should be factored into Weingarten's vision of Minoan regional administration. It would certainly explain the disappearance of the kouloures in the neo-palatial period.

Bennet :

In the Knossos system we did have decentralized storage. On the other hand, it is interesting that we have written recording of that storage activity by the central administration at Knossos.

Palaima :

I am uneasy about the distinction between accounting and accountability. My uneasiness may have to do with the surviving documentation. I think that there are idiosyncrasies in use and practice that can be observed in single texts and in wholesale systems site to site. Individuals can have different attitudes towards their jobs. One person will be less than conscientious, and another person will be exacting. In the University of Texas system, I can occasionally by-pass the lower stage of administrative employees in order get things done, for example obtaining your travel reimbursement checks. But even the higher administrators, whether they are willing to be flexible or liberal in their interpretations, still have to abide by the rules of the system. They can interpret the regulations more liberally, but they still have to make sure that the required standard documents are filled out and the standard forms are completed.

Magness-Gardiner :

Perhaps they will not make five copies of the documents to distribute among their scribes.

Palaima :

The point is that they *do*. Everything has to be done the way it is set up to be done, because the state might audit the accounts and the administrators in various offices (PASP, the Classics department, the dean's office, accounting, etc.) would have to produce all the pertinent documents. I have to maintain complete NEH files for several years after this conference. So one is not going to notice differences in the kinds of documentation from place to place unless the wholesale systems are different.

Magness-Gardiner :

I think that there are systemic differences and also idiosyncratic scribal differences and different uses of vocabulary.

Palaima :

Yes. This is clearly so with the Linear B material. Hand 41 at Pylos is a little less competent than Hand 43 in devising text layouts and recording information in a regular fashion. But the scribes themselves still have to produce the information that is required of them by their superiors. But I want to address a comment directly to Fiandra about clay documents. Is it true in other societies that if documents are legal, they are sealed, but otherwise the scribe who wrote them and signed them holds responsibility ? In the Linear B texts, we have no signatures even of the scribes. So this is one of the real problems in trying to determine Linear B scribal responsibility or accountability. The documents are totally different.

Fiandra :

On tablets sometimes there is a signature and a sealing. In those cases when a tablet has neither, frequently a clay sealing is found nearby.

Palaima :

This differs from Linear B practice where the sealings are in general not found in the central archives. This must be a distinctive feature of the Mycenaean system.

Fiandra :

The problem is that we do not know whether they might or might not have written on some other material. We must always take into account ephemeral materials for record-keeping.